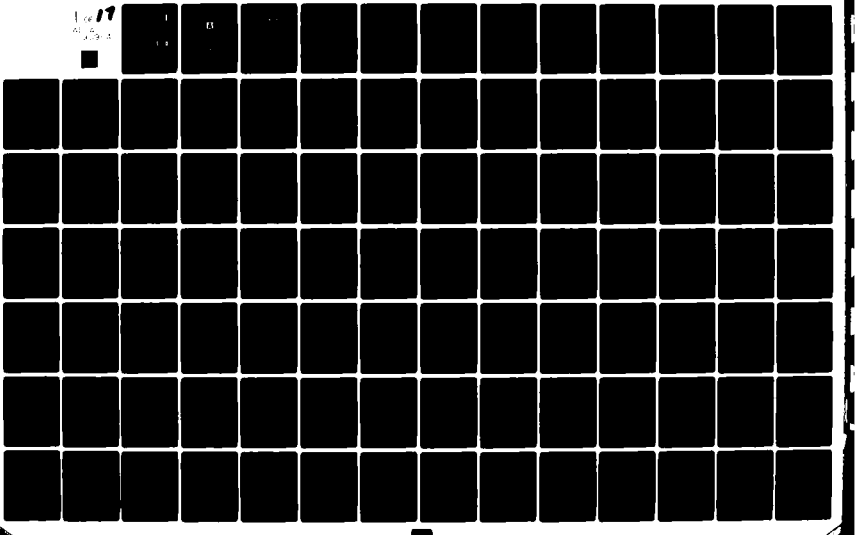
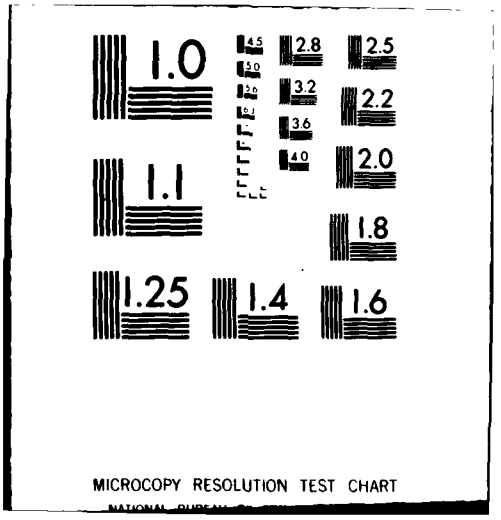
AD-A090 984 FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OH F/G 6/5
THE EXPERIENCE OF SOVIET MEDICINE IN THE GREAT PATRIOTIC WAR 19--ETC(U)
FEB 80 V N SHAMOV, B A SAMOTOKIN
UNCLASSIFIED FTD-ID(RS)T-1925-79 NL




1.0
1.1
1.25
1.4
1.6
1.8
2.0
2.2
2.5
2.8
3.2
3.6
4.0
4.5
5.0
5.6
MICROCOPY RESOLUTION TEST CHART

PHOTOGRAPH THIS SHEET

AD A090984

DTIC ACCESSION NUMBER

LEVEL

INVENTORY

FTD-ID(RS)T-1925-79

DOCUMENT IDENTIFICATION

DISTRIBUTION STATEMENT A
Approved for public release;
Distribution Unlimited

DISTRIBUTION STATEMENT

ACCESSION FOR	
NTIS	GRA&I
DTIC	TAB
UNANNOUNCED	
JUSTIFICATION	
BY	
DISTRIBUTION /	
AVAILABILITY CODES	
DIST	AVAIL AND/OR SPECIAL
A	

DISTRIBUTION STAMP

DTIC
ELECTE
S OCT 31 1980 D
D

DATE ACCESSIONED

DATE RECEIVED IN DTIC

PHOTOGRAPH THIS SHEET AND RETURN TO DTIC-DDA-2

DTIC FORM OCT 79 70A

DOCUMENT PROCESSING SHEET

AD A090984

FTD-ID(RS)T-1925-79

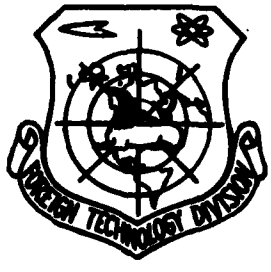
FOREIGN TECHNOLOGY DIVISION



THE EXPERIENCE OF SOVIET MEDICINE IN THE GREAT PATRIOTIC WAR 1941-1945

By

V. N. Shamov, B. A. Samotokin



Approved for public release;
distribution unlimited.

80 7 1 174

UNEDITED MACHINE TRANSLATION

FTD-ID(RS)T-1925-79 6 February 1980

MICROFICHE NR: FTD-80-C-000179

THE EXPERIENCE OF SOVIET MEDICINE IN THE GREAT PATRIOTIC WAR 1941-1945

By: V. N. Shamov, B. A. Samotokin

English pages: 1589

Source: Opyt Sovetskoy Meditsiny v Velikoy Otechestvennoy Voyne, 1941-1945, Vol. 4, Midgiz, Moscow, 1949, pp. 1-547 and 80 unnumbered pages.

Country of Origin: USSR
This document is a machine translation.
Requester: USAMIIA
Approved for public release; distribution unlimited.

THIS TRANSLATION IS A RENDITION OF THE ORIGINAL FOREIGN TEXT WITHOUT ANY ANALYTICAL OR EDITORIAL COMMENT. STATEMENTS OR THEORIES ADVOCATED OR IMPLIED ARE THOSE OF THE SOURCE AND DO NOT NECESSARILY REFLECT THE POSITION OR OPINION OF THE FOREIGN TECHNOLOGY DIVISION.

PREPARED BY:

TRANSLATION DIVISION
FOREIGN TECHNOLOGY DIVISION
WP-AFB, OHIO.

TABLE OF CONTENTS

U. S. Board on Geographic Names Transliteration System.....

Part One. Surgery..... 2

Section Two. Bullet Wounds and Damage to the Skull and Brain..... 3

General Part..... 5

Chapter I. Short Historical Survey of the Methods of the Treatment of Bullet Wounds to the Skull and Brain Prior to the Great Patriotic War..... 6

Chapter II. General Classification of Battle Damage to the Skull and Brain and Statistical Data..... 71

Chapter III. General Pathology of the Bullet Wounds of Skull and Brain and Their Complications..... 129

Chapter IV. General Questions of Clinic of Bullet Wounds and Damages of Skull and Brain..... 259

Chapter V. General Principles of the Treatment of Bullet Wounds of the Skull and Brain..... 429

Special Unit..... 494

Chapter I. Closed Injury of Skull..... 495

Chapter II. Bullet Wounds of the Soft Tissues of Skull.... 626

Chapter III. Bullet Nonpenetrating Wounds of the Bones of Skull..... 708

Chapter IV. Penetrating Bullet Wounds of Skull and Brain.. 910

U. S. BOARD ON GEOGRAPHIC NAMES TRANSLITERATION SYSTEM

Block	Italic	Transliteration	Block	Italic	Transliteration
А а	*А а*	A, a	Р р	*Р р*	R, r
Б б	*Б б*	B, b	С с	*С с*	S, s
В в	*В в*	V, v	Т т	*Т т*	T, t
Г г	*Г г*	G, g	У у	*У у*	U, u
Д д	*Д д*	D, d	Ф ф	*Ф ф*	F, f
Е е	*Е е*	Ye, ye; E, e*	Х х	*Х х*	Kh, kh
Ж ж	*Ж ж*	Zh, zh	Ц ц	*Ц ц*	Ts, ts
З з	*З з*	Z, z	Ч ч	*Ч ч*	Ch, ch
И и	*И и*	I, i	Ш ш	*Ш ш*	Sh, sh
Й й	*Й й*	Y, y	Щ щ	*Щ щ*	Shch, shch
К к	*К к*	K, k	Ъ ъ	*Ъ ъ*	"
Л л	*Л л*	L, l	Ы ы	*Ы ы*	Y, y
М м	*М м*	M, m	Ь ь	*Ь ь*	'
Н н	*Н н*	N, n	Э э	*Э э*	E, e
О о	*О о*	O, o	Ю ю	*Ю ю*	Yu, yu
П п	*П п*	P, p	Я я	*Я я*	Ya, ya

*ye initially, after vowels, and after ъ, ь; e elsewhere.
When written as ё in Russian, transliterate as yё or ё.

RUSSIAN AND ENGLISH TRIGONOMETRIC FUNCTIONS

Russian	English	Russian	English	Russian	English
sin	sin	sh	sinh	arc sh	$\sinh^{-1}$
cos	cos	ch	cosh	arc ch	$\cosh^{-1}$
tg	tan	th	tanh	arc th	$\tanh^{-1}$
ctg	cot	cth	coth	arc cth	$\coth^{-1}$
sec	sec	sch	sech	arc sch	sech^{-1}
cosec	csc	csch	csch	arc csch	csch^{-1}

Russian	English
rot	curl
lg	log

THE EXPERIENCE OF SOVIET MEDICINE IN THE GREAT PATRIOTIC WAR 1941-1945.

V. N. Shamov; B. A. Samotokin

Volume 4.

Page 2.

No typing.

Page 3.

Part One.

SURGERY.

Page 4.

Section Two

BULLET WOUNDS AND DAMAGE TO THE SKULL AND BRAIN.

Page 5. No typing

Pages 6-10.

Missing.

Pages 11-14.

No typing.

Page 15.

Missing.

Page 16.

GENERAL PART

Page 17.

Chapter I.

SHORT HISTORICAL SURVEY OF THE METHODS OF THE TREATMENT OF BULLET WOUNDS TO THE SKULL AND BRAIN PRIOR TO THE GREAT PATRIOTIC WAR.

Pre-antiseptic period.

The first attempts at the surgical treatment of the damages of skull and brain, as is known, they were done even in a deep antiquity. However, for a period of many centuries, during the pre-antiseptic period of surgery, these attempts almost always ended with failure. Even during XIX century the amount of surgical intervention in this region was insignificant, and the results of surgical treatment were contradictory and on the whole unsatisfactory.

During first Holstein [?] war (1849-1851) it was made only 2 trepanations and one resections of the bones of the skulls, after which survived only one wounded.

In Crimean campaign (1854-1856) English and French surgeons

produced 26 trepanations from which only 7 proved to be successful. General/common/total lethality with the bullet wounds of skull in the English and French troops/forces achieved in this war 73.8o/o. In Russian army, according to N. I. Pirogov's data, of 10 made it trepanations they happily ended only by 3. Of 10 other trepanations, in which N. I. Pirogov assisted, they happily ended also only by 3.

In Italian war (1859-1860) in 940 cases of the wounds of the skull of trepanation were produced 9 times, moreover only in 3 wounded they proved to be successful.

In civil war in America (1861-1865) after the second and the third year the trepanation of skull was made by 35 wounded, of them 28 died and 5 recovered; in 2 cases the result remained unknown. Of 7739 people, who obtained the bullet wounds only of the soft tissues of skull, died 2.1o/o; of 354 wounded, obtained breaks bones of skull with depression, recovered 123, died 231 (65.3o/o); of 486 wounded with the penetrating wounds of skull and brain recovered 68, died 418 (82.0o/o).

The same heavy was the fate of those wounded into skull and the same unsuccessful proved to be attempts at their surgical treatment during other wars of this period (Spanish war in Morocco 1859-1860, French expedition into Mexico 1862-1867, Prusso-Danish war 1864,

Austro-Prussian war 1860).

Comparing entire accumulated in these wars experience with its own observations, our great founder of military field surgery N. I. Pirogov (1865) makes the very valuable conclusion relative to the value of the surgical treatment of the bullet damages of skull in pre-antiseptic period. "Safety trepanation, indicates he, has as a goal to avoid the storage of pus under the pressing body. I acknowledge, I did not see from it good results, just as from the safety extraction of bullets and fragments from the wounds of skull.

Page 18.

But the reason for failures, obviously, was not process/operation itself, from the connected with the damage of skull contusion of the brain which, after being softened, killed patient" ... "The fact is that we, having before ourselves the traumatic damage of skull and without the least cerebral fits, nevertheless never will be able to know with correctness, is there no here contusion of brain, but if it here, then any new mechanical violence can more often damage, than bring benefit" ... "After surgical intervention the first days were full of hopes for a good result, but subsequent meningitides reduced to zero all efforts of the surgeons and their technical refinement".

Thus, N. I. Pirogov on the basis of his observations at that time already established that with the wounds of skull dangerously so much surgical intervention itself, as complication which it follow and which, in his opinicn, depend on the simultaneous "contusion of brain", i.e. on the special features/peculiarities of the reactions of brain to injury, at that time it is still small studied. The given by N. I. Pirogov histories of disease/sickness/illness/malady clearly show that the basic reascn of the death cf wounded after trepanation were the complications, caused by infection. In the pre-antiseptic period of surgery these complications could not still find correct explanation.

Introduction to antiseptic and asepsis tc surgery and onset of neuro-surgical speciality.

Rotary stage in the development of the surgery of the damages of skull and brain and in the development of entire surgery generally, should be considered the introduction of the antiseptic (1867) and aseptic (1892) method of the operation when was understood the role of the infection, disrupting the healing of wcunds, and were developed the methods cf prophylaxis and struggle with infectious complications. Thus, at the end of XIX century was begun the new era in surgery, which was marked by the rapid development of cavitary surgery. To this period it is necessary to relate the onset of new

speciality - the surgery of central nervcus systea.

In 1884 they successfully removed the neoplasm of brain the localization by which was accurately established/installed on the basis of the new neurologic methods of research. In 1888 is successfully produced the process/operation of separating the neoplasm of spinal cord. In the near ones in those year the new region of surgery began rapidly to be developed. In 1886 were published already 10 process/operations on brain.

Validity requires to note that to these first successes of the surgery of central nervous system, besides the antiseptic and aseptic method of operation, to a considerable extent contributed the accumulated by this time data of scientific research in the region of the physiology of brain, and also the invention of new diagnostic substances (ophthalmoscopy - 1851, cerebrospinal puncture - 1891, X-ray analysis - 1895), the successes in the development of clinical neuropathology and finally those remarkable improvements of the special technique of the process/operations on central nervous system, which proved to be so it was rich end of XIX century.

Further development of new speciality - neurosurgery - occurred in the first decades of XX century extremely rapidly.

In parallel with the dissemination of antisepsis and asepsis and the development of neurosurgical speciality which was noted by achievements in the region of the surgical treatment of the neoplasms of central nervous system, and, it is doubtless, under the great effect of these successes began to change surgeons' views on the treatment of bullet wounds and damages of skull and brain.

Page 19.

As is known, surgeons first very skeptically were related to Lister's antiseptic method; even in the surgery of peacetime this method was introduced very slowly. In connection with this military field surgeons and after 1867 even during known period as before very with restraint estimated primary trepanation with the bullet wounds of skull. The majorities of similar wounds as before treated conservatively, although began to apply the washing of wounds the skulls with different antiseptic solutions/openings and to lay bandages with sublimate, alcohol, peroxide of hydrogen, etc.

To surgical interventions with the bullet wounds of skull the surgeons for a long time resorted only in the unit cases, moreover these interventions were limited to the distance/separation of the superficially arranged/located bullets and bone fragments.

So, during Franco-Prussian war 1870-1871 were recorded 8132 bullet wounds of the skull; after wound perished 3668 people (45.1o/o). The lethality of these wounded in infirmaries achieved in German army, according to O. M. Khol'bek's data, 21.7o/o, without considering the foremost stages of the evacuation where perished bulk of wounded. Surgical treatment during this war underwent only the very small unit of those wounded the skull.

During the Russo-Turkish war 1877-1878, i.e. 11 years after introduction to the surgery of antiseptic method, the treatment of the bullet wounds of skull was still limited in essence to the application only of antiseptic dressings. To the operational processing of the wounds of skull the surgeons resorted extremely rarely, and, according to N. I. Pirogov's certificate, after this processing they remained in the living ones only of unit. "About trepanation, indicates he, to me they reported only that the fact that it was made 4 times and all operated they died".

Rotary stage in the treatment of the bullet wounds of skull it is necessary to consider the eightieth years of the past century when, being based on the successes of antiseptic method, the series/row of scientists both Soviet, and foreign, was expressed for the need of changing the principles of the surgical processing of the wounds of skull.

Among Russian surgecns the decisive suppcrter of active surgical measures was V. I. Kuz'min. Being based on personal observations, it in 1883 expressed remarkable for those times thought, what with the bullet wounds of skull "neither immense value of the driven out bone nor cut of the pieces of solid and soft cerebral shells and even brain nor hemorrhage frcm a. meningea media and sinuses nor probing punctures into the substance of brain nor age of patient by his nor weak forces - can hold dcwn/retain the hand of surgeon, who is decided bring in knife to the substance of brain...Trepanation during aseptic treatment presents safe process/operation".

Just as decisively stood up to the side of the active surgical processing of the wounds of skull and another Russian surgeon, G. F. Zeidler (1889): "In former times even damage/defeat of the soft units of the skull, especially with the exposure of his bones, they occupied some exceptional position/situation in the series/row of wounds they were generally and considered chiefly risky. Now we look on them as to other wounds, and under the protection of the antiseptic bandage of wound these flow/occur/last so happily, as wounds in other regions" ... "Are still more than in the therapy of the wounds of soft tissues, this revolution manifests itself in the treatment of the damages of the bones of skull".

At the end of XIX century favorable results of operation on skull with its wounds were described by an already whole series of the Russian surgeons (A. A. Troyanov, 1894; I. A. Soloveychik, 1895; V. R. Labuts, 1895; V. A. Krasintsev, 1895; R. V. Butts, 1896; V. V. Pravdolyubov, 1897, etc.).

Page 20.

It is necessary to note that the fundamental installations of the progressive-minded surgeons indicated were reflected, also, in military field surgeons' tactics during the wars of this period.

During Japanese-Chinese war (1894-1895) the bullet wounds of skull were processed already more actively.

In Greco-Turkish war (1897) the surgeons, who worked in the detachment of Russian red cross, produced several trepanations apropos of the bullet wounds of skull within early periods after wounds and were obtained the encouraging results.

During American-Spanish war (1898-1901) American surgeons in a number of cases resorted to the surgical processing of the wounds of

skull.

During Anglo-Boer war (1899-1902) some surgeons used extensively the active processing of the wounds of skull and brain within the earliest possible periods.

Thus, the development of antisepsis and asepsis allowed surgeons more frequently to resort to active interventions with the bullet wounds of skull. Despite the fact that the surgeons did not have available even at that time the considerable number of observations, nevertheless majority of them arrived at conclusion about the need of the primary and on the possibility early trepanation of skull with its bullet wounds. Even those surgeons who limited readings to primary trepanation, nevertheless considered it its necessary with suspicion to the presence of infection.

It is necessary to indicate that the development of cerebral surgery at the end of XIX century occurred in parallel with the study of symptomatology and pathogenesis of the bullet wounds of skull.

Were studied the data about comon brain and local symptoms from the side of brain during its wounds: violations of consciousness and movements in connection with character/nature and localization of wound, to the frequency of the appearance of headaches, vertigoes,

vomitings, the violations of respiration, cardiovascular system, ingestion, sensitive and reflector violations, the violations of urination, cerebellar fallouts, disorders of speech, view, etc.

In contrast the initial representations of the German surgeons about the sterility of the bullet wounds of skull, Russian surgeon P. S. Kochanovskiy during the years 1894-1895 for the first time indicated[1] that any wound of the fibrous unit of the head is infected and it must be thoroughly cleaned with the subsequent application of moist dressing.

FOOTNOTE [1]. "To the casuistry of the bullet wounds of head", Medical addition to marine collector/collection, SPb, 1894-1895. ENDFOOTNOTE.

Somewhat later to this view were connected other Russian surgeons - O. M. Khol'bek, V. K. Veber and P. I. Tikhov. In this case O. M. Khol'bek and P. I. Tikhov insisted on preventive/warning early trepanning of the bullet breaks of skull as most rational therapeutic measure with similar wounds.

Period of contemporary aseptic surgery.

Beginning of XX century is characterized by universal acclaim and dissemination of the principles of contemporary asepsis and

antiseptic in all regions of surgery. The principles indicated became the basis of the organization of aid by wounded in all subsequent wars, beginning with Russo-Japanese. Therefore Russo-Japanese war is of special interest for those studying the history of military field surgery, the during this war is assembled considerably more documentary materials, than during all preceding/previous wars.

Page 21.

In Russo-Japanese war (1904-1905) some Russian surgeons entered, already having the personal experiment/experience of the treatment of the military damages of skull, and they were the supporters of active surgical tactics with the bullet wounds of skull and brain (O. M. Khol'bek et al.). But the unit of the Russian surgeons, who did not have personal experiment/experience in the treatment of the bullet wounds of skull, still shared German surgeons' conservative views.

During Russo-Japanese war overwhelming majority (63.6o/o) of the wounds of skull, according to O. M. Khol'bek's data, was plotted/applied by bullets. Only 12.2o/o fell on wound of skull by shrapnel, 6.7o/o - by fragments garnet and 17.5o/o - by other weaponry. To 70.0o/o of those wounded the head in this war it died on the field of battle and only about 30.0o/o remained in living ones and entered into therapeutic installations (V. I. Razumovskiy). Of

the wounded of this latter/last category the majority composed wounded, who obtained chiefly the tangential wounds of skull by tunicary bullets or fragments of the artillery shells; considerably thinner/less frequent among them struck wounded with the through faults of skull.

According to the observations of many surgeons, the bullet wounds of skull in rare cases only flowed/occurred/lasted aseptically. Usually they were complicated by infection. In connection with this the majority of Russian military field surgeons considered that any bullet wound of skull, as a rule, is primary bacterially contaminated. Bacterial contamination will be brought in in this case with bullet, and as its source serve particles of clothing, mud/contamination on the body surface, etc. This primary bacterial contamination, if it insignificant, sometimes itself exhibits in no way, but it occurs in all cases and plays not smaller role, than the secondary contamination, which strikes into wound subsequently. During correct treatment and with departure/attendance the organism in the considerable percentage of the cases can manage the primary bacterial contamination, carried by shell.

The treatment of those wounded the skull during Russo-Japanese war was carried out through the following system. On foremost dressing stations surgical aid was limited to hair-cutting and shave

of hair in the periphery of wound, to cessation of hemorrhage and to application of dry hygroscopic dressing. R. R. Vreden and some other surgeons preferred to apply bandage from antiseptic material. Necessary operational intervention on skull was conducted either on main dressing station (division infirmary), or in the nearest field hospitals.

During the treatment of wounded with the bullet damages of skull all chief/leading Russian surgeons (R. R. Vreden, O. M. Khol'bek, I. R. Pavlovsky, P. I. D'yakonov, V. G. Tsege-Manteyfel', M. I. Glagolev et al.) adhered to active tactics, considering it necessary for warning/preventing the subsequent complications to operate even those wounded, whose wounds were in relatively good condition. The experiment/experience of trepanation of skull showed that also with insignificant external wound were possible the extensive damages of brain (O. M. Khol'bek, V. N. Rozanov, Ya. B. Zeldovich et al.).

The advisability of primary trepanation with the bullet wounds of skull is especially demonstrative confirmed by the statistical material, assembled by V. G. Tsege-Manteyfel'. According to his data, in the near rear, where entered wounded average/mean severities, with expectant tactics it perished 49.9o/o of those wounded the skull, whereas during active surgical processing - 14.2o/o.

Page 22.

It should be noted that the experiment/experience, acquired during war, gradually made with the supporters of active surgical tactics with the wounds of the skull not only of those leading, but also private military-field surgeons' mass. So, with discussion of the question about the treatment of the bullet wounds of skull at conference of one of the medical societies, formed during war, the common opinion came to the fact that each case of this wound requires surgical intervention for cleaning/purification of wound, distance/separation of fragments and creation of favorable conditions for healing.

Primary processing with the bullet wounds of skull was reduced in essence to the following: dry the shaven skins, surrounding wound, anesthesia/narcosis, carving of wound, distance/separation of bone fragments, wide opening of the edges of bone aperture, distance/separation from the depth of the wound of the destroyed particles of the brain, blood clots, bone fragments and on the possibility of the wounding shell. After cleaning/purification the wounds and the cessation of hemorrhage the wound loosely tamponing

and subsequently conducted opened. If process/operation was done within early periods, then O. M. Khol'bek after processing sewed solid cerebral shell. If solid cerebral shell proved to be whole, but it did not fluctuate and it was changed in color, it should have been revealed. By the wound of arteries was conducted their dressing, with the wounds of venous sinuses were limited by tamponade.

The periods of processing the bullet wounds of skull, in all surgeons' general/common/total opinion during Russo-Japanese war, they must be earliest possible. However, R. R. Vreden, O. M. Khol'bek, A. G. Devyatkovskiy already then introduced into this requirement one extremely important limitation - early process/operation must be applied only when to wounded after process/operation is provided further treatment on the spot. Of 17 wounded, evacuated soon after trepanation and entered to A. G. Devyatkovskiy after the prolonged transportation, died 13, while of 34 wounded in the skull, in which there were already the explicit signs/criteria of the development of infectious complications and which after trepanation long were treated on the spot, perished only 5 and recovered 29.

In connection with the periods of process/operations with the wounds of skull during Russo-Japanese war will arise a question also about the place of production in the primary surgical processing. V.

G. Tsege-Manteyfel' considered that operated wounded the skull should be, where the process/operation can be produced purely: "The place for process/operation must be determined each time the course of military events. In the majority of the cases this there will be field infirmary or main dressing station (division infirmary). On foremost dressing station there cannot be the speeches". R. R. Vreden, O. M. Khol'bek, V. I. Razumovskiy considered that surgical intervention is fully shown only on main dressing station (division infirmary) or in the nearest field hospitals.

In actuality during Russo-Japanese war surgical aid by that wounded the skull proved to be only in some infirmaries, besides is extremely insufficiently manned by specialists. For rendering aid by that wounded the skull were created three special hospitals in Harbin. However, these hospitals proved to be forced to be occupied more by the treatment of the wounds of stomach, breast, joints and breaks of bones, than the wounds of skull and brain. Entire/all medical service of Russian army had only 6 X-ray apparatuses from which 2 were located in special hospitals.

Page 23.

During Russo-Japanese war in the therapeutic installations of the Far East were produced 299 trepanations of skull, moreover the

lethality of those operated in the stage where was conducted trepanation, was equal to 14.0o/o. O. M. Khol'bek in his work in more detail analyzes 233 prccess/operations, produced in infirmaries, and 15 process/operations, made in more foremost stages. Of 248 that operated, according to O. M. Khol'bek's data, died 27.8o/o.

The significant part of the materials about the bullet wounds of skull during Russo-Japanese war is elaborated in O. M. Khol'bek's large monograph[1].

FOOTNOTE [1]. "About the military field wounds cf skull (observation from the experiment/experience of Russo-Japanese war)", Yur'yev, 1911. ENDFOOTNOTE.

Monograph this was not only solid work on this question within entire the preceding/previous time, but also served as leadership/manual for surgeons even during the subsequent years.

Thus, during Russo-Japanese war among Russian surgeons was established the uniform point of view to the need for the active surgical perfecting of the bullet wounds of skull. Among Japanese surgeons dominated the more conservative views, which can be explained by the effect of German school.

Indicationsof process/operation Japanese surgeons considered mainly vomiting, delay of pulse and increase in the temperature of body. Perfecting wound they limited only by the distance/separation of fragments in the region of intake bullet aperture.

After the termination of Russo-Japanese war V. G. Tsege-Manteyfel' appeared at German surgeons' 35th congress (1906) with report about the treatment of the bullet wounds of skull. The advanced by him on the basis of Russian surgeons' experience positions/situations about the need for the early surgical perfecting of the wounds of skull met serious objections on the part of Bergmann, who counted early trepanation under the military conditions for that contrasted even with tangential wounds, especially if for wounded is necessary transportation.

As showed the experiment/experience of the treatment of the bullet wounds of skull during Russo-Japanese war, Russian surgeons' majority held to the active methods of treatment, i.e., was applied the surgical perfecting of the wounds of skull, since it considered that these methods give the best results. Russian surgeons, as a rule, did not share those dominated in the German surgery of those of very restricted shown to surgical intervention with the wounds of skull, what continued to adhere to the large part of the Japanese surgeons.

Table 1. The various forms of bullet wounds of skull (O. M. Khol'bek).

(1) Характер ранений	(2) Всего	(3) Пулевые	(4) Осколочные	(5) Умерло
(6) Тангенциальные	155	116	49	41
(7) Сегментарные	39	37	2	14
(8) Диаметральные	32	32	—	6
(9) Слепые	61	30	31	14
(10) Основание черепа	17	17	—	3
(11) Орбито-темпоральные	26	22	4	4
(12) Всего	340	254	86	82

Key: (1). Character/nature of wounds. (2). In all. (3). Bullet. (4). Fragmentation. (5). [illegible]ied. (6). Tangential. (7). Segmental. (8). Diametric. (9). Blind. (10). Basis of skull. (11). orbit[illegible]temporal

Page 24.

Russian surgeons' this active tactics was substantiated by the established/installed by them pcsitions/situations, that all bullet wounds of skull are primary infected they threaten with the development of early or late heavy complications, but the external form/species of wound is not the indicator of the value of destruction in the depth of wound canal. The accumulated during war experience forced Russian surgeons to be voiced for early periods of perfecting the wounds of skull. However, they introduced into this requirement the very substantial limitation: early process/operation

must be conducted only when wounded after it is provided further treatment at the same place, since these wounded greatly badly/poorly withstand evacuation.

In connection with the requirements indicated by the most adequate/approaching place for operational intervention on skull were considered either main dressing station or nearest field hospitals, but in no way not foremost dressing station.

Acquired by Russian surgeons during this war considerable experiment/experience forced them to arrive at the conclusion/derivation that with the bullet wounds of skull the trepanation is not itself by so serious a process/operation, as they thought earlier.

The closest results of the trepanations of skull during Russo-Japanese war in Russian surgeons proved to be considerably better than in all preceding/previous wars. Lethality after trepanations, according to O. M. Khol'bek, composed 27.8o/o, whereas in Anglo-Boer war (1899-1902) in Steevenson it was equal to 33.6o/o.

Deserves attention also the fact that after the termination of Russo-Japanese war were for the first time evaluated not only nearest, but also distant result the trepanations of skull.

It turned out that further fate of those wounded into skull after trepanation in the sense of the restoration/reduction of their health is at least doubtful.

In the subsequent after Russo-Japanese war three Balkan wars which conducted Turkey against Bulgaria, Serbia, Montenegro and Greece (with 9/X 1912 at 3/XII 1912 and with 30/I 1913 at 14/V 1913) and Bulgaria against Greece, Serbia and Rumania (from June through August 1913), the organization of aid by that wounded into skull was located on comparatively low level. The peculiar conditions of mountainous country, the poor medical condition of the troops/forces, especially Turkish, the mass dissemination of dysentery, typhus and cholera finally late of wounded into infirmaries were the reason for a sharp descent in the quality of the qualified aid by wounded. Despite the fact that during these wars the losses were rather large (Bulgaria, Serbia, Greece and Montenegro they lost 108 thousand people) and among victims in combat there was a considerable number of wounded in the skull, cases of the surgical treatment of the bullet damages of skull it is noted very a little. In this case due to late process/operations and considerable infection of wounds surgical interventions were escorted/tracked by high detail. During these wars among military field surgeons continued the even previous

disagreements: some maintained that the bullet wounds of the skull is primary infected, others this rejected; the first insisted on the need for treating wounds of the skull, the second proposed to be limited to expectant tactics. However, under the effect of the experience of Russo-Japanese war, presented in monograph O. M. Khol'bek, in the end of the Balkan wars was outlined the specific march/passage to more active method with rendering aid by that wounded the skull. In this case, in order to ensure the entrance of wounded into hospitals within earlier periods, were done attempts at the approximation/approach of hospitals to foremost line.

First world war (1914-1918) was unprecedented in the number of participating in it troops/forces, on these troops/forces' saturation weapons and in a large quantity of those killed and wounded.

Page 25.

Relative to the frequency of wounds of head in the first world war are the following data: in German army to the total number of wounded of damage the heads composed 14.4o/o, in American - 13.3o/o, in English - 16.6o/o, in French - 15.5o/o.

The wounds only of cerebral skull according to their different forms/species were distributed as follows: in the German army of the

wound of the soft tissues of the skull comprised 6.3o/o, damage of the bones of skull - 2.0o/o, the damages of brain - 0.7o/o; in American army - the wounds of the soft tissue of skull - 1.3o/o, the wounds of bones -1.2o/o, wound of brain - 0.7o/o; in French army - the wounds of the bones of skull - 6.5o/o, the wounds of brain - 0.2o/o.

The wounds of skull during the first world war were considerably more heavily than in the preceding/previcus wars. This is explained by a large quantity of wounds, plotted/applied by the fragments of artillery shells.

Surgeons' tactics with respect to the bullet wounds of skull during the first world war was characterized by considerable diversity in different belligerent armies. In Germany before the war were with exceptional haste released into light/world by semi-official publication Russian doctor O. M. Khol'bek's works. Indicated in this work principles of the treatment of the bullet wounds of skull lay into basis of German surgeons' tactics during the first years of war.

As the basis of the classification of the wounds of skull in the majority of the belligerent armies was placed the classification of O. M. Khol'bek, who divided the wounds of skull into blind,

tangents, segmental ones and diametric ones. To this classification of Payr it added subsequently specific for the wounds of skull section - ricocheting wcunds.

N. N. Petrov introduced very important fundamental correction into the available subunit of the wounds of skull to the wounds of soft tissues and wound with the damage of bones, after proposing to distinguish in latter/last group of wound those penetrating and nonpenetrating ones. Criterion for a latter/last subunit he proposed to consider the presence of integrity or damage of solid cerebral shell as basic barrier against penetration of infection into submembrane spaces and into the substance of brain. An extremely important, lively discussed before question, is the bullet wound of the skull of that primary infected or infection it strikes into it only within later pericds - for a second time, it lost during the first world war its sharpness. Universal acclaim obtained the position/situation, advanced by Russian surgecns as early as 1894, that any bullet wound of skull is primary bacterially contaminated. In connection with this during the first world war found the acknowledgement and the requirement of the earliest possible surgical perfecting of the bullet wounds of skull (A. V. Britnev, N. N. Burdenko, V. A. Oppel', M. S. Astrov, I. A. Golyanitskiy, V. N. Shamov, S. I. Spasokukctskiy).

A. V. Britnev, after producing during the years 1914-1916 205 trepanations of skull, recognized the early process/operation of most favorable, moreover 46.0c/o of those wounded the skull it operated a first day after wound and 26.6o/o - into the second day for N. N. Petrov, I. A. Golyanitskiy, to M. S. Astrov in the large unit of those wounded the skull were possible to make a primary perfecting into the first two days after wound, and these periods they consider most favorable.

One should especially emphasize that, together with the wide acknowledgement of the need for the early primary perfecting of the bullet wounds of the skull, among the surgeons of all countries during the first world war was outlined the tendency toward the clearer refinement of readings for a process/operation depending on the means of the wound of skull.

Page 26.

If in a question about the primary perfecting of the fresh wounds of skull during this war surgeons adhered to different points of view, then with respect to wounded, who entered within later periods after wound, surgeons' tactics was also less specific. After the entrance of wounded to the 2-5th day after wound surgeons' majority considered it advisable to reject surgical intervention and

to resort to it only in the case of the appearance of complications.

Perfecting technique wound. Perfecting the wounds of skull during the first world war was conducted in accordance with requirements of asepsis and antiseptics. Surgeons' majority put into practice the complete shave of hair on head and perfecting skin by gasoline and iodine.

In the first period of war all process/operations on skull were conducted under overall anesthesia/narcosis. Russian surgeons proposed to perform perfecting the wounds of skull and brain under local anesthesia, after indicating that it does not increase intracranial pressure and he is easily transferred by victims. Local anesthesia rapidly conquered universal acclaim, it began to use extensively during perfecting of wounds skulls. In the end of the war only a few surgeons continued to make process/operation cn skull under narcosis.

Section/cut during perfecting of the wounds of skull was applied in two basic versions. Surgeons' small group, being based on the experiment/experience of the neuro-surgical practice of peacetime, attempted to apply also with the wounds of skull flap sections/cuts. But results proved to be poor that also it made it necessary subsequently to refuse from such sections/cuts. The overwhelming majority of the surgeons resectioned wound lengthwise or in the form

of triangle. With the wound of soft tissues and the nonpenetrating wounds of skull it was considered necessary to inspect the deepest units of the wound. During the small depressions of bone surgeons' majority abstained from trepanation, considering it as that shown only during the build-up/growth of compression syndrome or with other complications.

During perfecting of the penetrating wounds of skull the overwhelming majority of the surgeons produced the expansion of defect in bone with cutting pliers to the boundaries of undamaged/uninjured solid cerebral shell (A. V. Britnev, N. N. Petrov, M. S. Astrov, N. N. Burdenko). English surgeons attempted in a number of cases after trepanation to occlude defect with osteoplastic graft/flap. This method they used in two rear hospitals in 1917. The most active defender of osteoplastic method with primary trepanations apropos of the bullet wounds of skull was French neurosurgeon Martel. American neurosurgeon Cushing, after obtaining high lethality with osteoplastic method, since 1917 passed to the method of expanding the bone aperture through the wound; in this case after the carving of the damaged soft tissues and the exposures of bone he recommended the boring of in the periphery of the bone defect of 4-5 apertures and, connecting them between themselves, remove entire damaged sector of bone entirely. However, by most rational method under military field conditions in the period of the first

world war was acknowledged the resection method of trepanning of the defect of skull, which was being propagandized by Russian surgeons.

In a question about readings to the autopsy of undamaged/uninjured solid cerebral shell also there was not the unity of views. Surgeons' majority avoided the autopsy of undamaged/uninjured solid cerebral shell if to this was not special readings (N. N. Petrov, I. P. Dmitriev).

Page 27.

Payr recommended to first make the diagnostic puncture of solid cerebral shell and only in the case of obtaining of cerebral detrite or presence of hematoma to open shell under aseptic conditions.

In contrast this tactics (especially care of solid cerebral shell) many surgeons during the first world war placed wider readings to the autopsy of this shell. They revealed it with the more expressed focus or general/common/total symptoms from the side of brain even when solid cerebral shell fluctuated and its color remained unchanged. Unfortunately, the results of this tactics were not summed up. However, the large number of protrusions of brain with the nonpenetrating wounds of the skulls, about which mention N. N. Petrov, I. P. Dmitriev, N. I. Ladygin et al., gives grounds to think

about the unfavorable consequences of too expanded indications to the autopsy of undamaged/uninjured solid cerebral shell.

With hemorrhages from the vessels of solid cerebral shell, venous sinuses and vessels of brain was applied their facing and dressing or tamponade. It should be pointed out that the Russian surgeons since 1916 already focused attention on the need of retaining/preserving/maintaining the cross-country ability of venous sinus during its damages near the wall, proposing to occlude the wound of sinus either with plate from the in the neighborhood fascia (N. N. Petrov), or with small piece of muscle (V. N. Shamov, Ya. I. Mints). According to the observations of Ya. I. Mints, the small piece of muscle is take/adapted well even in purulent wound and it does not cause the subsequent thrombosis of sinus.

During perfecting of the wound strictly of brain surgeons' majority drove out all nonvital tissues with the aid of gauze balls or towels (A. V. Britnev, M. S. Astrov, N. N. Petrov, I. A. Golyanitskiy et al.). English and American surgeons washed wound of the cylinder, connected with the catheter which was introduced into wound canal.

Bone and metallic fragments some surgeons drove out by finger/pin, others are considered it necessary to make this only with

instruments. I. K. Spizharnyy not at all recommended the searching for of the fragments, arranged/located in the depth of the infected wound. N. N. Petrov allowed/assumed the cautious examination/inspection of cerebral wound for separating the foreign bodies, but at the depth is not more than 2 cm. A. P. Krymov during the distance/separation of foreign bodies from wound canal attempted to resort to electrical illuminator.

In a question about the post-operation treatment of wounded, that transferred surgical perfecting apropos of the penetrating wounds the skulls, the opinion of surgeons were divided. Majority adhered to the tested in previous wars open conduct of such, knowingly infected, wounds. However, at the same time, already at the very beginning of the first world war was outlined new direction. The initiator of this direction was Russian surgeon A. V. Britnev, who during October 1914 after the primary perfecting of the wounds of skull began to lay anechoic suture and were obtained in this case very good results. Anechoic suture preceded the radical perfecting of cerebral wound into possibly early periods. Gradually this tactics began to acquire more and more than supporters. To 1916 A. V. Britnev had available already material in 205 similar process/operations, moreover into 72.6o/o of cases these process/operations were produced into the first and second day after wound.

Besides A. V. Britnev, blind suture with the wounds of skull applied N. N. Petrov, V. K. Shamarin, G. A. Nevdubskiy, S. I. Spasokukotskiy, N. L. Seletskiy, M. P. Sokolovsky, I. A. Golyanitskiy, D. A. Rodionov. In this case they considered possible to lay anechoic suture after radical perfecting into early periods after wound, under the condition for careful observation of further course of wound.

Page 28.

In the doubtful in the sense of infection cases many surgeons during the imposition of anechoic suture left between sutures for 1-2 days emissaries The latter were placed only under skin, they sometimes achieved bone, but they should not have been contacted with cerebral tissue (I. A. Golyanitskiy).

Some surgeons did not limit themselves to the imposition of anechoic sutures only on soft integuments, but they attempted to sew even solid cerebral shell and to occlude bone defect. I. A. Golyanitskiy, M. I. Ladygin, I. K. Spizharnyy et al. in a number of cases with success occluded defect in solid cerebral shell with plates from wide fascia of thigh or galea apcneurotica. A. V. Britnev, N. N. Petrov, M. I. Ladygin, V. K. Shamarin for filling of defect in skull used bone fragments and obtained in a number of cases

good results.

However, at the same time, against entrainment of suturing of the wounds of skull under military field conditions during the first world war were also advanced authoritative objections.

So, one of the most prominent Russian military field surgeons, V. G. Tsege-Mantoyfel', cojecting to S. I. Spaskukotskiy to flap sections/cuts, he said: "Patch method is technically simple and good, but I doubt, can he avoid the diverticulum cf brain and does annihilate this method secondary infectien. I would want to focus attention on one fact: good surgecns can risk, by them it is permitted to search for new ways, but inexperienced try to imitate and give gross errors. In military field surgery are necessary the rules/handspikes and the methods of the treatments which do not impose considerable requirements on the mass cf the doctors in attendance".

N. N. Burdenko alsc very with restraint was related to anechoic suturing of the wounds of skull under military field conditions.

The overwhelming majority of the surgeons during the first world war continued to adhere to the open method of conducting the bullet wounds of skull. In this case some surgecns ccvered the processed

wound of brain by sterile gauze, others tamped its, after supplying tampon under the edge of solid cerebral shell and covering/coating from above with moist bandage, the third to avoid fallouts of brain resorted to the pressing tampons, the fourth inserted gauze emissary-turunda at entire depth of wound canal.

The negative property of such turundas and tampons consisted in the fact that, being impregnated with wound detrite, they rapidly were converted into peculiar plug, for which was saved/accumulated sometimes under large pressure purulent contents. In connection with this many surgeons considered unsuitable the use/application of turundas and tampons for the draining of the wounds of brain and they used different drainages.

The diversity of the applied during the first world war methods of the treatment of the bullet wounds of skull indicated that many relating here questions yet were not solved and between different specialists there is no understanding. About this testified assembled during December 1916. XIV congress/descent of russian surgeons. At congress/descent individual surgeons reported their remarkable achievements and new methods of the treatment of bullet wounds of the skull (A. V. Britnev, N. N. Petrov, V. N. Shamov, N. I. Ladygin, V. K. Shamarin et al.); however, entire experiment/experience of entire experiment/experience of war congress/descent did not sum up and

instructional instructions he did not give. Did not utilize this experience in the continuing war and the leadership/manual of the military medical service of tsarist army.

Page 29.

Insufficiently seriously evaluated the new propositions, expressed at congress/descent, and individual surgeons. It suffices to say that on a very important question - about suturing of the bullet wounds of skull blindly - the presided at congress/descent venerable military field surgeon N. A. Vel'yaminov expressed himself as follows: "From one side, they assert that any bullet wound is primary infected, on the other hand, they advise with sutures to tightly occlude operating wound (skulls) in the infected tissues. For which? Forgive - I search for logic, but I do not find it".

In the army medical service of tsarist army it was not the single system of leadership/manual therapeutic aid by wounded. Hence understandably extreme diversity of views, and also practical procedures, which existed among the military surgeons of tsarist army.

Not better was the matter, also, in western allies, for which only toward the end of the war at the called in France allied

surgical conference (15/III 1917) it was possible to agree about some the more or less universally recognized principles of the treatment of the bullet wounds of skull.

Most posterior complications of the wounds of skull and brain. In contrast are comparatively favorable to direct results of operation apropos of wounds the skulls, which gave the front line surgeons, observations of these wounded in rear hospitals showed that subsequently in those operated is developed the series/row of severe complications - meningitides, encephalitides, abscesses of brain. Such complications were noted very frequently, and from them perished a large quantity of wounded.

Ya. M. Bruskin in one of the rear hospitals noted the development of abscesses in 70.0o/o of those wounded the head brain. V. N. Shamov communicates that among 32 those wounded to skull, that had infectious complications, in 22 developed the abscesses of brain, also, in 10 - heavy encephalitides. V. K. Shamarin, who was using the materials of the Petersburg Obukhov hospital, indicates that from late infectious complications it perished to 80.0o/o of those wounded the brain.

Many foreign surgeons also noted that with the wounds of brain heavy following complications are very frequently and lethality with

these complications is very great.

Attempts at the surgical treatment of the wounds of skull during the late manifestations of infection indicated during the first world war proved to be unsuccessful.

Any active surgical interventions with purpose of radical distance/separation from the encephalitic focus of the basic sources of infection (bone fragments and metal foreign bodies) led, as a rule, to new outbreaks of infection, moreover limber affair ended with the dissemination of infection to the ventricles of brain. Autopsy and draining of cerebral abscesses in the presence of foreign bodies in the majority of the cases also gave little-encouraging results, in spite of the use/application of new methods of draining.

Some general/common/total surgeons, little familiar with the special features/peculiarities of patholcgical processes in brain, attempted with the frequently encountered infectious complication - the fallout of the individual sections of brain - to apply radical methods in the form of cut-off. Others on the contrary, attempted to avoid the possibility of fallout by the application of gypsum dressings. Logically, these methods were condemned by the more experienced surgeons who insisted on especially care of the fallen sectors of cerebral tissue, recommending to cover/coat with their

bandages with vaseline.

Page 30.

To protect exposed sectors of brain from injury in this zone were for the first time introduced special wadded-gauze bandages in the form of "crackers".

During the treatment of meningitides sufficiently widely practiced repeated lumbar punctures. N. N. Petrov supplemented these punctures by the washing of sub-arachnoidal space with salt solution with the introduction 5-10 cm^3 of the solution/opening of sublimate 1:10000.

During the first world war was in more detail studied the pathogenesis of the series/row of the infectious complications of the bullet wounds of brain. N. N. Petrov rationally subdivided all cases of the fallout of brain into three basic groups: 1) the outflow of brain, 2) the fallout of brain, connected directly with injury and hydrodynamic activity of the wounding shell, and 3) protrusion of brain, which is the consequence of inflammatory process. However, in this case surgeons' majority the pathogenesis of protrusions of brain came into connection/communication with the developing encephalitis, some indicated their connection/communication with abscesses.

Studying the develcping with wounds skulls infectious complications, V. N. Shamov (1916) indicated that primary meningitis after wound usually is not, since sub-arachnoidal space on edges of defect of skull is occluded as a result of traumatic edema of brain. Subsequently rapidly is formed the adhesive process, which reliably delimits cerebral shells from wound canal. Encountered subsequently purulent meningitides have most frequently secondary character/nature and are developed on the current of cerebrospinal fluid from the ventricles of brain, where infection penetrates from the foci of encephalitis or as a result of the penetration of cerebral abscess.

Outcomes of the bullet wounds of skull and brain. for judgment about the effectiveness cf different methods of the treatment of the bullet wounds of the skulls and brain which were applied during the first world war, one should completely lcgically turn to the available numerous satistical materials. However, more detailed study of these materials gives so diverse a picture of the results of treatment, that it it is possible to use only for obtaining the general/common/total, very tentative impressicns. The contradiction of statistical data depends, on one hand, from the insufficiency of the accounting of the diversity of medical-tactical conditions under

which it was necessary to treat wounded, and on the other hand, from a difference in the principles, placed as basis during the calculation/enumeration of the percentages of recovery and lethality: some calculated these percentages with respect to all those wounded the head, others - with respect to the wounds of skull with damage to bone, third - only with respect to the penetrating wounds of skull.

With the stipulations indicated it is possible to give the following data of the first world war on the wounds of skull and brain.

Russian surgeon Ya. O. Alksne to 11 thousand wounded, who entered into hospital, calculates the percentage of the wounds of skull into 3.5-4.5. Among those killed on the field of battle 50.0-55.0o/o had the damages of skull. Among dead persons on main dressing station 27.3o/o had the wounds of skull. Of 122 those wounded into skull, that were being located in hospital, died during first 5-6 days 35.6o/o. General/common/total lethality with the wounds of skull, including here and dead persons on the field of battle, Ya. O. Alksne calculates into 90.0o/o.

According to French statistical data, 50.0-70.0o/o of wounded with the penetrating wounds of skull perished in foremost stages and 33.0o/o - from late complications.

Apropos of lethality among those operated different surgeons give also very contradictory data.

Ya. O. Alksne 54 operated apropos wounds of skull, with the short periods of observation, lost only of 2 people, whereas everyone not operated died V. K. Shamarin, operating heavier wounded, obtained to 100 trepanations 27.0o/o of lethality; D. P. Kuznetskiy to 50 process/operations - 22.0o/o.

Page 31.

In M. A. Mukharinskiy to 500 wounds of skull general/common/total lethality achieved 42.0o/o. Of 311 operated wounded died 31.2o/o, of 189 that not operated - 58.7o/o. Post-operation lethality depended on the severity of the wound: of 53 operated apropos nonpenetrating wounds it died 2 people (3.7o/o), of 258 operated apropos penetrating wounds - 95 people (36.8o/o). Greatest lethality of distance blind-end (40.0 o/o) and diametric wounds (62.0o/o).

A. B. Britnev of 205 that operated, who after process/operation superimposed anechoic suture, lost 68 people (33.0o/o), whereas of 62 unoperated wounded died 43(69.0c/o).

Of foreign surgeons Pribram to 400 trepanations, produced in forward area, calculates the lethality into 32.0o/o. Cushing in 250 cases of the wounds of skull, from which in 133 cases there were the penetrating wounds, determines the percentage of post-operation lethality into 41.3. Edy and Bagstock note that from entire number of those wounded into skull and head brain it got better without the complications only of 9.0o/o, but it returned to formation/order 4.0o/o.

According to total German statistical data, the lethality of those wounded the skull in foremost infirmaries was calculated into 34.2o/o, in rear hospitals - into 30.0o/o. In this case the lethality in the various forms of wounds was distributed as follows (Manninger):

Table 2.

(1) Характер ранений	(2) Умерло (в %)	
	(3) в передовых лазаретах	(4) в тыловых госпиталях
(5) Тангенциальные . .	31,4	17,6
(6) Сквозные	43,0	16,6
(7) Слепые	74,0	14,0

Key: (1). Character/nature of wcunds. (2). died (in o/o). (3). in foremost infirmaries. (4). in rear hospitals. (5). Tangential. (6).

Through. (7). Blind.

Organizational measures. The heavy fate of those wounded the skull and the head brain and the poor results of their treatment guided military field surgeons' thought during the first world war to conducting of the series/row of organizational measures. Among them one should indicate, first of all, the introduction to the armies of the belligerent countries of protective metallic helmets. Helmets wonderfully protected head from the multiple small/fine fragments wounds by which in the first world war were very frequent.

Rational preventive measure with the wounds of skull it is necessary to consider short cropping of hair on head, but this measure in practice was realized with great difficulty.

Very important from organizational side was a question about evacuation of those wounded in a head and the tightly closely related with it question about place of surgical intervention in those wounded in head brain. The sums of the observations, initiated in many surgeons with the first months of war, showed that those wounded the skull badly/poorly withstand evacuation after surgical intervention (N. N. Petrov, N. N. Burdenko, S. I. Spasokukotskiy, A. V. Britnev, M. A. Mukharinskiy, G. A. Nevdubskiy, D. P. Kuznetskiy et al.).

"Of 24 wounded, operated in foremost hospitals, indicates one of surgeons, and now transported into hospital in Chernovitsy, survived only two".

Page 32.

There is no doubt, that the neglect of these principles in the beginning of war and their insufficiently persistent conducting of the second half were the main reason for a vast number of subsequent complications during the first world war.

To solve problem set above was very difficult, especially if we consider the need for operating those wounded into skull within the earliest possible periods. True, the positional character/nature of war considerably damped the sharpness of problem, i.e., the requirement of the earliest possible period of operation and prolonged hospitalization of wounded on the spot for process/operation.

In the name of the realization of the principle of the prolonged post-operation hospitalization of those wounded the skull chief/leading neurosurgeons' series/row during the first world war

stood up even by a somewhat paradoxical route/path of failure of urgent process/operations with the wounds of skull and brain.

Most sharp in this direction expressed French neurosurgeon Martel. On the basis of his large experiment/experience he arrived at the conclusion that one ought not to perform process/operation on skull in a hurry, it must be made only, where is possible the prolonged post-operation hospitalization of patient under the appropriate conditions. Therefore all must be directed toward the acceleration of the delivery/procurement of wounded from the battlefield from foremost stages into rear or front line hospital.

The periods of the necessary post-operation hospitalization of those wounded the skull different surgeons determined differently. Some minimum period of hospitalization considered 2 weeks (V. K. Shamarin), others - 3-4 weeks (N. N. Petrov, A. V. Britnev, S. I. Spasokukotskiy et al.), third - even 6-7 weeks (G. A. Nevdubskiy).

During the first world war was advanced and one additional very important requirement - full value of perfecting the wounds of brain, with extraction from it as much as possible of all bone and metallic fragments.

In connection with this surgeons began to attach much importance

to the preliminary radiographic research of skull as to the condition, ensuring more full-valued treatment of the wound of brain. This was explained by the fact that in many wounded through one or another the period after primary perfecting were detected in cerebral tissue the bone and metal fragments, which were the reason for the development of severe complications.

From all this logically escape/ensued the thought that perfecting the bullet wounds of skull must be conducted according to the principles, accepted in neuro-surgical speciality, taking into account all special features/peculiarities of the neuro-surgical technology which in the period of the first world war achieved large specific character.

Thus, into the second half and in the end of the first world war was especially advanced a new question - about the need organizing the specialized neuro-surgical aid by that wounded the skull.

However, the clearly outlined in the end of the first world war tendencies toward the creation of the specialized neuro-surgical aid with the wounds of skull and brain could not present even in that period of the ordered organized system. Affair was limited only to the individual, individually conducted attempts to concentrate wounded with the damages of skull in the specific hospitals, to enlistment to the more thorough research of such wounded doctors - neuropathologists and roentgenologists and to the primary perfecting of wound-neurosurgeons or specially prepared surgeons.

Page 33.

In the first world war in the treatment of the bullet wounds of skull and brain was accumulated large experiment/experience. However, it is necessary with regret to note that the experiment/experience of surgeons' very large unit was not fixed for history. This is why now of the experiment/experience of the first world war it is difficult to derive any specific laws. The extensive materials, assembled during war in Russian armies, are lost and cannot be generalized. Individual Russian statistical data and almost all foreign statistical materials bear too individual a character/nature and reflect either the final fate of wounded or effect on the results of the treatment even of the main elements/cells of combat and tactical situation. In connection with this using the available materials of the first world war it is possible to obtain only the general idea about the results of the treatment of the bullet wounds of skull.

Analyzing experiment/experience on the treatment of the bullet wounds of skull and brain for the time of the first world war, it is necessary to note that during it was refined and rationalized the classification of the bullet wounds of skull depending on the

character/nature of wound, and are also advanced different readings to the primary processing of wounds with their limitation with diametric and perforating wounds. By all it was acknowledged, that the bullet wounds of skull are primary microbial contaminated and necessary their fastest perfecting. At the same time, were especially sharply set a question also about the high value of secondary infection for further course or brain wound and the outcome of wound. In the process of the surgical treatment of those wounded the skull was elaborated the primary perfecting technique of the wounds of skull, in which was outlined the new direction-occlusion of tightly operating wound for its defense from secondary infection, and were also established/installed the specific readings to the imposition of anechoic suture, namely: the earliest possible and radical surgical perfecting and the prolonged post-operation treatment of wounded on the spot where was produced process/operation. The positional character/nature of the first world war created in the majority of the cases favorable prerequisites/premises for the anechoic occlusion of the operating wound of skull, and it successfully was applied by many surgeons. However, in the majority of the cases the bullet wounds of skull during this war were treated by the open method.

Despite the fact that the process/operation of the primary perfecting of the wounds of skull gave during the first world war considerably best direct results, than in past wars, late

complications were observed nevertheless very frequently and is made itself final prognosis with the bullet wounds of skull, as before, very serious.

For an improvement in the results of the treatment of the bullet wounds of skull in the second half war was outlined and partially realized the series/row of the organizational measures: the short hair-cutting of the hair before combat, carrying during the battle of protective metallic helmets, fastest delivery/procurement of wounded from foremost positions into hospitals. It was at the same time especially emphasized that the fate of wounded depended more on the conditions under which was conducted the process/operation, than from the periods of intervention after wound. Such necessary conditions for process/operation included: a strict observance of asepsis, the qualification of surgeon and the possibility of the prolonged hospitalization of wounded on the spot in the postoperative period.

Page 34.

At the end of the first world war was set an important question about the need for the preliminary examination/inspection of those wounded in skull by neuropathologist and roentgenologist. For decreasing of the most posterior complications and improvement in the distant results of treatment the surgeons advanced the requirement to

drive out from the substance of brain during primary processing all metallic and especially bone fragments, which are the permanent foci of infection. With this already more radical surgery in the zone of brain it is necessary to consider the special features/peculiarities of the reaction of cerebral substance to injury and infection.

Finally, which is very important to emphasize, toward the end of the first world war was outlined the tendency toward the creation of the special system of aid by that wounded into skull, in which these wounded would be concentrated into the specific rear hospitals in which can be provided further observation of their condition and necessary treatment. But in effect within always of the first world war were made only individual attempts at the creation of this specialized aid by that wounded into skull. Entirely this principle was not realized and was not converted into system.

Neuro-surgical direction in treatment of bullet wounds of skull.

As it was noted, toward the end of the first world war in the treatment of the bullet wounds of skull it was outlined and underwent development the new special direction - neuro-surgical, which began in many respects to diverge from the principles of treatment, established/installed by general/common/total surgery.

Based not only on the special methods of diagnosis and peculiar surgical technology, but also on the more deepened understanding of the occurring in central nervous system physiological and pathological processes, taking into account those peculiar reactions which the head brain answers the injury and the infection, this direction of new speciality was justified by the great successes in the region of identification and surgical treatment of the neoplasms of central nervous system under conditions of peaceful circumstances.

As far as Russia is concerned pre-revolutionary, then in it by pure/clean neurosurgery was occupied only L. M. Pussep, who had small separation/section in neuropathological clinic. Besides it, surgical process/operations on central nervous system performed general/common/total surgeons (I. S. Razumovskiy, S. P. Fedorov, S. I. Spasokukotskiy, N. F. Bogoyavlenskiy et al.). Proper attention to the development of neuro-surgical speciality and to the creation of necessary for this conditions was turned only in Soviet time.

In 1921 A. L. Polenov opened Leningrad's first neuro-surgical clinic, while in 1926, also in Leningrad, was discovered the special institute of surgical neuropathology (A. G. Kolotkov, S. P. Fedorov); in 1938 both these installations merged into one neuro-surgical institute under A. L. Polenov's leadership/manual. In Moscow N. N. Burdenko first organized in surgical clinic neuro-surgical

separation/section (1923), and then on his initiative was organized central neuro-surgical institute (1934). In 1923 in Kharkov was created neuro-surgical separation/section with surgical clinic of V. N. Shamov, while in 1931 - with Ukrainian psychoneurological institute (Z. I. Geymanovich). Page 35. In 1925 neuro-surgical separation/section was discovered in Rostov on the basis of neurologic clinic (P. I. Emdin). In Saratov, and then in Moscow clinic of S. I. Spasokukotskiy by neurosurgery was occupied A. N. Bakulev. In the Soviet Union gradually were created their own neuro-surgical schools, was begun the training of personnel of the neurosurgeons. In 1935 it was created by the bureau of the neuro-surgical council first chairman of which was N. N. Burdenko. Bureau contributed to the strategic formation of all neurosurgeons of the Soviet Union, systematically accumulating them to conferences, sessions and so forth, etc. Since 1937 of beginnings regularly to emerge edited by N. N. Burdenko the special lcg/journal "questions of neurosurgery".

The scientific and organizational work, expanded/scanned under leadership/manual by N. N. Burdenkc and A. L. Polenova by two special institutes of neurosurgery, gave good results. Were prepared specialists' cadres, mastering neuro-surgical technology.

In a matter of training the Soviet neurosurgeons for work under

military conditions it is necessary to note the extremely large services of the chief surgeon of the Red Army N. N. Burdenko, to whom we are obligated by the timely and detailed development of the most important questions of military neurosurgery.

In two decades, that passed from the time of the first world war, in neurosurgery were developed the methods of the contrast X-ray analysis of the ventricles of brain and sub-arachnoidal space, was improved intervention technique in different, even least available departments of brain, was developed the special procedure of struggle with hemorrhage, by shock, hypertension syndrome, by infection and in details were studied the reactions of brain to injury and infection. In this case was explained the role of edema and bloating of brain, is opened the dehydrating effect of hypertonic solutions, is in detail studied histology of neoplasms and patholcgical processes with the wounds of central nervous system and their clinical symptomatology.

The special methods of diagnosis, special understanding and treatment of the patholcgical prccesses, which occur in the region of central nervous system, special operational technology, which considers the diversity of the reactions of brain, and finally special methods of prophylaxis and struggle with the complications, which appear during surgical interventions also in post-operation

period, ensured exceptional successes and increase in the neuro-surgical speciality.

In the subsequent after the first world war years, together with the continuous rapid development of the neurosurgery of peacetime, were developed/processed questicns of the surgical treatment of the bullet wounds of skull and brain, moreover by the development of these all questions were occupied no longer cnly general/comscn/total surgeons, on mainly specialists in neurosurgery.

After stressed and mass combat which were characteristic for the first world war, which fcllowed then military collision-armed struggle of republic Spain with fascists (1937-1938), combat of the Soviet troops/forces with the Japanese in Khasan lake (1938) and on river Khalkhin-Gol (1939), war with White Finns (1939-1940) - was of limited character/nature, they were comparatively short-term and they had their specific medical-tactical circumstances, not characteristic to the circumstances of large wars. The experiment/experience of these military engagements did not give grounds to introduce new principles and large changes in a matter of the organization of the treatment of wounded during the bullet damages of skull and brain.

During war in Spain the surgeons of republic army under the appropriate conditions sufficiently used extensively anechoic suture during processing of the wounds of skull. Anechoic sutures were laid during the periods up to 18 and 24 hours after wound. Even those wounds which after processing sewed themselves tightly after 26 hours after wound, according tc the observations of the doctors, healed first intention (Bitus, Hart). During processing of cerebral wound Spanish surgeons used the reception/procedure which proved to be are completely advisable. Instead of cleaning/purification of wound canal in brain by instruments they caused in wcunded vomiting or forced them to strain and to cough. As a result of intracranial pressure increase in such cases the blood clots, detrite and bone fragments (Barcoon) were secreted from cerebral wound independently.

Combat actions against Japanese in area of Khasan lake (1938) occurred among mounds in marshy ground, they were very stressed, although continued a total of several days. With a comparatively rapid carrying out from the field of combat all wounded the skull were operated in army area in the first 12 hcurs after wound. However, were noted the cases of imposition of primary sutures on the insufficiently processed wounds. During these combat widely was applied the streptocide (internal and intravenous), strictly it was observed bed mode/conditions, were applied the intravenous infusions of the solution/opening cf urotropin and of hypertonic solution,

glucoses and sulfate magnesias.

After process/operations the wounded were never maintained/withstood sufficiently for long in army area and most frequently rapidly they were headed into the rear. Subsequently those wounded the skull were treated in rear hospitals under the permanent observation of the experienced surgeons and neuropathologists.

According to M. N. Akhutin's data, during combat in Khasan lake the wounds of skull are noted into 2.7o/o of cases with respect to a total number of wounded, moreover among those wounded the skull nonpenetrating wounds composed 66.8o/o, and penetrating -33.2o/o bullet wounds by -37.4o/o, wound by the fragments of shells into min -51.4o/o, other -11.2o/o).

General/common/total lethality with the penetrating wounds of skull during combat process/operation achieved 30.0o/o, moreover about 2/3 wounded perished in foremost stages and about 1/3 - in rear hospitals.

The military engagements of Soviet troops/forces with the Japanese in Khalkhin-Gol river occurred in bare, waterless steppes in the summer of 1939 and continued 4 months.

The organization of aid by wounded was impeded by large distances, complete absence of natural covers and populated areas. At the same time in certain cases PMP were possible to deploy only in 10-12 km from the line of combat, MSB - in 25-30 km, PPG - in 75-90 km, and evacuation hospitals (GOPEP) - in 150 km from the foremost line; the heavy wounded were sent on aircraft into hospital base, and light ones and average/mean severity of wounded they evacuated along dirt roads in vehicles.

On the character/nature of the wounds of skull in this combat process/operation give representation M. N. Akhutin's following numerals (in percentages):

The general/common/total percentage of the wounds of skull ... 3.6

1. Nonpenetrating ... 52.7

2. Penetrating ... 47.3

According to the type of the wounding weaponry:

a) bullet ... 17.7

b) fragmentation ... 68.6

c) other ... 13.7

According to the character/nature of the wound:

1. Tangential ... 21.0

2. Blind ... 56.0

3. Segmental ... 12.0

4. Diametric ... 11.0.

Those wounded the skull during these combat operations operated almost exclusively in KhPPG general/common/total surgeons, moreover by them limber were allowed/assumed the errors in the operational technology: insufficiently was expanded aperture in the bones of skull, in consequence of which could not be extracted even superficially lying/horizontal fragments of the glassy plate; brain frequently was traumatized during the unsuccessful attempts to extract foreign bodies and during the introduction of gauze tampons. Some doctors were carried along by stitching with blind wounds, limbers allowed/assumed further evacuation of wounded too early. The

treatment of the hospitalized wounded also always did not stand at proper height/altitude, especially in the sense of the early diagnosis of infectious complications from the side of shells and substance of brain.

Page 37.

Combat with White Finns, that were continuing of 100 days (winter of 1939/40 g.), occurred in cruel frost in the impenetrable forests/scaffolding with deep snow cover. Northern direction had considerably expanded evacuation routes/paths. However, main trends had relatively short evacuation routes and at a distance of 50 km from front they had available the powerful/thick bed basis of Leningrad clinics and hospitals with the highly skilled specialists.

On the character/nature of the wounds of skull in war with White Finns give representation M. I. Akhutin's following numerals (in percentages).

The general/common/total percentage of the wounds of skull ... 5.1

1. Nonpenetrating ... 46.0

2. Penetrating ... 54.0

a) bullet ... 50.5

b) fragmentation ... 49.5

1. Tangential ... 33.0

2. Blind ... 53.6

3. Segmental ... 10.4

4. Diametric ... 3.0.

The predominance of bullet wounds during combat with White Finns pronounced also on the character/nature of the damages of skull. Diametric and segmental wounds were encountered, judging according to the data of the examination/inspection of twigs/rods, frequently, but, as a rule, they entailed death on the field of battle. The stages of evacuation reached in essence the wounded with tangential wounds or comparatively surface blind wounds of skull by the small/fine fragments of the mines; whereas wounded with diametric and segmental wounds were encountered considerably thinner/less frequent. Lethality on the field of battle among wounded into head, judging

according to the data of the examination/inspection of twigs/rods, in this war equalled 35.0-40.0o/o.

During combat with White Finns in foremost stages it was sufficient surgeons, and in the rear wounded obtained the qualified aid of the specialists of the Leningrad neuro-surgical institute of neuro-surgical clinic of the military medical academy.

Primary processing in the northern direction of front was made 57.4o/o of those wounded the head, and on Karelian neck, judging according to the data of Leningrad neuro-surgical institute, - even 71.6o/o. On the character/nature of surgical aid in the foremost stages of evacuation gives representation Table 3 (P. A. Cyprians).

Table shows that the large part of the process/operations is made with wounds with the damage of bones, moreover in DG these process/operations composed large part. In this case during the day of wound were operated by 69.0o/o of wounded, on second day -24.0o/o, to third -6.0o/o and later than -1.0o/o.

Post-operation lethality with respect to a total quantity operated of those wounded the head it comprised: in MSB -19.7o/o, in DG -24.7o/o, in KhPPG -8.0o/o.

Regarding the effect of evacuation on the condition of wounded it is possible to indicate I. A. Trukhalev's data (962 cases), which noted that a certain unit of the wounded was evacuated in position/situation sitting and in 8.0o/o of them the condition after evacuation deteriorated.

In wounded with the penetrating wounds of skull the subsequent complications, with which was required surgical intervention, were observed into 25.0-30.0o/o of cases. Predominated the abscesses of brain with which the lethality reached to 41.1o/o (I. A. Trukhalev, I. S. Babchin). The complications of the meningoencephalitis became an even larger percentage of lethality.

Table 3.

(1) Характер хирургической помощи / (2) Этап	МСБ	ДГ /	ХППГ	(3) Не указано
(4) Рассечение и иссечение мягких тканей (5)	36,9	17,1	37,1	60,0
Рассечение и иссечение раны с расширением костного дефекта, удалением костных и металлических осколков (трепанация)	63,1	82,9	62,9	40,0

Key: (1). Character/nature of surgical aid. (2). Stage. (3). It is not shown. (4). Splitting up and carving of scft tissues. (5). Splitting up and carving of wound with expansion of bone defect, distance/separation cf bone and metallic fragments (trepanation).

Page 38.

During the more detailed analysis of the organization of aid by that wounded the skull during war with White Finns is revealed the number of deficiencies/lacks, which was consisting in the fact that in the majority of the cases processing the wcunds of skull was conducted in army area by general/common/total surgeons, without specialists' participation, it is necessary equipment and X-ray apparatuses. The period cf post-operation hospitalization in the series/row of wounded was insufficient. Process/operation was limited sometimes only to the surface treatment of skin and bone, without affecting the cerebral canal; at the same time occurred the cases

when operating wound sewed itself tightly. As a result the unit of those wounded into skull entered neuro-surgical clinics of Leningrad already with severe infectious complications in the form of the phlegmon of soft tissues, purulent meningitides, encephalitides and abscesses of brain.

These complications, based on materials of Leningrad neuro-surgical institute, it gave 18.4o/o of protrusions; into 14.4o/o were observed the abscesses, into 13.8o/o - osteomyelitis, in 8.5o/o - diffuse encephalitides, into 6.7o/o - meningitides and into 3.6o/o of cases - subarachnoid fistulas (I. S. Babchin).

Thus, the experiment/experience of combat process/operations indicated and especially combat with White Finns convincingly showed that with the wounds of skull and brain neither approximation/approach of surgical aid to foremost positions nor early processing of wounds yet solve the problem of the treatment of the wounds of skull, if those wounded the skull are evacuated in one flow with other wounded and if processing and treatment of the wounds of skull are conducted by general/common/total surgeons, little sign with the principles of neuro-surgical speciality and the special features/peculiarities of pathological processes by the wound of brain.

Taking into account the special features/peculiarities of the wounds of skull and brain, the medical service of the Red Army even prior to the beginning of the Great Patriotic War manufactured the ordered system of rendering aid with this genus wounds. The basic principles of the system indicated consisted in failure of the operational processing of those wounded the skull in army area and their evacuation according to designation/purpose into the specialized hospitals of the army area so that in these hospitals those wounded in skull could obtain specialists' not only qualified aid - neurosurgeons, ophthalmolcgists, otolaryngologists, stomatologists and neuropathologists, but alsc could be subjected to detailed roentgenological examination/inspection with the subsequent, so/such necessary for them prolonged postoperative hospitalization.

Page 39.

Chapter II.

GENERAL CLASSIFICATION OF BATTLE DAMAGE TO THE SKULL AND BRAIN AND STATISTICAL DATA[1].

FOOTNOTE [1]. In this chapter, as in all subsequent, percentage relationships/ratios they are brought on the basis of the maps/charts/cards of the deepened development of the histories of disease/sickness/illness/malady. All statistical data, given based on materials of other sources, each time are escorted/tracked by the appropriate admonition.

The given in present volume statistical materials of the maps/charts/cards of the deepened characteristic are related only to average numerals. All deflections from these average numerals, depending on the varied conditions of a medical-tactical circumstances, will be presented in the following volume. ENDFOOTNOTE.

~~Classification~~.

Classification

The classification of the battle damages of skull and brain must put into single ordered and consecutive system entire diversity of wounds and closed damages of skull and brain, that were being observed during the Great Patrictic War. Target of this classification - to establish/install the basic and characteristic features, which facilitate: 1) correct and timely identification, evaluation, prognosis and treatment of these damages and refinement of a sorting-evacuation characteristic, 2) the organization of their rational and precise statistical accounting and finally 3) the intensified scientific study of these damages.

The single, rational and expanded/scanned classification, which many-sidedly envelops basic clinico-anatomical properties and pathophysiological mechanisms of these damages with their most essential and characteristic features which between themselves are tightly closely related and mutually caused, it contributes also to autopsy and correct understanding of these internal mechanisms and interrelations. Finally, classification facilitates the formation of the rational, expanded/scanned and precise clinical diagnosis, which helps to the rapid alignment of doctor and to the correct selection of the tactics of the specialized line-of-communication treatment under the complicated combat conditions of front and in accordance with the contemporary doctrine of the military field surgery of Soviet army.

The battle damages of skull and brain are divided, according to the conventional surgical principle, to two basic groups: the open damages or wounds and closed damages.

Page 40.

With the wounds of skull and brain, together with the damage of different tissues and organs/controls, is compulsorily disrupted also the integrity of the skin integuments of skull. Therefore with the wounds of skull on its surface always is a defect of skin integuments - wound with the specific separable (blood, cerebro-spinal fluid, cerebral detrite, pus, etc.) and wound infection which can be extended into depth, cause the development of threatening infectious complications in brain and its surrounding cerebral shells, in the bones of skull and in soft tissues.

All wounds of skull in war are divided according to the type of the wounding weaponry, the character/nature of wound and the appearance of wound into the bullet wounds, plotted/applied by bullets and fragments of diverse shells, wound by silent weaponry - bayonet, cup, dagger and so forth and the damages, plotted/applied by blunt gun (gun butt, etc.), by heavy objects/subjects (with the

collapse of buildings, dugouts) or with transport accidents at front (contused wounds of skull by analogy with the same damages in peaceful circumstances).

The closed damages of skull and brain compose the second group of combat injuries, which is characterized in essence by the retention/preservation/maintaining the integrity of skin integuments, independent of character/nature and degree of damage the more deeply arranged/located tissues and organs/controls - bones of skull, cerebral shells and substance of brain. Therefore in connection with absence during the closed damages of the skull of wound and, consequently, also wound infection, complicated problem of severe infectious complications it will withdraw in this group of combat injuries to the second plan/laycut.

The closed damages of skull and brain in war are divided into two basic subgroups: the closed damages in the true sense of word and air contusions.

During the closed damages in the true sense of this word the traumatizing agent, the mechanism of injury, pathoanatomical changes and clinical picture are analogous to the same damages under peaceful conditions (strike/shock, contusion, incidence/drop, etc.). By analogy with the latter they are divided into the following five

basic forms, or the symptom complexes: 1) concussion of brain, 2) the contusions of brain, 3) the compression of brain (hemorrhage into area of skull and edema of brain), 4) the breaks of the arch/summary of skull even 5) the breaks of the basis of skull. Details about the closed damages of skull are presented in chapter I of the special unit of this section.

The air contusions, caused by blast, are formed with the breaks of large/coarse shells or bombs. The damages of skull and brain in this case sharply differ from damages with the strictly closed injuries of skull not only in terms of the character/nature of the traumatizing agent and in terms of the mechanism of the injury, which captures entire organism, but also by the peculiar clinical picture which can be observed only under conditions of war. It is in more detail about this form/species of the combat injuries of skull, which are of interest for neuropathologists, psychiatrists and otolaryngologists, it speaks in section X of the unit "Therapy" of present "Work".

Bullet wounds compose 67.9%/o of all battle damages of skull and brain, the closed damages - 10.9%/c and other damages/defeats (wound by silent weaponry, the open damages by blunt gun and the result of transport injury) - 21.2%/o (I. S. Babchin).

The bullet wounds of skull and brain are divided, first of all, according to the type of the wounding weaponry into two basic groups -- bullet and fragmentation.

Page 41.

The bullet wounds, applied by rifle, automatic, machine-gun, revolver and shrapnel bullets, comprise, according to the data of the maps/charts/cards of the deepened characteristic, 17.3o/o of all bullet wounds of skull.

The fragmentation wounds, caused by diverse artillery shells, mines, garnets, aircraft bombs and secondary shells, mines, garnets, aircraft bombs and secondary shells, comprise, according to the same data, 82.7o/o.

The sharp predominance of the fragmentation wounds of known limits oscillates depending on the character/nature of armament, form/species of combat process/operations, front sector, etc.) is the special feature/peculiarity of modern wars in which participate the armies, rich equipped by artillery, mortars, aviation, etc. This fact lays a deep impression, also, on the basic character/nature of wounds. Thus, for instance, bullets, which are characterized by the smooth fairing and which possess large manpower, even at great

distances cause most frequently perforating wcunds. However, the fragments of different shells although possess the high initial velocity, due to irregular form and uneven surface they rapidly lose it and cause most frequently blind-end wcunds.

Besides the subunit of all bullet wounds the skulls according to the type of the wounding weaponry, have long ago already attempted to class them, also, according to the basic signs/criteria of the wound itself: by severity and mechanism of wound, in depth of penetration of shell into the area of skull, according to means of wound canal, localization of wound cn anatomical regions, to character/nature of the pathoanatomical changes, in complications, etc. Beginning from the end of the past century, were proposed many diverse classifications, based cn different enumerated above signs/criteria. However, the single conventional classification of the bullet wounds of skull and brain there does not exist also, until now.

The first attempt at tne rational classification of the bullet wounds of skull and brain according to their basic sign/criterion - severity and depth of penetration of shell - was made in 1891. Its essence was reduced to the division of all bullet wounds of skull into wounds penetrating and nonpenetrating. The basic criterion of this division was the damage of the bones of skull and the degree of the penetration of shell into its area, independent of the condition

of solid cerebral shell, on what, as is known, is constructed contemporary evaluation of these basically various forms. Their correct contemporary evaluation for the first time is encountered in Russian literature in N. N. Petrov, who in 1917 clearly divided all bullet wounds of skull into those penetrating, i.e., intradural, and nonpenetrating, i.e., extradural. By analogy with pleura and peritoneum N. N. Petrov considered solid cerebral shell basic barrier impeding the penetration of wound infection into submembrane space and into the substance of brain. Following by N. N. Petrov this classification in its contemporary illumination is encountered in V. I. Dobrotvorskiy (1937) and in other authors.

In instructions in accordance with the military field surgery of the main army medical administration of Red Army (1941) is for the first time introduced official subunit to the penetrating and nonpenetrating wounds of skull in their contemporary understanding, and within the period of the Great Patriotic War it solidly entered into clinic of the bullet wounds of skull.

Page 42.

However, at the beginning of the Great Patriotic War the classification of the bullet wounds of skull did not provide for the important details, necessary for the formation of the

expanded/scanned clinical diagnosis which must repel severity and character/nature of wound, lighten its correct evaluation - prognosis and to serve as guide to action, i.e., to the correct classification of wounded, their rapid evacuation on designation/purpose and selection of suitable tactics and rational methods of the specialized treatment. During the first years of the Great Patriotic War it was necessary to use the classification, established/installed by the official account, dividing the bullet wounds of skull into two groups: a) with the damage of bones and b) without the damage of bones, and only during war this classificatior was supplemented by expanded form account for neuro-surgical wounded, detailing the wounds of brain and their complication.

Since the beginning of the war was developed and widely introduced in the practice of Leningrad, and thereupon other fronts and service areas the single expanded/scanned clinico-X-ray-anatomical classification of the bullet wounds of skull, in which to the roentgenological method of research as to most precise and objective was given especially serious attention.

According to this classification all bullet wounds of skull and its contents are divided first of all, depending on their character/nature, more precise than the depth of penetration of wound canal, to three basic groups: 1) the wound of the soft tissues of

skull, 2) the nonpenetrating wounds of the bones of skull, 3) the penetrating wounds of skull and brain.

1. Wounds of soft tissues of skull are related to most lungs. With them remain wholes not only dura mater, on also the bone of skull and suffer only its integuments - skin, aponeurosis, muscles, periosteum.

However, with the wcunds of the soft tissues of skull can be encountered heavier damages/defeats with the damage of brain. By analogy with the closed damages and with the wound of soft tissues sometimes are encountered the symptom complexes of jolt and contusions of brain, although usually they are observed comparatively rarely, they are expressed to weaker degree and therefore they are not very frequently distinguished and do not yield to a precise accounting.

It is necessary also to keep in mind that among this group "of the easily" wounded there can be the individual persons with that hidden, that not discovered with X-ray analysis by the break of the external or internal plate of the bones of skull on the spot of wound, sometimes even with the damage of tunicary and cerebral vessels, with the heavy clinical picture of contusion and compression of brain. Usually such wcunded attract attention of doctor by the

presence of dark macula in the exposed surface of bone. Macula forms translucent through the external plate of bone hematoma in porous substance. Such "light" wounds compose seemingly transition group to heavier - nonpenetrating wounds of the bones of skull.

2. Nonpenetrating wounds of bones of skull are characterized by damage of bones of arch/summary or basis of skull with integrity of solid cerebral shell, which is reliable barrier for wound infection. This barrier impedes the penetration of infection together with shell and bone fragments into subtunic space, into the substance of brain and into its ventricles.

3. Penetrating wounds of skull and brain are characterized by bullet break of its bones with violation of integrity of solid cerebral shell and by direct penetration of bacterial contamination together with wounding shell into subtunic space and into substance of brain.

Page 43.

The mechanism of the development of the bullet wounds of skull can be judged indirectly by the external form/species of wound and from the data of the X-ray analysis, which establishes/installs the types of the breaks of the bones of skull, a quantity and the

sizes/dimensions of bone fragments, presence or absence in the wound canal of the wounding shell (foreign body) and finally localization and interrelation with each other. Distinguish the following four basic characters/natures of bullet wounds the skulls: tangent, through, blind and ricocheting (Fig. 1).

Tangential (tangential) wounds are characterized by the damage of cerebral skull by the wounding shell on tangent to its surface. Because of this wound canal has in the majority of the cases either intake or outlet, but it is presented, depending on its location and depth, either in the form of the simple surface scratch of skin integuments, without splitting up of the subject of the aponeurosis or in the form of the gaping linear wound, deep chute or sulci the bottom which forms periosteum, different layers of the damaged bone, solid cerebral shell or finally very substance of brain. The latter, as a rule, is exposed on comparatively small space, with certain exceptions when the extensive defect of bone and solid cerebral shell is escorted/tracked by the fallout of the sector of the destroyed brain. Thus, the wounds of tangential character/nature can be different severity. A deep wound sulcus, carried out by the cerebral detrite, mixed with blood clots and bone fragments, not always and not for entire elongation/extent is open; in a number of cases it can have narrow point from undamaged/uninjured soft tissues - skin navigation bridge, which overhangs oval form by wound, that converts it into the similarity of wound canal with sharply extended intake and outlet.

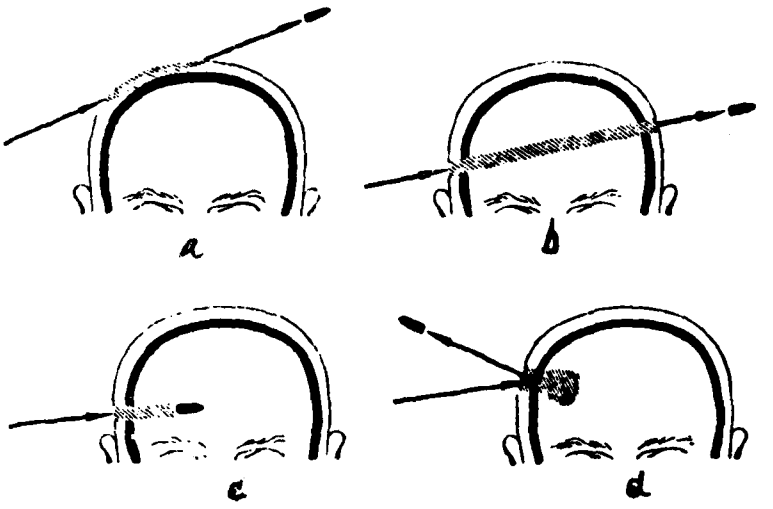


Fig. 1. Character/nature of the bullet wounds of skull by the mechanism of development. a) the tangent; b) through; c) blind; d) ricocheting.

Page 44.

This seemingly transitional form from the tangential character/nature of wound to through.

Perforating wounds are characterized by the presence in area of skull of locked from all sides wound canal with individual intake and outlets and by the absence in this canal, as a rule, the wounding shell.

Perforating wounds usually will be deposited by bullets at the

large velocity of their flight. Therefore most frequently bone fragments in wound canal it is a little, are arranged/located they in inlet towards the inside from it, and in output - towards the outside. The almost always perforating wounds of skull, in spite of the diversity of the types of wcund canal, they are penetrating, and comparatively large percentage cf wounded with these means of wounds it perishes on the field of battle. These wcunded give the highest percentage of lethality in the foremost stages of evacuation. Only into 4.0o/o of cases perforating wcunds are nonpenetrating and into 3.8o/o of cases the damage is limited to the wound of soft tissues.

The blind character/nature of wounds is characterized by presence on the surface of the skull only of the inlet, which leads into the blind wound canal, formed by the jammed at its end wounding shell which lost its fcrce and was converted into foreign body. Besides the latter, in wound canal always it is possible to reveal/detect much, usually the small/fine, bone fragments, carried along by the depthward wounding shell. Depending on living the pitchforks of shell, depth and character/nature of wound canal, the severity of blind wounds it is different. Besides this, should be noted the characteristic for the penetrating wounds of skull depth of the occurrence of the foreign bcdies, which are arranged/located in the blind end of the wcund canal and in the majority of the cases much deeper than numerous bone fragments. With short wound canal the

foreign body can be arranged/located along its course, among bone fragments, rarely even in quite inlet. This form of the disposition of foreign bodies more frequently is encountered with blind nonpenetrating wounds, what draws it nearer by the mechanism of wound the following character/nature - ricocheting and appears as transfer to it form.

The ricocheting wounds are characterized by the presence in skull of one wound aperture, which is simultaneously intake and output. Therefore, in spite of the external similarity of this character/nature of wound to blind or tangent, foreign bodies in this case in wound, as a rule , is not for entire elongation/extent of wound canal and only sometimes in the perforated defect of bone or into soft ones the integuments of skull they randomly jam with exit (ricochet). The mechanism of the development of the ricocheting wounds depends on the contact angle of the wounding shell with the convex surface of the arch/summary of skull, and also on the force of shell at the moment of wound. The bearing/angle of wound in this case can be either straight line (upright), or acute/sharp, approaching tangential wounds.

The force of shell usually is sufficient in this case only to that in order to produce the crushed break on the restricted space of the bones of the arch/summary of skull and, after transmitting

maintained force to numerous bone fragments, to convert them as into the secondary shells, which penetrate into the substance of brain in the form of wide sheaf or narrow flow at the depth of 5-6 cm, it is sometimes deeper.

Page 45.

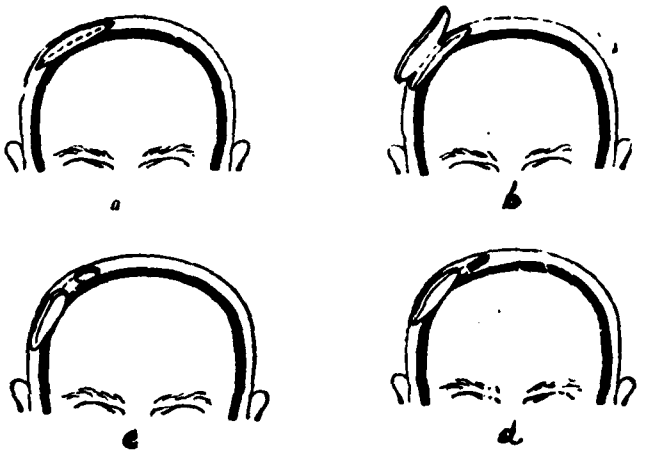


Fig. 2. Character/nature of tangential wounds. a) simple; b) flap; c) through, d) blind.

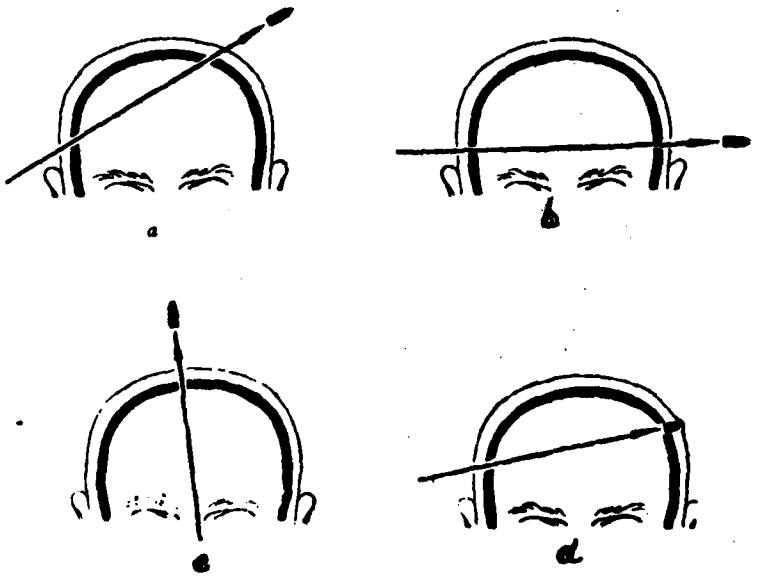


Fig. 3. Character/nature of perforating wounds. a) segmental; b) diametric; c) diagonal; d) blind (incomplete mechanism).

Primary shell itself rebounds, it ricochets from the surface of skull, leaving the wound canal through its inlet, sometimes it jams in it, since its force it falls short in order to overcome the resistance of the surrounding soft tissues (incomplete mechanism of wound). In such cases the wounding shell is arranged/located very closely to surface, towards the outside the bone fragments.

Thus, according to mechanism the bullet wounds of skull are divided into four basic characters/natures: tangents, through, blind and ricocheting. Each of these wounds is qualitatively excellent from other, but at the same time there are many transitional forms, which differ from each other only in terms of insignificant, purely measurable characteristics. This latitude of the mutual transformations of one mechanism of the wounds of skull in another finds its expression in the diversity of the types of wound canal.

With tangential wounds can be observed four types of wound canals (Fig. 2): tangential simple wound with the open sulcate canal, tangential flap wound with the formation of a skin-aponeurotic graft/flap, tangential perforating wound when above a deep sulcus is

a narrow skin navigation bridge (march/passage to perforating segmental wound), and the tangential blind wound when the shell, which forms the wound of complaints on the surface of the arch/summary of skull, blindly jams at the end of the wound canal in soft tissues (incomplete mechanism with march/passage to blind wound).

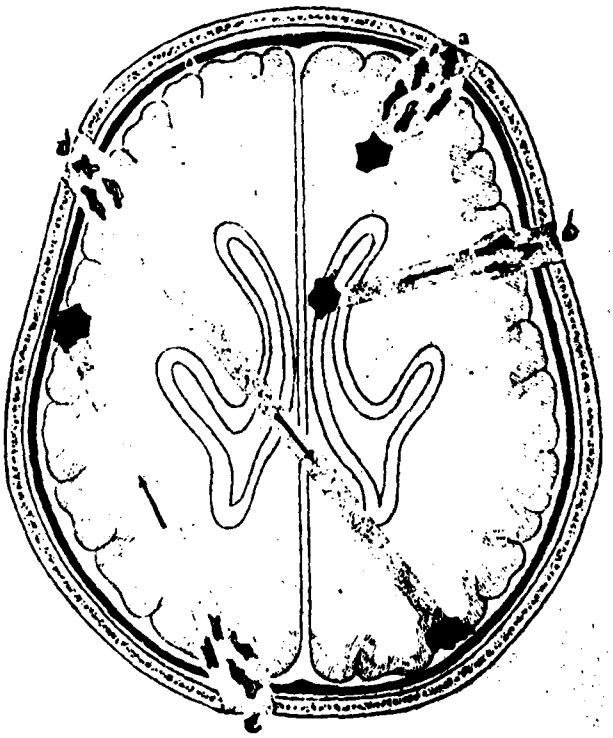


Fig. 4. Character/nature of blind-end wounds. a) simple; b) radial; c) segmental; d) diametric.

Page 47.

With perforating wounds usually are distinguished the following basic types of wound canal (Fig. 3): through segmented, when wound canal is passed to the area of skull along the chord of the greater or smaller length, which connects intake and outlet, through diametric, when wound canal passes according to the diameter of skull

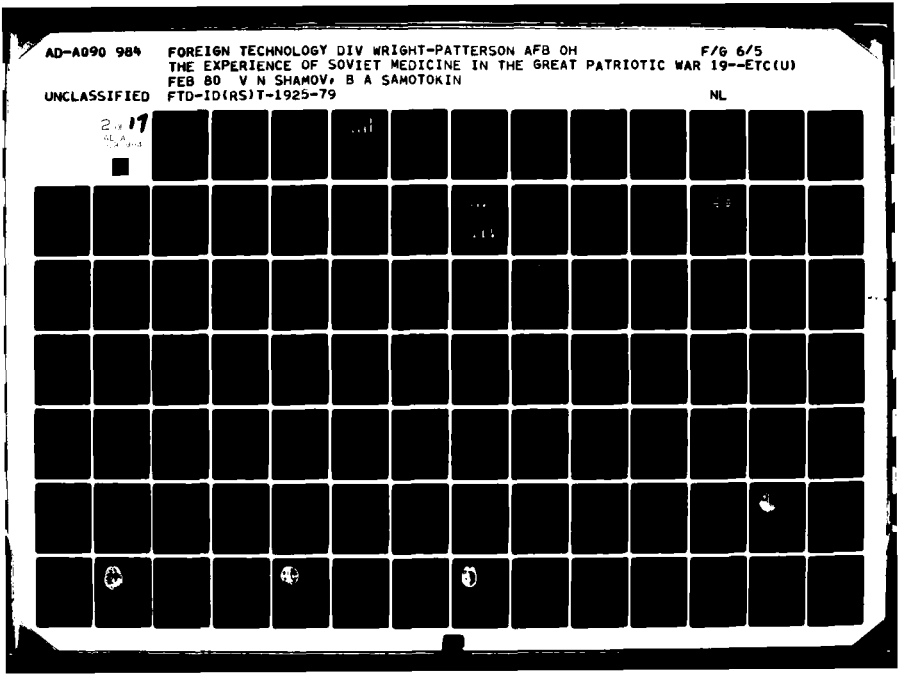
- longitudinal, transverse or oblique, and finally the through diagonal or axial form/species when diametric wound canal is passed along the vertical axis of skull, from basis to the arch/summary of skull or vice versa. With the incomplete mechanism of perforating wound the bullet can jam under skin in outlet of skull, forming the fourth type of wound canal, transfer to blind-end wounds.

With blind-end wounds are distinguished also four types of the wound canal: a) by blind simple, b) blind radial, c) blind segmental and d) blind diametric (Fig. 4). Thus, the enumerated types of wound canals with blind-end wcunds are analogous to the enumerated types of wound canals with perforating wcunds and differ from the latter only in terms of the incorplete mechanism of wound, with which the shell, after consuming its force, jams in the area of skull.

With the ricocheting wounds there can be two types of the wound canals: the ricocheting simple, plumb or tangent, when in wound canal are only numerous fragments, but there is no wounding shell, and the ricocheting blind, when foreign body jams in the inlet of wound canal (Fig. 5).

Comparing between themselves the enumerated above mechanisms of wounds and the types of wound canals, on one hand, and the severity of these wounds - with another, it is possible to conclude that these

AD-A090 984 FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OH F/G 6/5
THE EXPERIENCE OF SOVIET MEDICINE IN THE GREAT PATRIOTIC WAR 19--ETC(U)
FEB 80 V N SHAMOV, B A SAMOTOKIN
UNCLASSIFIED FTD-ID(RS)T-1925-79 NL




A
098

relationships/ratios are characterized by known constancy and law (Fig. 6). Most heavy, as is evident, are the perforating wounds which into 92.2o/o are penetrating; then blind, from which 38.2o/o of those penetrating; further, that ricochet, from which penetrating 18.6o/o, and least heavy - tangents, of them penetrating 15.2o/o.

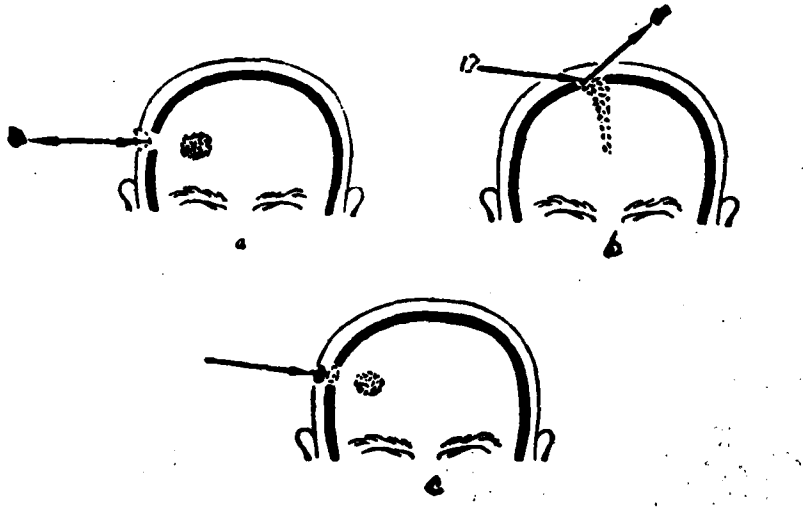


Fig. 5. Character/nature of the ricocheting wounds. a) simple (plumb); b) simple (tangent); c) blind (not completed).

Page 48.

During the ordinary X-ray examination of that wounded into skull it is possible to determine the basic types of the breaks of the bones of skull - arch/summary or basis, and also number and sizes/dimensions of bone fragments, metallic foreign bodies and their relationship/ratio with each other.

For the classification of the breaks of the bones of the arch/summary of the skull of most of ideal is N. S. Kosinskoy's roentgenological classification, developed at Leningrad Front.

According to this classification (it is in detail described in chapter IV), all bullet breaks of the arch/summary of skull are divided into six basic types:

I. Incomplete break with the isolated/insulated damage of one external or internal plate alone of the bones of the skull (it is encountered usually with nonpenetrating wounds).

II. The linear break or crack in the isolated form/species (it is encountered exclusively rarely and it is observed only with nonpenetrating wounds).

III. The depressed break without the presence of defect in the bone (it is encountered in the majority of the cases with nonpenetrating wounds and it is considerably less frequent with those penetrating).

IV. The crushed break with small/fine bone fragments on the surface of the solid cerebral shell (it is encountered mainly with nonpenetrating wounds and less frequent with those penetrating).

V. The perforated break with the presence of one or two small apertures in the bones of the arch/summary of skull and many small/fine bone splinters, located usually in the area of the skull (it is encountered most frequently and it is exclusive only with the penetrating wounds). This type of break is divided in turn, into three subtypes: a) perforated blind (most frequently observing), b) perforated vertical, c) the perforated through (observing it is most rare).

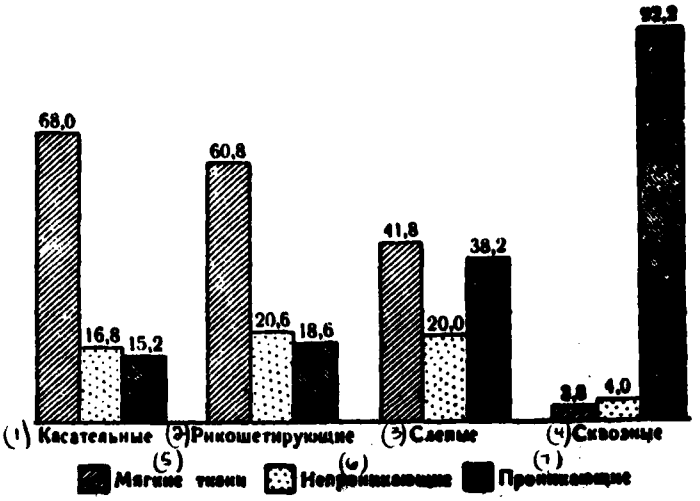


Fig. 6. Relationships/ratios of the frequency of different types of wound canals among the wounds of skull (in percent).

Key: (1). Tangents. (2). Ricocheting. (3). Blind. (4). Through. (5). Soft tissues. (6). Nonpenetrating. (7). Penetrating.

Page 49.

VI. Comminuted break is characterized by the presence of large/coarse bone fragments and by unusual for all remaining breaks displacement of these fragments towards the outside from the skull (it is typical only for some perforating segmental wounds, it is encountered rarely and it is escorted/tracked by high lethality).

The classification of the bullet breaks of the basis of the skulls which, according to the data of Leningrad Front, compose 11.0o/o of all bullet breaks of skull, is much more complicated and has narrower and more special interest for frontier with neurosurgery specialities - military field otorhinolaryngology, ophthalmology and maxillofacial surgery.

All bullet wounds of skull, independent of their severity and character/nature, accept to distribute on their anatomical localization, being guided by the existing division on the anatomical regions of skull or the portions of the large hemispheres of brain. The latter, which relates only to the penetrating wounds, is more difficultly and it is less reliable, since topographically the portions of brain do not coincide completely with the similar/analogous regions of the bones of skull. With the bullet wounds of skull, as a rule, are secreted the following anatomical regions about the projection of the bones: frontal, sincipital, temporal, postcranial, front-naso-orbital, temporo-orbital, ear and mastoid extension, posterior cranial pit.

The official classification of the bullet wounds of brain provides for their distribution according to four portions of the large hemispheres: frontal, sincipital, temporal and postcranial. The wounds of cerebellum and brain stem into this classification are not

connected, since wounded with similar damages, usually lethal, rarely enter even the foremost stages of evacuation.

All bullet wounds of skull can be single and multiple. They can be also simple (isolated/insulated) or be combined with the damage of adjacent and border zones - eye, ear, person, neck and more distant departments.

The contemporary classification of the bullet wounds of skull and brain cannot be limited to some external static signs/criteria alone, but as far as possible must attempt to consider also the dynamics of pathomorphological and clinical course and development of complicated and protracted wound process with its diverse and frequently observing complications.

Complications with the bullet wounds of skull and brain are subdivided according to character/nature into noninfectious and infectious, but on periods or periods of onset - to early ones and late ones, in accordance with those presented in chapter III by five periods of the course of wound process.

Noninfectious complications. To a number of early noninfectious complications with the bullet wounds of skull one should relate, first of all:

1. Shock, which is observed frequently in the foremost stages of evacuation, predominantly on PMP and DMP.

2. External hemorrhages, which appear usually with wound of soft tissues with damage to temporal and postcranial artery, with nonpenetrating and penetrating wounds of skull with damage to average/mean tunicary artery and especially large/coarse sinus venosus.

Page 50.

Appearing on the field of battle or during transportation, these hemorrhages, as a rule, lead to death of wounded.

3. Intracranial hemorrhages and hematomas, which depend on wound of large/coarse tunicary vessels: a meningea media, sinus longitudinalis superior, sinus transversus, confluens sinuum, large/coarse surface vessels of brain of large hemispheres and basis, small/fine vessels in depth of brain and vascular webes/plexi in ventricles. Appearing on this basis epidural, subdural, sub-arachnoidal, intra-cerebral and intra-ventricular hemorrhages and hematomas are observed very frequently. Lethality with them is very

great.

4. Liquorrhea, or external outflow from wound of cerebro-spinal fluid, is observed two types - sub-arachnoidal and ventricular. The first depends on the damage of subarachnoid space and bears usually short-term character/nature, the second depends on the wound of the wall of lateral ventricle, it flows/occurs/lasts more long and in all bears the threatening character/nature.

5. Edema and bloating of brain - acute/sharp, jet process, which develops in brain and shells as a result of deep circulatory violations, frequently leads wounded to death.

From the late noninfectious complications of special attention deserves traumatic epilepsy, which is encountered, based on materials of military hospitals, in 1.1o/o of all wounded with the bullet damages of skull, and according to the data of the Leningrad institute of the appraisal/review of ability to work and job placement of invalids, in 7.4o/o of entire number of disabled war veterans, who transferred the penetrating wounds of skull.

Should be also noted the series/row of other complications of the late period (arachnoiditis, cyst, cicatrical painful syndromes, etc.), of the appearing as a result different violations in the zone

of a tunicary-cerebral scar, to description which are devoted several chapters of the special unit of the present section.

The infectious complications of the bullet wounds of skull are observed very frequently, are diverse, heavily flow/occur/last and depend on vastness and depth wounds, mechanism and the form/species of wound canal and break, presence in brain of foreign bodies and bone fragments, character/nature of wound infection and finally reactivity of organism and condition of its protective immunobiologic forces.

Regular connection/communication between the type of wound canal and the break of the bones of skull, on one hand, and the character/nature of the most frequently developing infectious complications - with another, was established/installed by special clinical X-ray research.

Infectious complications are divided into early ones and late ones, depending on the period of the development of complication from the moment/torque of wound and period of wound process.

Bullet osteomyelitis - least severe complication. Its reason - absence or inopportuneness of the primary processing of the wound of integuments and bones of skull or technical deficiencies/lacks in

this processing. Should be distinguished three clinical forms of osteomyelitis: lamellar, edge/boundary, diffuse (thrombophlebitis).

Page 51.

The purulent (pseudoosteomyelitis) fistulas of the soft tissues of skull are caused by the suppurative processes, which develop around foreign bodies and bone fragments, and also in the presence of external communication/report to the area of abscess or empyema of frontal sinus. Are distinguished extra- and the intracranial purulent fistulas of soft tissues.

Meningitis - frequent and terrible complication of the penetrating wounds of skull, sometimes is with the nonpenetrating wounds of the bones of skull and even with the wound of soft tissues.

Meningoencephalitis unites pure form of limited encephalitis with the encephalitis, which are escorted/tracked by primary or complicated secondary meningitis.

Abscess of brain - restricted, encysted accumulation of pus, is developed usually in connection with the defect of the primary processing of the cerebral wound when in it remain bone fragments and foreign bodies. Distinguish the early abscesses, which appear in the

process of the healing of the wound of skull (usually to 3 months from the moment/torque of wound), and the late abscesses, which appear after 3 months, when wound on skull already cicatrized and healed.

Other infectious complications, which are not independent forms and observed only with the penetrating wounds of the skull (the "malignant" protrusions of brain, ependymitis, subarachnoid fistulas and the like), are described in the appropriate chapter, dedicated to the classification of the bullet penetrating wounds of skull.

Statistical data.

The frequency of the bullet wounds of head during past wars (especially the wars of end XIX and beginning of the XX century) taking into account in this group the total data of the wounds of skull, face, eye, ear and neck achieved in general/common/total 11.0-15.0o/o.

The military collisions/encounters, which occurred in the gap/interval between the first world and Great Patriotic War, in the number of the participating trocps/forces bore the comparatively restricted character/nature and were deployed under such specific conditions that their comparison with the data of the Great Patriotic

War is indemonstrable.

As an example it suffices to cite data of the Spanish republic army, in which the frequency of the wounds of skull achieved 8.2o/o, whereas during the combat operations of the Soviet troops/forces in area of Khasan lake those wounded the skull were only 2.7o/o of all wounded, and under the military effects on river Khalkhin-Gol - 3.6o/o. During combat with White Finns the frequency of the wounds of skull achieved 4.7o/o (P.A. Cyprians).

The frequency of the bullet wounds of skull within the period of the Great Patriotic War was dissimilar. So, with the defensive actions of the first year of war, and also with the positional character/nature of combat operations the percentage of the wounds of skull was small, with offensive combat and pursuit of the routed enemy it grew/rose in essence due to ignoring by many soldiers of protective helmets.

The closed injury of head and neck during the Great Patriotic War is noted in 11.4o/o cf wounded (with respect to those had the closed damages).

The obtained closed damages only of cerebral skull with damage to bone composed 2.4o/o with respect to entire number of closed

injuries generally. In this group are introduced the closed damages, obtained with the collapse of dugouts and buildings, plotted/applied with accidents in the field of transportation, by the lumps of the earth/ground, by calculi, logs, etc.

Page 52.

The frequency of different in severity groups of the wounds of skull is shown in Fig. 7.

As can be seen from Fig. 7, more than the half all those wounded the skull had the damages only of soft tissues. These wounds flowed/occurred/lasted most easily, and bulk of wounded completely got better.

However, almost third all of those wounded the head in the Great Patriotic War obtained the heavy penetrating damages of skull to brain. As a result of the need of the prolonged and complicated treatment of these wounded was required the organization at all fronts and in all armies of the wide net/system of the specialized agencies.

The group of wounded with the nonpenetrating damages of the skulls, with which, in spite of damages to bone, solid cerebral shell

remained whole, it comprised with respect to all those wounded skull 17.3o/o. These wounded also required the specialized neuro-surgical aid, and, as showed the experiment/experience of war, during correct treatment wound process proceeded in them is comparatively favorably.

Thus, the wounds of skull with damage to the bone (including the here nonpenetrating and penetrating wounds) composed 45.4o/o of all wounds of skull.

The Great Patriotic War was characterized by troops/forces' large saturation by combat technolcgy, by wide application of the massed fire/light, in particular, artillery and mortar.

This fact was repelled also in the character/nature of the bullet wounds of skull. Attention is drawn to also the high frequency of the multiple wounds of the skull and other organs/controls.

The wounds of skull were single and set (Table 4) (in percentages).



Fig. 7. Frequency of different in severity groups of the bullet wounds of skull (in percentages).

Key: (1). Wound. (2). soft tissues. (3). nonpenetrating with damage of bones. (4). penetrating skulls also of brain.

Table 4.

(1) Характер ранений	(2) Частота множественных ранений черепа и других органов	(3) Частота изолированных ранений черепа	(4) В том числе	
			(5) одиночные ранения черепа	(6) множественные ранения черепа
(7) Ранения мягких тканей черепа . . .	28,7	71,3	63,1	8,2
(8) Непроникающие ранения черепа . . .	31,0	69,0	61,1	7,9
Проникающие ранения черепа	31,6	68,4	61,7	6,7
(9) Всего . . .	30,1	69,9	62,2	7,7

Key: (1). Character/nature of wounds. (2). Frequency of multiple wounds of skull and other organs/controls. (3). Frequency of isolated/insulated wounds of skull. (4). Among other things. (5). single wounds of skull. (6). multiple wounds of skull. (7). Wounds of soft tissues of skull. (8). Nonpenetrating wounds of skull. (9). Penetrating wounds of skull. (10). In all.

Page 53.

From Table 4 it is evident that the single wounds of skull in this war were observed less than into 2/3 cases. In remaining third of cases of wound the skulls proved to be set.

Furthermore, Table 4 shows that a quantity of multiple wounds only of skull is decreased with an increase of the severity of wounds. This is explained by the fact that the extremely heavy combinations of the multiple wounds of skull (for example, two or three simultaneous penetrating wounds), as a rule, proved to be incompatible with life, and wounded perished on the field of battle. Therefore as a result of high lethality with the multiple wounds of skull occurred the relative decrease of this group of the wounded, who entered the stages of evacuation.

The frequency of the wounds of different organs/controls with

the basic wound of skull is represented in Table 5 (in percentages).

Table 5 shows that most frequently are encountered the wounds of skull with multiple comninations. The study of the histories of disease/sickness/illness/malady showed that the multiple combinations in essence are related to simultaneous wounds by the small/fine fragments of the mines of skull, face, neck, ear, eye and shoulder belt/zone. Further in frequency follow the simultaneous wounds of skull and upper extremities, then lower extremities, chest, etc.

The distribution of the wounds of skull depending on the form/species of the wounding shell is represented in Fig. 8. On this diagram it is evident that with the wounds of skull predominated the fragmentation damages, which composed 82.7o/o, while bullet wounds composed only 17.3o/o.

However, in comparison with fragmentation ones bullet wounds were heavier - penetrating, moreover certain unit of them was escorted/tracked by the extensive decomposition of the bones of skull, brain tissue and its shells, composing the group of perforating segmental and diametric wounds.

Among multiple wounds most frequently were encountered fragmentation, however, in contrast to previous wars, were observed the multiple bullet wounds of skull (machine-gun and mainly automatic fire/light).

Table 5.

(1) Характер ранений	(2) Множественные ранения черепа и других органов							
	(4) всего	(3) в том числе: (6) лица	(7) шеи	(8) груди	(9) живота	(10) верхних конечностей	(11) нижних конечностей	(12) множественные сочетания
(13) Ранения мягких тканей черепа	28,7	3,9	1,2	2,5	0,1	6,8	6,9	8,2
(14) Непроникающие ранения черепа	31,0	4,0	0,9	2,7	0,3	7,7	6,2	9,2
Проникающие ранения черепа	31,6	4,2	0,7	2,4	0,5	6,8	6,1	10,9
Всего	30,1	4,0	1,0	2,5	0,3	7,0	6,1	9,2

Key: (1). Character/nature of wounds. (2). Multiple wounds of skull and other organs/controls. (3). among other things. (4). in all. (5). person. (6). neck. (7). breast. (8). stomach. (9). upper extremities. (10). lower extremities. (11). multiple combinations. (12). Wounds of soft tissues of skull. (13). Nonpenetrating wcunds of skull. (14). Penetrating wounds of skull.

Page 54.

The distribution of the wounds of skull depending on the character/nature of wound canal is represented in Fig. 9. In an entire group of wounds of skull tangential wounds composed 45.9o/o, ricocheting - 11.1o/o, blind - 38.5o/o, through - 4.5o/o. Should be

paid attention that the perforating wounds in effect were penetrating (segmental into 5.6o/o and diametric into 10.1o/o of cases). Among the lightest group of wounds into the soft tissues of skull predominated tangential wounds, the second place in frequency occupied blind-end wounds.

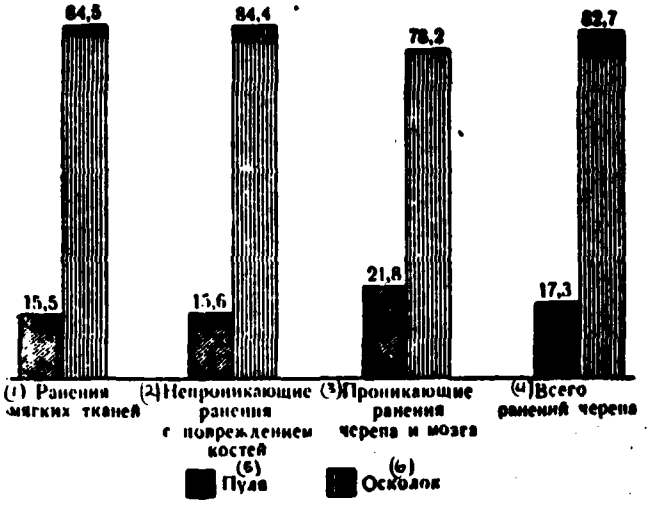


Fig. 8. Distribution of the wounds of skull depending on the wounding shell (in percentages).

Key: (1). Wounds of soft tissues. (2). Nonpenetrating wounds with damage of bones. (3). Penetrating wounds of skull and brain. (4). In all wounds of skull. (5). Bullet. (6). Fragment.

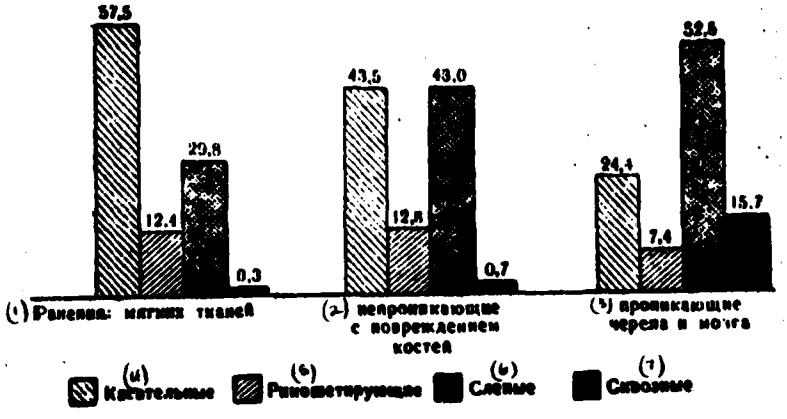


Fig. 9

Fig. 9. Distribution of wounds of skull depending on character/nature of wound canal (in percentages).

Key: (1). Wounds: soft tissues. (2). nonpenetrating with damage of bones. (3). penetrating skulls also of brain. (4). Tangents. (5). Ricocheting. (6). Blind. (7). Through.

Page 55.

For nonpenetrating wounds are typical tangential, and blind damages. The ricocheting wounds in this group are encountered more frequently than in other groups.

For the penetrating wounds by most typical ones prove to be blind-end wounds and then already tangents. Perforating wounds are characteristic also for the penetrating damages.

The comparison of the form/species of the wounding shell and character/nature of the wound canal of different groups of the wounds of skull is represented in Fig. 10. As can be seen from this diagram, the tangential damages of skull are observed considerably more frequent with bullet wounds than with fragmentation ones, moreover with an increase of the severity of wound it decreases and the frequency of tangential damages, especially with wounds by fragments.

The ricocheting wounds more frequently are encountered during damages/defeats by fragments and mainly in the group of nonpenetrating wounds.

The blind wounds predominate during the fragmentation damages/defeats of skull and are observed the more frequently the heavier the wound.

Perforating wounds are encountered 9 times more frequently in the group of those wounded by bullets, than in the group of those casualty by different fragments; their frequency grows with an increase in the severity of damage. In particular, in the group of those wounded by bullets, that obtained the penetrating damages of the skull (although an absolute number of bullet wounds of skull in this war is considerably less than in all preceding/previous wars), the frequency of the perforating wounds of skull achieved 37.1%.

The large material which was studied during the compilation of present section, made it possible to detail different combinations of the damages of skull on localization. In the development of localization are taken into consideration only the wounds of skull with the violation of the integrity of bones, since with the wound of

the soft tissues of skull localization of wounds is not reflected so/such sharply in neurologic symptomatology and course of process (Table 6).

As can be seen from Table 6, most frequently is damaged the sincipital region, then frontal and then approximately/exemplarily equally frequently temporal and postcranial.

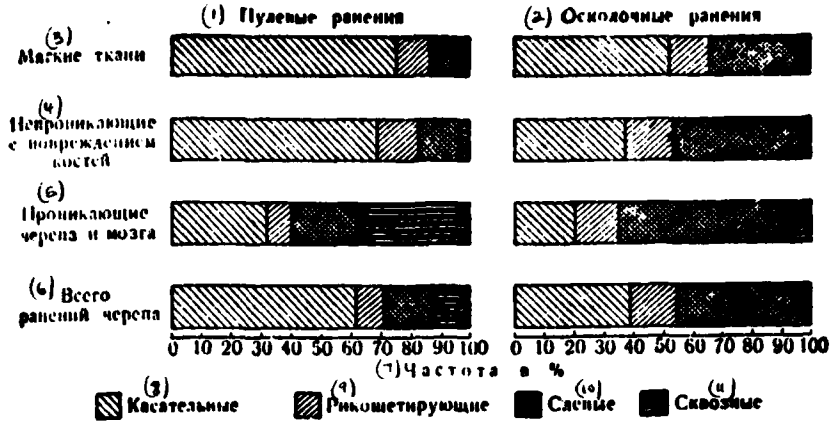


Fig. 10. Comparison of the form/species of the wounding shell and character/nature of the wound canal of different groups of the wounds of skull (in percentages).

Key: (1). Bullet wounds. (2). Fragmentation wounds. (3). Soft tissues. (4). Nonpenetrating with damage of bones. (5). Penetrating skulls also of brain. (6). In all wounds of skull. (7). Frequency in o/o. (8). Tangents. (9). Ricocheting. (10). Blind. (11). Through.

Page 56.

With the simultaneous or frontier wound of two regions should be noted the greatest frequency of the wounds of regions, adjacent with sincipital, frontoparietal, sincipital-postcranial and sincipital-temporal.

The wounds of more than two regions of skull in frequency occupy the 8th place and in the predominant number of cases are penetrating. The virtually nonpenetrating wounds of more than two regions of skull were observed only during multiple small/fine mine-fragmentation damages/defeats.

Of known interest is the distribution of the wounds of skull according to the character/nature of break.

At the beginning of the Great Patriotic War of the single roentgenological classification of the breaks of the bones of skull there did not exist. In the period of war N. S. Kosinskaya (Leningradskiy front) developed the clinical X-ray classification of the bullet breaks of the bones of skull, which proved to be most rational, scientifically substantiated and it justified itself in practice; therefore in the present section of "Work" was undertaken the basis of this classification. However, during the deepened development of the histories of the disease/sickness/illness/malady of those wounded the skull it was explained that the recordings about X-ray examinations are very contradictory and their to bring together to single classification is impossible. Nevertheless N. S. Kosinskaya's materials both on quantity and on selection make it

possible to characterize all means of the wounds of skull with the damage of bones. Therefcre in present chapter, as an exception, are given personal materials of the author of this classification (table 7).

Most frequently were encountered the perforated breaks, characteristic for the penetrating wounds, and also crushed, characteristic both for the nonpenetrating wounds (2/3 this form/species of breaks) and for the surface penetrating wounds (1/3 these all breaks).

Table 6. Frequency of different localizations of the wounds of skull with damage to bone (in percentages).

(1) Область ранения	(2) Непроникающие ранения черепа	(3) Проникающие ранения черепа
(4) Лобная	14,5	11,9
(5) Теменная	29,8	24,0
(6) Височная	10,5	10,3
(7) Затылочная	11,7	10,1
(8) Лобно-орбитальная	3,2	4,0
(9) Лобно-теменная	8,4	8,8
(10) Лобно-височная	3,4	4,9
(11) Лобно-затылочная	0,3	0,6
(12) Теменно-височная	5,4	6,2
(13) Теменно-затылочная	7,3	9,0
(14) Височно-затылочная	1,5	2,7
(15) Больше двух областей	4,0	7,5
(16) Всего	100,0	100,0

Key: (1). Region of wound. (2). Nonpenetrating wounds of skull. (3). Penetrating wounds of skull. (4). Frontal. (5). Sincipital. (6). Temporal. (7). Postcranial. (8). Frontal-orbital. (9). Frontoparietal. (10). Frontotemporal. (11). Frontal-postcranial. (12). Sincipital- temporal. (13). Sincipital-postcranial. (14). Temporal-postcranial. (15). It is more than two regions. (16). In all.

Page 57.

Incomplete breaks and isolated/insulated cracks are characteristic only for nonpenetrating wounds. They are encountered, obviously, it is more frequently than indicate the available data,

since are possible the cases of small scratches, sulci or hollows of bone, characteristic for incomplete breaks and diagnosed either clinically or roentgenclogically.

The fragmentation breaks, which are characterized by the large zone of damage to bone with the education of large/coarse bone fragments, are characteristic for the penetrating perforating segmental wounds (in more detail see chapter IV "X-ray diagnostics of the breaks of the bones of skull").

For the characteristic of the clinical severity of different groups of the wounds of skull is given Table 8.

Table 7. Frequency of different forms/species of the breaks of the bones of skull (in percentages) (according to N. S. Kosinskaya's classification).

(1) Вид перелома, определенный рентгенологически	(2) Непроникающие ранения черепа	(3) Проникающие ранения черепа
(4) Неполный	12,3	—
(5) Линейный	1,9	—
(6) Вдавленный	27,9	5,0
(7) Раздробленный	57,9	20,5
(8) Дырчатый: (9) сквозной, (10) отвесный, (11) слепой	—	71,2
(12) Оскольчатый	—	3,3
(13) Всего	100,0	100,0

Key: (1). Form/species of break, determined roentgenologically. (2). Nonpenetrating wounds of skull. (3). Penetrating wounds of skull. (4). Incomplete. (5). Linear. (6). Depressed. (7). Crushed. (8). Perforated. (9). blind. (10). plumb. (11). through. (12). Fragmentation. (13). In all.

Table 8. Frequency of the revealed violations from the side of nervous system and somatic sphere with the wound of skull (in percentages).

(1) Вид поражения / (2) Характер ранений	(3) Шок	Нарушения сознания (4)	Стволовые симптомы (5)	Нарушения зрения (6)	Нарушения слуха (7)	Общемозговые симптомы (8)	Двигательные нарушения (9)	Нарушения чувствительности (10)	Нарушения речи (11)	Изменения в крови (12)	Изменения в ликворе (13)	Изменения в крови и ликворе (14)
(15) Ранения мягких тканей черепа	0,5	59,3	1,6	6,0	28,0	1,9	3,0	1,5	0,9	11,6	1,1	0,7
(16) Непроникающие ранения черепа	1,2	80,8	6,3	21,7	51,1	14,0	22,0	11,9	1,7	22,3	6,4	2,9
(17) Проникающие ранения черепа	6,1	96,2	27,2	37,6	31,4	47,1	41,8	17,5	13,7	36,5	13,0	14,6
(18) Всего . . .	2,2	75,9	9,6	17,6	33,0	16,7	17,2	7,7	5,3	24,9	8,3	6,6

Key: (1). Means of violations. (2). Character/nature of wounds. (3). Shock. (4). Violations of consciousness. (5). Hanger-on symptoms. (6). Violations of view. (7). Violations of rumor. (8). Tunicary symptons. (9). Motor violations. (10). Violations of sensitivity. (11). Violations of speech. (12). Changes in blood. (13). Changes in cerebrospinal fluid. (14). Changes in blood and cerebrospinal fluid. (15). Wounds of soft tissues of skull. (16). Nonpenetrating wounds of skull. (17). Penetrating wounds of skull. (18). In all.

Page 58.

Detailed analysis of the data, given in Table 8, will be produced in the appropriate chapters (clinical picture, clinical laboratory diagnosis, treatment, etc.), until it should be noted that with the wounds of skull by most frequent symptcm proved to be the

loss of consciousness, revealed into 96.2o/o of cases penetrating also into of 80.8o/o cases of nonpenetrating wounds. The second place in frequency with the penetrating wounds of skull occupied tunicary symptoms, and with the wcunds of soft tissues and nonpenetrating wounds - disturbances of hearing, etc.

The clinical severity of wounds characterizes the frequency of some noninfectious complications with the wcunds of skull with the damage of bones. So, the wounds of venous sinuses with nonpenetrating wounds are noted into 1.3o/o of cases, and with those penetrating - into 3.5o/o of cases. The wounds of basic barrel and large/coarse branches of average/mean tunicary artery with nonpenetrating wounds are fixed into 1.9o/o, but with the penetrating wounds - into 1.8o/o of cases. Intracranial hematomas (epi- and subdural) were rare phenomenon with nonpenetrating wounds (0.9o/o) and comparatively frequently they were noted with those penetrating (15.3o/o). Intra-cerebral hematomas are fixed into 4.8o/o of all cases of the penetrating wounds.

The wounds of cerebral ventricles are noted into 6.3o/o of all cases of the penetrating wounds of skull.

With the penetrating wounds of skull and brain into 6.2o/o of cases developed liqiorrhea from sub-arachnoidal space or from

cerebral ventricles.

The clinical severity of different groups of the wounds of skull is characterized also by the frequency of different infectious complications from the side of brain and its shells. These complications are recorded with the wound of the soft tissues of skull into 1.3o/o of cases, with the nonpenetrating wounds of skull - into 19.8o/o, with those penetrating - into 45.7o/o, and among all wounds of skull on the average - into 17.0o/o of cases.

The given above data tell about the fact that although in the lightest group of the damages of skull - the wounds of soft tissues - the infectious complications were observed altogether only into 1.3o/o of cases, nevertheless the so/such small percent compels the doctor to be very attentive and alerted during the detection of the overall clinical phenomena which can be considered as it began the developments of terrible infectious complications.

Among the nonpenetrating wounds of skull infectious complications were noted almost in each fifth wounded. The large part of the wounded with similar complications it was possible to cure. Very important role in this case played the wide supply of army with antisepsis, also, first of all sulfanilamides. As illustration it is possible to indicate that during Great Patriotic War 81.7o/o of

wounded with the nonpenetrating wounds of skull and 94.1o/o of wounded with the penetrating wounds of skull and brain were treated by sulfanilamides.

Thus, bulk of wounded with the damage of the bones of skull was encompassed sulfanilamidctherapy (in average/mean 93.3o/o).

High value acquired also the use/application of the dehydrating substances for dealing with traumatic edema and bloating of brain. In the year of Great Patriotic War 69.2o/o cf wounded with nonpenetrating wounds the skulls and brain, while in average/mean 82.1o/o of its all wounded skull with damage bones obtained the dehydrating substances.

Page 59.

This unprecedented on completeness envelopment of wounded skull of sulfanilamidotherapy and dehydration became feasible only because of the correct organization of the specialized neuro-surgical aid in Soviet army. This made it possible to save many thousands of lives of the heroic defenders of cur native land.

With the penetrating wounds of skull and brain infectious complications were observed into 45.7o/o of cases.

It is logical that the similar complicated wounds flowed/occurred/lasted heavily, since they were developed against the background of the decomposition of the substance of brain and usually they were cured with great difficulty, in spite of all therapeutic measures.

Table 9 shows that in the group of the penetrating wounds of skull and brain most frequent infectious complications were the meningoencephalites, meningitides and abscesses of brain which, as is known, they are considered the as most terrible complications. With nonpenetrating wounds and wounds of the soft tissues of skull by most typical complications proved to be purulent fistulas and osteomyelitis. However, almost in each twentieth wounded with nonpenetrating wound skull were developed severe complications - meningitis, meningoencephalitis or abscess of brain. This forced doctor to be alerted with any wound of skull, even with nonpenetrating.

In Table 9 did not enter the data about the frequency of the protrusions of brain which was noted with the penetrating wounds into 34.9o/o, but with nonpenetrating wounds (after the operational autopsy of solid cerebral shell) - into 1.3o/o of cases.

Early epilepsy during the penetrating damages developed in 2.6o/o of wounded, and with nonpenetrating wounds - in 1.3o/o of wounded. However, this epilepsy was not independent disease as traumatic epilepsy in the ordinary understanding of this word, but only one of the symptoms of the stimulation of brain with early traumatic and infectious complications (hematcma, edema, abscess of brain, etc.).

Table 9. Frequency of different forms/species of infectious complications with the wounds of skull (in percentages).

(1) Осложнения / (2) Характер ранений	(3) Осложнений не было	(4) Виды инфекционных осложнений: (5) менингит	(6) менингоэнцефалит	(7) абсцесс	(8) ликворный свищ	(9) гнойный свищ	(10) остеомиелит	(11) комбинированные осложнения
(12) Ранения мягких тканей черепа	98,7	0,1	0,2	0,1	—	0,7	0,2	—
(13) Непроникающие ранения черепа	80,2	1,3	0,8	2,2	—	7,5	6,6	1,4
(14) Проникающие ранения черепа	54,3	10,8	13,3	12,2	0,9	3,9	1,7	2,9
(15) Всего . . .	83,0	3,3	4,0	3,8	0,6	2,5	1,8	1,0

Key: (1). Complications. (2). Character/nature of wounds. (3). Forms/species of infecticus complications. (4). Complications it was not. (5). meningitis. (6). meningoencephalitis. (7). abscess. (8). subarachnoid fistula. (9). purulent fistula. (10). osteomyelitis. (11). combined complications. (12). Character/nature of wounds. (13). Wounds of soft tissues of skull. (14). Penetrating wounds of skull. (15). In all.

Page 60.

In Table 10 are briefly described the outcomes of the bullet wounds of skull depending on the severity of damage (in percentages).

As can be seen from this table, more than two thirds of a number of all wounded completely recovered or temporarily lost ability to work. Such results of the treatment of those wounded the skull are unprecedented in the history of large/coarse wars and testify about the exceptional achievements of the military field surgery of Soviet army, about the celebration of her single doctrine as basis of which is assumed the principle of the line-of-communication, specialized treatment of wounded with evacuation according to designation/purpose.

Table 10.

(1) Характер ранений черепа	(2) Полностью выздоровели или временно утратили трудоспособность			(5) Прочие исходы
	(3) всего	(4) в том числе		
		(6) полностью выздоровели	(7) временно утратили трудоспособность	
(8) Мягких тканей . . .	99,6	96,6	3,0	0,4
(9) Непроникающие . .	96,4	72,1	24,3	3,6
(10) Проникающие . . .	46,8	12,7	34,1	53,2
(11) Всего . . .	83,4	68,5	14,9	16,6

Key: (1). Character/nature of the wounds of skull. (2). Completely they recovered or they temporarily lost ability to work. (3). in all. (4). among other things. (5). Other outcomes. (6). completely they recovered. (7). they temporarily lost ability to work. (8). Soft tissues. (9). Nonpenetrating. (10). Penetrating. (11). In all.

Page 61.

Chapter III.

GENERAL PATHOLOGY OF THE BULLET WOUNDS OF SKULL AND BRAIN AND THEIR COMPLICATIONS.

Edema and swelling of brain.

Edema and bloating of brain are the special reaction of brain in response to different stimulation-injury, hemorrhage, development of neoplasms, etc. This reaction causes completely special character/nature of all pathological processes, which take place in brain, and plays extremely large role in the development of pathological conditions after bullet damages.

By terms "edema" and "bloating" of brain accept to understand to the damage of the water metabolism/exchange of the cerebral tissue, which are expressed in an increase in the volume of brain.

The essence of edema consists in an increase in the quantity of free fluid/liquid in pericellular and perivascular spaces. The bloating of brain is characterized by an increase in the fluid/liquid, connected with the proteins of the cellular elements/cells of brain.

The research of a number of the Soviet authors from the school of N. N. Burdenko, and also of V. N. Shamov, L. A. Orbeli, P. Ye. Spesareva and work of some foreign authors in detail illuminated the pathogenesis of edema and bloating and established/installed basic condition/positions for the understanding of the role of these conditions with the wounds of brain and for determining the method of their rational prophylaxis and treatment. The violation of water cerebral metabolism requires special attention not only because the water metabolism/exchange in central nervous system is located in more unsteady state, than in any other organ/control, but also because a change in it leads to an increase in the volume of brain, restricted by the locked space of skull. Therefore with an insignificant increase of the volume of brain in skull are filled its all additional area-tanks and sub-arachnoidal spaces, cerebral substance is squeezed, brain tissue is pinched in the region of the aperture of cerebellar coat or large foramen. Further increase in the volume of brain impedes blood circulation in capillaries, in consequence of which it is disrupted, and thereupon ceases the activity of nerve

cells.

The same process of an increase of the volume of brain in the skull whose integrity is disrupted, leads to the filling with the brain of the wound aperture of skull and to protrustion from it of the substance of brain and the form/species of the protrusion of different value and in accordance with this causes jamming and partial death of the strangled nerve tissue.

Page 62.

The dynamics of the violation of water metabolism/exchange with the open injury and after it was studied experimentally by S. Yu. Minkin in clinic of V. N. Shamov (1939).

The obtained by him data are reduced to the fact that following with injury is detected the development of edema of brain. Toward the end of the first and beginning of the second day edema of brain achieves its maximum, after which begin to predominate the phenomena of the bloating of brain. Toward the end of the fourth and the beginning of the fifth day the degree of bloating gradually is decreased and grows the picture of secondary edema which still distinctly is determined after 11 days. Of course the data of onset presented and the developments of physicochemical changes in brain

are only schematic and in practice considerably oscillate, since they depend on a whole series of all possible conditions and first of all from localization and volume of the destruction of brain.

By the reason for the onset of edema of brain with injury P. Ye. Snesarev considers the violation of hemodynamics and the liberation/excretion of fluid/liquid vessels as a result of an increase in the permeability of their walls.

The second reason for edema is a change in the hydrophilic behavior of the colloids of living tissues.

L. I. Smirnov in the pathogenesis of edema of brain attaches the vital importance of the hypersecretion of cerebro-spinal fluid by the epitheliades cell of vascular webes/plexi and sub-arachnoidal spaces. He indicates also the large role in the development of edema of the violations of circulation, anaemic condition of sanguiferous system, which is relieved by passive hyperemia, stasis.

The American authors (Rend and Courville) completely disregard the value of vasomotor disorders in the develcpment of edema of brain and they consider that only role in this case plays hyperproduction of cerebro-spinal fluid by vascular webes/plexi.

Evidently, besides the violation of circulation in sanguiferous system and overproduction of cerebrospinal fluid, has value and violation of the speed of the absorption of cerebrospinal fluid. S. Yu. Minkin gives the facts, which demonstrate the violation of the absorption of cerebro-spinal fluid in patients, by which were introduced different vegetotropic preparations. Clinical observations establish also beneficial effect on the course of edema of the brain after piercing of sub-arachnoidal spaces with the removal of them even of a small quantity of cerebrospinal fluid.

Thus, it is necessary to think that in the pathogenesis of edema of brain has a value the disorder of blood circulation with the violation of liberation/excretion and absorption of cerebro-spinal fluid.

In this case it is necessary to keep in mind that the function of vasomotors is regulated by sympathetic nervous system. The effect of the latter on blood circulation and water balance of brain was established/installed by the works of L. A. Orbeli et al., which showed that in the control of the water metabolism/exchange of brain participates also the pituitary gland.

The pathogenesis of the bloating of brain is studied by N. N. Burdenko's school. Clinical data made it possible to assume that the

reason for bloating is the reflector mechanism. As basis for this served observations of patients with surgical interventions in the region of the barrel of brain and third ventricle. Is especially sensitive the hypophysial-infundibular region whose stimulation causes sharp swelling of brain.

Page 63.

In bloating actively participates cerebral tissue itself. This is why under specific conditions the diverticulum of cerebral substance is irrepressible deployed similarly to reflex.

Experimentally this question is developed in B. N. Klosovskiy's laboratory, who studied water cerebral metabolism via the effect on vegetative system. During the stimulation of vegetative centers in average/mean brain in dogs attacked/advanced the instantaneous bloating of brain, which was revealed/detected in its fallout into the preliminarily made trepanation aperture of skull. Were histologically established/installed the almost complete absence of the blood in vessels, the absence of perivascular and pericellular spaces. During Nissl staining nerve cells were sharply vacuolized ones and deformed.

Macroscopically it swelled brain it is characterized by an

increase in the volume. The windings of brain are smoothed, veins are expanded and become plethoric. The shells of brain slightly cloud, and the expanded liquor spaces are filled with cerebro-spinal fluid, in consequence of which the brain in section/cut proves to be moist. The swollen brain differs from edematic in terms of sharp anemia, special by density, absence of fluid/liquid in liquor areas, wasting of vessels. In section/cut the brain of dry. At the places of bone prominences and edges of solid cerebral shell are sectors of hemorrhage and necroses.

The microscopic changes, characteristic for edema of brain, repeatedly attracted attention of the researchers. In recent years this question is most in detail developed by the Soviet authors. Not all zones of brain with its injury are equally subjected to edema; so, in gray substance, brain stem and calloused body the phenomena of edema are observed more rarely, whereas in white substance edema becomes apparent most vividly and rapidly. With edema pericellular spaces are expanded. Nerve fibers are made by those loosened, is observed their disorientation. The cells of oligodendroglia increase, their body is expanded and protoplasm becomes macrovacuolar and polythalamous, extensions are made by short ones and disappear. The lumens of vessels either are expanded or completely they are dropped. Their endothelial cells increase in sizes/dimensions, nuclei are made by bright ones. Perivascular spaces sharply are expanded.

With bloating changes in the nerve cells are expressed mainly in the fact that their dendrites are thickened and become the visible at a great distance. Changes in the nerve fibers with bloating morphologically coincide with their changes with edema of brain. Glial elements/cells, first of all astrocytes, will swell, their bodies are thickened and contain many large/coarse vacuoles, but extensions take the deformed form. In final stage attacks/advances clasmatodendrosis and complete decomposition/decay of cellular body. Vessels barely change, their only walls weakly will swell and are made by fibrous ones.

Thus, microscopically typical for edema it is necessary to count increase in the volume of perivascular oligodendroglia and expansion of the pericellular and perivascular spaces; whereas for bloating are characteristic only changes in the astroglia up to clasmatodendrosis.

Clinically the condition of edema and bloating of brain becomes apparent in the symptoms of an increase in the intracranial pressure, nonuniformity of pulse, disorder of respiration, improvement in the temperature, comatose condition, transient paresis, aphasias, psychoses, etc.

To distinguish clinically the condition of edema of brain of its bloating is not impossible. With differentiation of edema and bloating of brain from the organic processes, connected with the specific destructive changes, hemorrhages, meningitides, etc., it is necessary to keep in mind that the first are characterized by the mutability/variability of their course, whereas the second are characterized by more stable, prolonged and clearer objective symptoms.

The character/nature of wound, volume and localization of the damage of brain, and also condition of combat circumstances, transport, period and character/nature of neuro-surgical processing to a considerable extent affect the clinical picture of traumatic edema and bloating of brain and they make with its very diverse.

Moderate edema with which circulatory processes in brain change, frequently contributes to the known immobilization of brain in cranial box.

Considerable edema or bloating of brain causes the heavy clinical and morphological changes which with limber lead to lethal outcome.

Struggle with the phenomena of edema of brain is based on introduction of substance, which increase osmotic pressure in the blood and the tissues. Clinical observations of the oscillation/vibration of the production of cerebro-spinal fluid confirmed the correctness of this position/situation.

S. Yu. Minkin on patient with the outflow of cerebrospinal fluid from the isolated/insulated by neoplasm lateral ventricle of cerebrum showed that the intravenous introduction 50 cm^3 30o/o of solution of sodium chloride not only lowers, but completely ceases the liberation/excretion of cerebro-spinal fluid by the vascular webes/plexi of ventricles for 1-1 1/2 hours. After reception by the patient of 200 cm^3 of water in it again was secreted the cerebrospinal fluid. The introduction of 50 cm^3 40o/o of solution of glucose did not intravenously cause noticeable changes in the production of cerebro-spinal fluid. Approximately/exemplarily analogous data obtained V. M. Sitenko during the observation of the patient who suffered nasal liquorrhea with outflow fluid/liquid from sub-arachnoidal space.

Observations of wounded with the extensive defects of skull and fallout of brain during war with White Finns and in the Great

Patriotic War also showed that the hypertonic solutions of electrolytes (sodium chloride, sulfate magnesia, etc.) increase osmotic pressure in the blood considerably more strongly and perform more long than nonelectrolytes (for example, glucose).

Numerous infusions of the hypertonic solutions of common salt, which were being applied in clinic of V. N. Shamov are more than 10 years on many patients with neoplasms and wounds of brain, just as the results of the wide application of these solutions in the period of the Great Patriotic War, they did not confirm those fears which were expressed in the foreign press. The infusion of the hypertonic solutions of common salt was always escorted/tracked by the rapid and considerable effect which was noted even when preliminary introduction of the solutions of glucose did not give effect. The hypertonic solutions of common salt in comparison with the solutions of magnesia sulfate have an advantage in that sense, that they can be applied simultaneously with sulfanilamides. This fact is important with the wounds of brain under military conditions.

B. N. Klosovskiy for setting of different activity of those dehydrating of a substance-glucose and by that cooked salt-investigated those wounded the skull with the presence of liquorrhea. He showed that only intravenous introduction 20 cm^3 15o/o of solution of common salt gave prolonged positive effect. With the bloating of

brain (confirmed in section) the infusion of the hypertonic solution of salt did not give effect.

Page 65.

Short-term improvement was achieved in this case only after the intravenous infusion of the solutions of glucose. The mechanism of dehydration with edema and bloating B. N. Klosovskiy explains by the effect of glucose with the bloating of brain on the vegetative system stimulation by which leads to reverse/inverse process-protrusion of cells.

During the Great Patriotic War with the wounds of brain as the dehydrating substances most widely were applied the solutions of glucose and of common salt. The solutions of sulfate magnesia used comparatively rarely and almost completely they were not applied solutions saccharoses. The usually dehydrants were introduced intravenously, solutions of magnesia - are intramuscular, per os, also, in enemas.

As basic reading to the use/application of hypertonic sclutions serves the growing the intracranial pressure increase. With the bullet wounds of skull the best method for setting of readings and contraindications to the use/application of the dehydrating

substances consists in observation of the condition of wounded.

Is contraindicated the use/application of hypertonic solutions in the following cases: 1) with lowering in the intracranial pressure (in these cases, on the contrary, it is possible to use the injections of the destilled water or the sub-arachnoidal introduction of air); 2) with the deep shock; 3) with the continuous cerebral hemorrhages and the heavy contusions of brain.

Besides the intravenous introduction of hypertonic solutions, for lowering in the intracranial pressure are applied also the diuretics and is limited the reception/procedure of fluids/liquids. Besides this, it is necessary to take measures for the blood pressure increase.

Lumbar or suboccipital punctures for separating of cerebrospinal fluid and decrease in this way of intracranial pressure in a number of cases proved to be especially effective. The value of the unloading punctures hardly is possible to overestimate - with the acute/sharp injury of skull they give effect immediately.

However, it is necessary to remember that these unloading punctures can be the reason for very undesirable complications with restricted edema of the temporal portion when the rapid evacuation of

cerebro-spinal fluid can cause the jamming of the barrel of brain. Therefore it is always more preferable for lowering in the intracranial pressure to begin with the intravenous introductions of hypertonic solutions and with failure to only convert/transfer them to the cautious unloading punctures. In certain cases during the combination of edema with the bloating of brain even this combination can not give the desired results. In the similar cases it is necessary to sometimes raise the question about decompressive trepanation.

Thus, one of the most permanent, very early and frequently severe complications during the damage of brain are the appearing in it processes of the viclation of water metabolism/exchange. As the nearest reasons for the development of these processes, obviously, serve reflector actions, and also direct damage to tissue, brain, its shells, blood vessels, etc. Besides an increase of the volume of brain in the locked cranial box and, therefore, the violations in it of normal circulatory processes, are disrupted the physiological functions of brain itself and unavoidably entire organism. The latter fact in turn, complicates the course of the damages of skull and brain.

All this dictates the need for a strict accounting of the pathological conditions indicated and timely on them action.

Page 66.

Microflora of the wounds of brain.

During the Great Patriotic War was in detail and systematically studied by different installations of our country and, in particular, by the laboratories of the Institute of Neurology of AMN of the USSR a very important question about microflora of the wounds of brain.

From 1942 bacteriological research they were conducted also in the specialized hospitals of army, front line and service area.

N. I. Grashchenkov investigated more than 1000 those wounded the head brain, of them 75.0o/o with the bullet wounds of skull. Were produced more than 10000 analyses, moreover was retained as far as possible succession in research between the army, front line and rear stage of evacuation.

Researchers posed the problem not only to study wound flora from the first days of wound to the healing of wound, but also to explain the dependence of the course of the wound of brain on the character/nature of its pathogenic microflora, severity of wound,

promptness and completeness of surgical intervention, or treatment in post-operation period.

During the study of microflora of the wounds of brain were conducted bacteriological research with the liberation/excretion of the pure/clean cultures of pathogenic microorganisms, careful microscopy both of cerebral and developing on the appropriate media microbial cultures, comprehensive analysis of pure/clean cultures in the relation to of their morphological and biochemical properties and pathogenicity. Singular value was given to the analysis of the pathogenicity of the most important microbial associations during wound infection. Was investigated the character/nature of changes of the microbes in wound under the effect of sulfanilamide preparations and antibiotics, were carried out the parallel microbiological and cytological research of wound discharge, and also the research of immunity.

It was established/installed, that the microbial contamination of the wounds of skull is observed in all cases. Wound infection can develop under under the effect of different reasons, even after early surgical processing, in particular if the wounded is evacuated prematurely. Early evacuation and absence of prophylaxis with sulfanilamide preparations or antibiotics frequently lead to the dissemination of wound infection from wound canal on shells and the

substance of brain.

In the course of the first month from the moment/torque of wound descends a quantity of pathogenic anaerobes, which soil wound. One should be specified that the percentage of the content of anaerobes in different wounds is not identical. So, in the wounds of extremities pathogenic anaerobes, in particular, Cl perfringens, are encountered into 44.0o/o of cases, in the wounds of brain - into 34.6o/o, and with the nonpenetrating wounds of skull - into 8.2% ~~8o/o~~. This is explained by the fact that with the penetrating wounds are created the favorable conditions for the rapid development of the carried with wound pathogenic anaerobes. Such conditions include oxygen starvation of tissues as a result of the damage of blood vessels, and also presence of the cerebral detrite, which is good nutrient medium for reproducing the pathogenic anaerobes.

The percentage of contamination by microflora of the wounds of brain is changed depending on the periods of wound.

As can be seen from Table 11, a quantity of anaerobes and hemolytic streptococci, which soil the wound of brain, decreases with each ten-day period/decade, while a number of nonhemolytic streptococci grows. Grows also a quantity of intestinal and Pseudomonas pyocyanea.

Page 67.

Streptococci and anaerobes are developed in medium with pH=6.2-7.2, staphylococci - with pH=6.2-8.2, enteric bacteria - with pH=5.6-8.5, Pseudomonades pyocyanea - with alkaline medium.

The relationship/ratio of the individual forms/species of the pathogenic and putrefactive anaerobes, which soil cerebral wound into the first ten-day pericd/decade, it is shown in Table 12.

In frequency the determinations of different anaerobes of the wound of brain closely stand to the wounds of extremities. The wounds of brain are contaminated by the same anaerobes, as the wounds of extremities, although the percentage of the isolatable pathogenic and putrefactive anaerobes with the penetrating wounds of brain is somewhat less than with the wounds of extremities.

Table 11.

(1) Вид микробов	(2) Процент загрязненных микрофлорой ран мозга по дням с момента ранения			
	1–10	10–20	20–30	30–40
Анаэробы (3)	34,6	16,0	14,0	2,0
Аэробы (4) гемолитические стрептококки (5)	33,0	32,0	25,0	20,0
Аэробы негемолитические кокки (6)	27,0	33,0	42,0	52,0

Key: (1). Form/species of microbes. (2). Percentage of those contaminated by microflcia of wounds of brain on days from moment/torque of wound. (3). Anaerobes. (4). Aerobes. (5). hemolytic streptococci. (6). nonhemolytic cocci.

Table 12. Relationship/ratio of the individual forms/species of the pathogenic and putrefactive anaerobes, which soil cerebral wound (in percentages).

Вид микробов (1)	Первая декада после ранения (2)	Вторая декада после ранения (3)
Патогенные анаэробы (4)		
Clostridium perfringens	34,6	
" oedematiens	5,0	
" histolyticus	0,5	
" tetani	5,0	
" sordelli . . .	5,0	
" fallax	3,0	
" carnis	0,5	
Streptococcus anaërobicus	9,0	
Гнилостные анаэробы (5)		
Clostridium sporogenes . .	6,0	28,8
" putrificum . .	3,0	20,0
" butyricum . .	—	14,0
" tetanomorphum	--	20,3

Key: (1). Form/species of microbes. (2). First ten-day period/decade after wound. (3). Second ten-day period/decade after wound. (4). Pathogenic anaerobes. (5). Putrefactive anaerobes.

Page 68.

With the penetrating and nonpenetrating wounds of skull in the character/nature of microflora is a difference. The experimental reproduction of the anaerobic infection of brain by inoculation into the submembrane space of the brain of the experimental animal cultures of the pathogenic anaerobes, isolated from the wounds of

Table 13. Percent of inoculability of microbes contaminating wound by days from moment of injury.

Вид микробов (1)	1–10-й день (2)	10–20-й день (2)	20–30-й день (2)	30–60-й день (2)
Анаэробы: патогенные и гнилостные . . . (3) . .	100,0	82,0	36,0	3,0
Аэробы (4) гемолитические стрептококки (5)	28,0	52,0	29,0	60,0
Аэробы негемолитические кокки . . . (6).	58,0	78,0	88,0	100,0

Key: (1) type of microbe. (2) day. (3) anaerobic; pathogenic and putrefactive. (4) aerokes (5) hemolytic skeptococci. (6) nonhemolytic streptococci.

brain, led to the rapid death of animals even in the small doses of pathogenic anaerobes. However, with inoculation into the soft tissues of the skull even of larger doses was developed only transitory edema. This is one of the proofs of the fact that in the damaged brain tissue the pathogenic anaerobes can rapidly multiply.

The composition of microflora, which soils the wound of brain, in the course of the development of wound process in quantitative sense is changed.

As can be seen from Table 13, between pathogenic and putrefactive anaerobes, on one hand, and hemolytic streptococcus and by other forms/species of cocci (streptococci, staphylococci, etc.) - with another, is noted peculiar antagonism.

Such dynamics of the development of the microflora, which soils wound, is characteristic for coursing the wound, which is not escorted/tracked by complications. In the absence of processing the wound of brain pathogenic flora long is held up in cerebral tissue, the putrefactive microorganisms beginning to be developed especially rapidly. In such patients in the course of 2-3 months after wound is observed the following flora: pathogenic anaerobes - 62.0o/o, staphylococci - 71.0o/o streptococci - 91.0o/o, the coliform bacterium - 42.0o/o.

From pathogenic anaerobes most stably it is retained in wounds Cl, perfringens. On the contrary, Cl oedematiens, Cl sordelli and others usually are enccuntered during the first ten-day period/decade after wound and subsequently are detected only in the exceptional cases. However, disappearing frcm wound discharge, these anaerobes can be retained in deep wound pockets and subsequently cause different complications, up to wound sepsis.

Thus, for instance, in wounded T Cl perfringens and Cl oedematiens they were fcund in discharge frcm the depth of cerebral wound on the 12th day after wound. In further seedings/inoculations of wound discharge then they revealed/detected not to the time, but after 4 months, in the day of death of wounded, both these of the form/species of anaerobes they proved to be in seedings/inoculations from the wound canal of brain. Cl perfringens, furthermore, it was isolated from cerebro-spinal fluid, a Cl oedematiens - in seedings/inoculations of the blood from heart and from the liver, undertaken through several hours after death cf wounded. Were observed numerous cases when prolonged liberation/excretion from wound Cl perfringens was not reflected noticeably in the course of wound process. So, in sick Ts and K. Cl perfringens it was secreted of the wound of more than 2 months and nevertheless the process of

healing proceeded almost normally.

In the complicated interconnection peace/world and macroorganism were revealed/detected the known relationships/ratios; especially this concerned the force of the pathogenicity of anaerobes. The pathogenicity of anaercbes is reinforced in such associations as Cl perfringens s Cl sporogenes or with replacing ego Cl putrificum.

Page 69.

In the wounds of dead persons were observed complicated microbial associations, in particular, association of the pathogenic and putrefactive anaerobes, sometimes in the connection with Streptococcus anaerobicus. During the happy course of wound process in wounds is usually found only Cl perfringens. The prolonged contamination of wounds by pathogenic anaerobes in combinatica with putrefactive anaerobes predetermined the frequently unhappy course of wounds. Unfavorable was the combination of pathogenic hemolytic streptococci with pathogenic and putrefactive anaerobes. Unfavorable on outcomes, although to a lesser degree, proved to be the wounds, contaminated putrefactive aerobes in association with the hemolytic streptococcus; in this case process it flowed/occurred/lasted with putrefactive decomposition/decay or protrusion into the wound of cerebral substance in the general heavy condition of wounded.

The diversity of the putrefactive forms of aerobes, which soil wound, presence or absence of complicated associations determined the diversity of clinical special features/peculiarities in this group of wounded.

The course of wounds frequently acquired the threatening character/nature during contamination by putrefactive anaerobes or putrefactive aerobes in combination with pathogenic streptococci. With the generalization of infection, together with heavy general condition, were noted the absence of the pulsation of brain in the region of wound, the liberation/excretion of cerebral detrite with odor, the formation of serocontaminated deposit, the fallout of cerebral substance, and in other cases and the development of the encephalitis of anaerobic etiolcgy.

Most easily flowed/cccurred/lasted the wcunds, contaminated by ordinary coccic flora, namely by staphylococci, micrococci, Sarcinas, etc. The character/nature of the microbial contamination of wounds and especially the presence of one or the other microbial associations they predetermined frequently and very course of wound process.

The generaliza' ion of the specific means of pathogenic microflora or microbial associations depended on the reactivity of organism, severity of the wound of brain, form/species of surgical intervention, period and character/nature of evacuation and character/nature of subsequent neuro-surgical intervention.

Consequently, the microbial contamination of the wound of brain and its dynamics the not isolated/insulated phenomenon, they stand in continuous relation with the enumerated above conditions.

The accounting of the character/nature of microbes and microbial associations in wound has high value for the successful treatment of the wounds of brain.

It should be noted that sometimes soon after wound (already on the 3rd day) in the blood and the cerebro-spinal fluid appeared these or other cocci. These microbes soon disappeared and were detected only in wound discharge. Fact this makes it possible to assume that the microbes, as a result of the violation of the cross-country ability of blood-brain barrier at the moment of wound, can penetrate in the blood stream and in cerebro-spinal fluid. In proportion to an improvement in the condition of wounded further entrance of microbes into liquor system ceases. With the acute/sharp forms of anaerobic infection, as a result of the violation of the histiocytic barrier

between the damaged and healthy/sound brain tissue, is facilitated the penetration of microbes into sub-arachnoidal space.

The presence of microbes in the blood and the cerebro-spinal fluid within the early periods of wound indicates the need possible for earlier prophylaxis by sulfanilamides or by antibiotics.

The severity of anaerobic infection with the wounds of brain is found in complete agreement with the clinical picture of disease.

Page 70.

So, of 14.3o/o of patients, that had the wounds of brain, contaminated by pathogenic anaerobes, died about one third, of the wounded with the sharply flowed/occurred/lasted anaerobic infection died the half, from wounded with the subacute flowed/occurred/lasted anaerobic infection died one third, of the wounded with chronic course it died about half.

The gaseous gangrene of brain was observed usually into the specialized KhPPG armies, subacute form - in the hospitals of front, anaerobic encephalitides - in rear evacuation hospitals. The latter/last form of gaseous infection drew the attention of the surgeons and found its reflection in the literature, while the

acute/sharp form of encephalitis. The concept about primary encephalitis should be considered polythalamous, from it it is necessary to secrete the concept of the gaseous gangrene of brain.

Immunity appears in the organism of wounded when of microbial contamination, including infection of the wounds of brain is present. If we investigate antibodies in blood serum, then their caption in heavily wounded into the first ten-day period/decade after wound is equal to zero. Beginning from the 10-15th day, it systematically grows and it achieves maximum to 30-60 days after wound. The increased caption of antibodies is retained to the moment/torque of disappearance from the wound of the microbe, which produced an increase in the caption. After this caption gradually it descends. 2-3 Months after wound and after the cicatrization of wound the caption still remains considerable, which gives the possibility to determine by serological method the available previously infection.

Pathological anatomy of the bullet wounds of skull and brain.

Within the time of the Great Patriotic War Soviet anatomical pathologists fulfilled vast work on the study of wounds of skull and developing after them complications. The autopsies of dead persons from the injury of skull were conducted in all stages of evacuation,

and also it is direct on the field of battle. Was accumulated large and diverse material fcr the thorough study cf the morphology of the traumatic damages of skull and brain.

In many instances the observed morphological pictures were photographed and were sketched.

The anatomical pathologists of Soviet army worked in intimate contact with the doctors in attendance, in particular, with neurosurgeons. The cases of death of wounded from the injury of skull, as from other means of wcunds, they underwent careful study at clinico-anatomical conferences which sufficiently regularly cccurred in all therapeutic installations of army, army, front line and service area. At these ccnferences, as with anatomical pathologists' daily contact with neurosurgeons, were thoroughly analyzed the results of pathoanatomical observations. Thus, the anatomical pathologists of Soviet army actively helped neurosurgeons in the explanation of the reasons for death of those wounded the skull.

The sums of the study of questions of the pathological anatomy of the combat injury of skull and brain regularly were illuminated at numerous scientific congresses/descents and conferences, which occurred during war. Basic questions of the morphology of the wounds of skull and brain are reflected in the series/row of the

communications/reports, published in different collectors/collections and logs/journals.

The detailed description of the pathological anatomy of the wounds of brain is stated in the monographs of Soviet neurohistologists P. Ye. Snesarev and L. I. Smirnov.

Page 71.

To the generalization of vast material on the pathological anatomy of the combat injury of skull and brain, accumulated for the time of the Great Patrictic War, and is dedicated present chapter.

The pathoanatomical changes in the brain, which develop as a result of combat injury, are diverse. This diversity is caused by the series/row of the moments/torques: by form/species, form and kinetic energy of the wounding shell, by ratio of the line of the flight of shell to skull, by topographic special features/peculiarities of the region of damage, by individual characteristics of skull and brain, etc. On the combination of these facts it depends, will be maintained or disrupted the integrity of the bones of skull, solid shell and substance of brain in each individual case.

To the onset of the series/row of pathoanatomical changes

contribute inopportuneness and low quality of surgical aid, premature evacuation, noncorresponding form/species of transport, etc.

Dynamics of pathological changes after the injury of skull and brain. The regular shift/relief of the phenomena, which develop with the injury of skull and brain, makes it possible to distinguish in their course the series/row of the periods. Each period is characterized by the specific pathomorphological picture. For the characteristic of the individual period in each specific case vital importance have: the stage of the healing of the primary fault of the substance of the brain; the condition of blood circulation and liquor circulation; the presence of complications from the side of brain and its shells, their character/nature.

Up to the moment/torque of the termination of the Great Patriotic War arose the need for combining proposed by many authors classifications of the course of wound process in brain and manufacturing the most rational single classification of the stages of the development of pathological processes after the bullet wounds of skull and brain. This mission carried out Soviet neurosurgeons, who gathered to VII session of the neuro-surgical advice/council on 22 May 1946. According tc accepted at this session classification, all the course of the injury of skull and brain conditionally is divided into the following periods:

1) initial, or acute/sharp, period;

2) the period of early reactions and complications (infection and discirculation);

3) the period of the elimination of early complications and tendency toward the limitation of the infection focus;

4) the period of the late complications;

5) the period of the distant consequences.

The duration of each of the periods indicated is not identical in different cases and depends on many moments/torques. Most important of them are the vastness of the primary decomposition of the substance of brain and the character/nature of the connected complications. From these complications in the first place will cost the suppurations. Has a value and anaerobic infection. Individual periods were characterized by the following signs/criteria.

I. Initial, acute/sharp, period envelop approximately first three days after delivering of combat injury. At this time most

vividly become apparent the changes, caused by the direct activity of mechanical energy [1].

FOOTNOTE [1]. Questions of ballistics in present section are not examined, since they will be illuminated in IV unit of the present "Work". ENDFOOTNOTE.

Page 72.

Most characteristic pathcanatomical changes of the brain in acute/sharp period are: necroses and dystrophias in the place of wound, violations of blood circulation, violations of water metabolism/exchange and liquor circulation. Jet phenomena in this period are expressed weakly. There are nc infectious complications in the overwhelming majority of the cases.

The degree of the manifestation of the phenomena, caused by the direct activity of injury, is not always identical. Frequently were encountered wounds with comparatively small primary necroses, but with the sharply pronounced discrders blood circulations and water metabolism/exchange. In the onset of these disorders vital importance had the late carrying cut of wounded from the field of combat, and also the insufficient or late shcwn/rendered medical aid. Were observed the cases and also of contradictory/opposite character/nature,

when the extensive decomposition of the substance of brain was escorted/tracked by comparatively small disorders of blood circulation and water metabolism/exchange. The observations indicated testify about the absence of the complete dependence between primary necroses, disorders of blood circulation and water metabolism/exchange.

However, in a number of cases of the discrder of blood circulation and water cerebral metaboliss was caused by vastness the decomposition of the substance of brain. Ay the same time the primary necroses, which appear as a result of the direct activity of injury, increased in connection with the violations of blood circulation.

Thus, primary necroses, disorders of blood circulation and water metabolism/exchange in acute/sharp period appear in brain tissue independently of each other, as a result of the direct activity of injury. But during further development they can exert a substantial influence on each other.

The cases of death in acute/sharp period were most frequently connected with the direct activity of injury. Almost into 50.0o/o of cases death was caused by the severity of wound (extensive decomposition of the substance of brain, the damage of vital centers, the wound of ventricles). About 40.0o/o of the fatal results were

connected with the disorders of blood circulation (large/coarse hematomas) and water metabolism/exchange (edema and bloating of brain). Only in the insignificant percentage of the cases the reason for death in this period were the rapidly flowed/occurred/lasted infectious complications.

Observations show that a great number of autopsies fell on dead persons in acute/sharp period.

II. Period early reactions and complications (infection and discirculation) begins by approximately the third day after delivering of injury. Average duration of this period - about one month. Pathoanatomically this period is characterized by the jet changes in substance and shells of brain, which appear both in the regions, which border to primary traumatic necroses, and in distance from them, and also by jet changes in the periphery of foreign bodies, by consecutive disorders cerebrospinal fluid and blood circulation, by the appearance of infectious complications both of the restricted and diffuse character/nature.

In this period are observed the processes of the self-purification of wound canal from the fission products of the brain tissue and issuing from blood. In the area of damage it is noted the mobilization of the cells, which fulfill in brain the element function of reticulo-endothelial system. At a certain distance from wound canal appears jet aseptic inflammation.

Page 73.

Mortality in the second period by larger unit depends on the diffuse purulent inflammation of shells and substance of the brain (diffuse purulent leptomeningitis and encephalitis).

As other reasons for death in this period served the secondary hemorrhages, which appeared in connection with the development of infection. In certain cases the development of hemorrhage stood in connection with the defects of transport or therapeutic aid. The specific place occupied the cases of death from edema and bloating of the substance of brain.

III. The period of the elimination of early complications and tendency toward the limitation of infectious focus begins by approximately the second or third month after wound. In mild cases this period began somewhat earlier. Its average duration about 4 months. Morphologically - this is the period of predominantly productive phenomena (phenomena of healing) and limitation of infectious foci.

The pathological anatomy of the described period is characterized by the predominance of the processes of the substitution of the tissue defect above the processes of self-purification, by the elimination of the aseptic tissue reactions of the preceding/previous period, by limitation and elimination of the infectious processes, which arose in the preceding/previous period.

Basic reason for death in this period - secondary purulent inflammation of substance and shells of brain, which has diffuse character/nature. Considerably less frequent death attacked/advanced as a result of the secondary disorders blood and spinal fluid circulation, sometimes appeared with local suppurations.

IV. The period of late complications begins within different periods after delivering of the injury: in the severe cases - on the third fourth month after delivering of injury, in lighter - somewhat earlier. The duration of period was involved/tightened of up to 2-3 years.

During favorable course in this period is observed the final formation of scar and the complete elimination of the complications

of the preceding/previcus periods. In the complicated cases often was observed the aggravation of suppuration, sometimes with the education of the abscess of brain.

V. The period of the distant consequences comes many years later after delivering of injury. Most characteristic for it is the presence of the formed scar on the spot of damage.

Afterward the more or less large/coarse damages of the substance of brain, even after 10-15 years after wcund, processes self-purification sometimes still continue, and scar tissue undergoes change. In particular occurs the slow substitution of the connective units of the scar by the elements/cells cf hyperplasiized astrology.

Long years continue the processes of the ascending and descending degeneration cf the nerve fibers, connected with the damaged centers and the carrying out routes/paths.

Basic pathoanatomical changes with the wounds of skull and brain. In spite of the diversity of the pathcanatomical pictures which are observed with the wounds of skull and brain, it nevertheless proved to be possible to generalize the separate means of the relating here mcrphological changes in the specific groups. These groups following:

1. Changes, connected with the direct activity of injury (primary necroses, discrders of water metabolism/exchange, cerebrospinal fluid-and blood circulation).

Page 74.

II. Jet changes in substance and shells cf brain as a result of injury (change in the wound canal, aseptic inflammatory processes, growths of glia and of ccnnective tissue, formation of scar).

III. Infectious processes, which complicate the course of injury (purulent inflammation and anaerobic infection).

I. Changes, connected with the immediate activity of injury. This group includes primary necroses, violaticns of blood circulation, water metabolism/exchange and spinal fluid circulation. Great value these processes have in the acute/sharp, initial period of the injury of skull and brain.

According to G. A. Margulis's data (524 cases of the wounds of skull), the basic percentage of dead persons as a result of the direct activity of injury were the wounded, who passed away during

the first 15 days from the moment/torque of wcund.

The specific gravity/weight of the cases of death from the direct activity of injury within the limits of the similar/analogous stages of different fronts could sharply oscillate depending on local conditions. From the direct activity of injury the mortality rate in army area was greatest, whereas in army and front line area it was considerably less.

According to V. L. Byalik's data, death from the direct activity of injury composed in army area basic grcup, in army area 1/3 and in front line area 1/5 unit.

Primary necrosis. Vital importance among changes in the group in question had primary traumatic necrosis of the substance of the brain which appeared both in the scene of action of the wounding shell and in the sectors, bordering to the zone of its direct activity (wall of wound canal).

Sometimes necroses appeared as the consequence of hydrodynamic effects. Primary necroses were observed in the form: a) crushing of the substance of brain on the course of shell and introduced bone fragments, b) breaks from jolt, c) contusion foci.

Morphologically primary necrosis was usually the focus of the hemorrhagic softening of the substance of brain. Contours and volume of primary necrosis depended on value, form, form/species and kinetic energy of the wounding shell. The specific value had a direction of its flight. As a rule, the greatest decomposition was observed with fragmentation wounds. The rotary motions of fragment during its flight increased the volume of decomposition and gave to wound torn form/species. With autopsies on the field of battle were observed the cases of crushing of the considerable departments of the brain. In those been killed on the field of battle in large quantities of cases on autopsy were detected the wounds of ventricles.

The decomposition of the substance of brain frequently served as the cause of death of those wounded into skull.

a) With blind-end wounds volume and form of primary decomposition to a considerable degree depended on the depth of penetration of shell into the substance of brain. With the cessation of shell in the surface departments of brain the wound took the form of the infundibulum whose diameter was considerably more and the diameter of shell, and the diameter of inlet in the bones of skull. During deeper disposition of shell the wound of brain had peculiar retort-like form with expansion about inlet. At certain depth this expansion sharply was narrowed and passed into the wound canal of

slit-shaped form at the end of which lay/rested metallic fragment.

Page 75.

Usually in the place of the cessation of fragment wound canal was ampullaceously expanded. With heavy blind-end fragmentation wounds to determine wound canal it was possible not always. Frequently instead of it was detected extensive diffuse crushing of the substance of brain (Fig. 11).

With perforating wounds wound canal had tubular form with belled expansions about intake and outlet. As a result of the bloating of the substance of brain the diameter of wound canal (in its narrow unit) frequently proved to be less than the value of the wounding shell. The expansion of wound canal usually was more in intake, than in outlet, aperture. With wounds of both hemispheres wound canal in the place of its passage through the large crescent-shaped extension of solid shell proved to be stenotic (Fig. 12).

With perforating wounds with short chord the substance of brain, which was being arranged/located between the bone of skull and wound canal, underwent hemorrhagic softening. With the tangential penetrating wounds the wound of brain took the form of the groove, partially covered by the scraps of solid cerebral shell. With the

penetrating wounds the region of primary necrosis frequently acquired complex form as a result of introduction into the substance of the brain of bone fragments (Fig. 13) which radially diverged in all directions and they sometimes achieved the wall of ventricle. In a number of cases bone fragments were detected in the cavity of ventricles.

With the autopsy of dead persons in the first 3-4 hours after wound the walls of wound canal in the substance of brain were pale, dry, denser to the touch than their surrounding tissue. The surface of the wound of brain and wound canal was uneven, fringed. In the lumen of wound canal was arranged/located the crushed substance of brain and blood clots. The blood-containing impregnation of the walls of wound canal and hemorrhages in them it was not detected. Microscopically was observed dry anaemic necrosis.

In the cases of death on second- third days after wound the picture was another. The walls of wound canal of these cases consisted of the impregnated with the blcod edematic substance of the brain; around wound canal were arranged/located multiple hemorrhages. During histological research was detected the picture of the death of tissue, which in the zone of blccd-containing impregnation enveloped all elements/cells both cf connective and nerve tissue.



Fig. 11. Blind fragmentation of wound with considerable crushing of left cerebral hemisphere. Purulent leptomeningitis.

Page 76.

b) breaks from the jolts, which appear under the effect of hydrodynamic moments/torques, were the fissural sectors of softening the substance of brain, exiting from the lumen of wound canal to sides. More frequent breaks were short, and in certain cases sufficiently long. Sometimes they reached the ventricles of brain and even they were revealed in them. Gaps from jolt were observed only in extra-heavy cases of the penetrating wounds.

c) Contusion foci - these are the foci of the necrosis of the substance of brain, impregnated with the blood. The mechanism of the appearance of contusion foci is not yet sufficiently explained. Some of them, probably, are true primary traumatic necroses and are formed from the contusion of brain against the prominences of the bones of skull and the extensions of solid cerebral shell. Such foci usually were observed in the eye socket surface of frontal portions, in basis and poles of temporal portions - in the places of the application/appendix of strike/shock or shock/counterblow. However, for the larger unit of the cases the mechanism of the onset of contusion foci should be explained angiospasm at the moment of injury with the subsequent education of the focus of the numbness of the substance of brain. For the following hours of spasms it is relieved by paralytic vasodilation and by stasis. The become numb sector of the substance of brain via diapedesis fills with the blood.

The observations, made during war, show that the increased permeability of vascular wall is morphologically substantiated by the greater or smaller damage of the argyrophil substance of the wall of vessel.

The contusion foci had the vital importance with the closed

injury and the nonpenetrating wounds of skull. Certainly, they were observed also with the penetrating wounds.

During the damage of solid cerebral shell by bone fragments to the forming focus of the contusion softening were connected the damages of brain by directly bone fragments. In this case the formed osteofragmentation wound canals of different length diverged from the contusion focus in the form of rays/beams. As frequently were observed the contusion foci, to say difficultly - in the reports of the series/row of the prosectors, represented during the Great Patriotic War, they were united with hemorrhages into brain.



Fig. 12. Perforating fragmentation segmental wound of postcranial portions.

Page 77.

The fresh contusion foci in the section/cut of brain took the form of dark-red ones, less frequent than ruby-colored ones, maculae, sharply delimited from the surrounding tissue. Subsequently, usually to the outcome of the first day after wound, their tissue acquired flaccid, paste-like consistency and peculiar raspberry-colored stain/staining. The size/dimension of the contusion foci was

dissimilar. Were observed foci first by value from cam/fist, then of microscopic sizes/dimensions. Frequently large/coarse focus was surrounded by the group of small/fine ones. The most frequently contusion foci were arranged/located in brain core. Sometimes they were spread also to the subject departments of the white substance of cerebral windings. In a number of cases with contusion large-size foci, which occupied almost entire thickness of cortex, molecular layer it remained undamaged/uninjured.

During the surface disposition of the contusion foci they x-rayed through the shells of brain and sometimes, in the cases of nonpenetrating wounds, on process/operation they appeared as subdural hemorrhage. Sometimes the contusion foci burst open into subarachnoid or even into subdural space, forming the hemorrhages of the corresponding localization.

In the course of time the brain tissue in the region of the contusion focus began to fall, the color of focus was changed, became rusty or brown. Frequently appeared the intergrowth between the substance and the shells of brain. In the uncomplicated cases the outcome of the contusion foci were porencephalia (P. Ye. Snesarev), the cysts, filled with fluid/liquid of chocolate color (L. I. Smirnov, M. M. Aleksandrovskaya), or the pigmented scars, it is more frequent after small/fine foci. Sometimes appeared festering of

contusion foci.

Disorders of blood circulation. The disorders of blood circulation, connected with the direct activity of injury, usually were observed in the first and partially in the second period of the course of the wounds of skull and brain.

The forms/species of the disorders of blood circulation were diverse; the methods of their onset, morphological expression, localization and their extent were different.

Among the disorders of blood circulation great value had the hemorrhages which were also different both in the mechanism of their development and in localization. In the significant part of the cases by the reason for the hemorrhages, which appeared at the moment of delivering the injury, was the gap of the wall of vessel as a result of its damage by shell, fragments of bones or as a result of jolt and other mechanical actions.



Fig. 13. Perforating fragmentation diametric wound with the introduction of bone fragment into the substance of brain.

Page 78.

Sometimes, as a result of the wound of vascular wall by the displaced or extracted with process/operation foreign bodies, hemorrhages appeared after certain time after wound ("consecutive hemorrhages").

In the significant part of the cases the intracranial hemorrhages appeared via diapedesis. Old views on diapedesis with the undamaged/uninjured wall of vessel on the basis of the

experiment/experience of the Great Patriotic War were shaken, since during special stains/stainings it was possible to trace the damage of the argyrophil substance of vascular wall, causing increase of its permeability.

The specific value had the hemorrhages, which appeared as a result of the numbness of the wall of vessel. More frequent such hemorrhages were observed in the walls of wound canal and in the region of the focus necroses of the substance of brain. Hemorrhages had the various forms: point, maculose, ring-shaped, lamellar and in the form of restricted hematomas. Hemorrhages always were not arranged/located in the zone of wound, then they frequently detected at considerable distance from wound.

Were encountered single, and multiple (it is more frequent in white substance) hemorrhages. By localization were distinguished epidural, intradural, subdural, sub-arachnoidal, subpial, intra-cerebral and intra-ventricular hemorrhages.

Epidural hemorrhages were encountered in the various forms of the injury of skull. Especially important value they had with the closed injury and nonpenetrating wounds. The volume of epidural hemorrhages was various. In certain cases were observed insignificant quantities of blood, in others - extensive accumulations, calling the

compression of brain (Fig. 14).

As a rule, epidural hemorrhages appeared with the gap of the vessel, damaged by shell, bone fragments or edges of the displaced bones. The ordinary source of hemorrhage were intraosseous/intraosteal/endoosteal veins, vein-graduates and, are more frequently, the veins of the external surface of solid cerebral shell. More rarely were observed hemorrhages from sinuses and from average/mean tunicary artery. The latter had special importance, since frequently was produced the rapidly growing compression of brain.

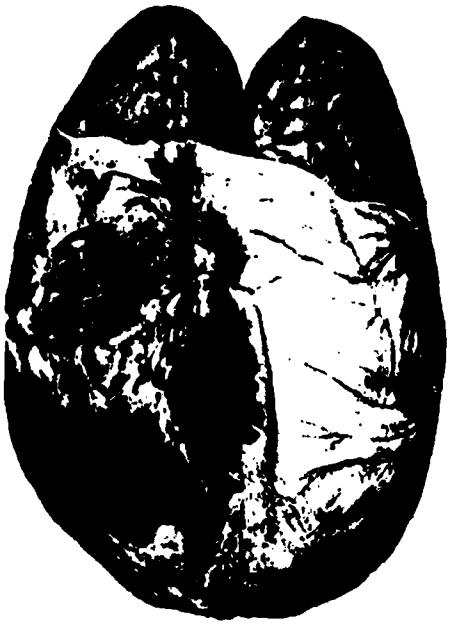


Fig. 14. Wake fragmentation wound of the left sincipital portion of brain. Epidural hematoma.

Page 79.

In more detail about epidural hemorrhages see below - in section "nonpenetrating wounds".

Subdural hemorrhages were encountered more frequent than epidural and usually they appeared with the gap of the wall of vessel. According to V. I. Byalik's data, in army and army area subdural hemorrhages composed 42.2-48.0o/o of all intracranial

hemorrhages, epidural hematomas - 10.3-10.5o/o. The ordinary source of the first were the veins of soft cerebral shell on the side of wound. Frequently the gap occurred in the place of the inflow of these veins into the sinuses of solid cerebral shell. Arterial hemorrhages and hemorrhages from sinuses were observed rarely.

Usually with one-sided wounds subdural hemorrhages were arranged/located on the damaged side, rarely them found also on healthy/sound side.

Subdural hematomas frequently served as a reason for death of those wounded into skull. A number of observed subdural hematomas, according to the data of sectional material, oscillated in considerable limits. Thus, for instance, in army areas they were observed from 6.0 to 22.0o/o of cases (according to V. L. Kisilevskiy's data - in 22o/o, V. S. Klyachko - in 10.0-16.2o/o, T. I. Stankevich - in 6.9-14.3o/o); in the evacuation hospitals of front, according to G. A. Margulis's data, in 1.6o/o. The dissimilar percentage of subdural hematomas in limits of one and the same stage was caused by the varied conditions of a medical-tactical circumstances and by the condition of the entered wounded.

The phenomena of the compression of brain were observed not only with massive hematomas (300-400 cm^3), but also with considerably

smaller in volume (50 cm^3). The appearance of symptoms of compression depended, obviously, from localization of hematoma and rate/tempo of growth of hemorrhage. The specific value for the onset of the symptoms of compression had combination of hematoma with the phenomena of edema and bloating of the substance of brain.

With autopsies in the cases of subdural hematoma found the dark-red blood clots, which were being spread over the internal surface of solid shell or which were being arranged/located in the form of the compact restricted accumulations of the blood.

Frequently with autopsy under solid cerebral shell was detected the dark liquid blood, which sometimes flowed in to the basis of brain. Fairly often subdural hematomas were escorted/tracked by the accumulation of the blood in epidural space.

With heavy wounds were encountered sub-arachnoidal hemorrhages with the blood-containing impregnation of the subject surface strata of cortex. During abundant sub-arachnoidal hemorrhages was observed the accumulation of the blood in the tanks of the basis of brain.

Intra-cerebral hemorrhages more frequent were connected with the contusion foci (see above). Usually they were escorted/tracked by edema and stagnant plethora of the substance of the brain of the

casualty region.

Intra-ventricular hemorrhages were detected in dead persons soon after wound, it is more frequent with the wounds of ventricles. Usually the blood from the casualty ventricle was spread all over the liquor system. With the wounds of lateral ventricles almost always was detected the blood in the third and fourth ventricle.

Violations of water metabolism/exchange in the brain tissue and liquor circulation. The disorders of water metabolism/exchange into brain tissue and disorders of liquor circulation, connected with the direct activity of injury, were observed in the form of edema and bloating of brain, and also hydrocephalus both internal, and external.

Page 80.

Edema and bloating of brain - sufficiently frequent phenomena with wounds it is black and brain. Usually they are observed during the first days after wound.

The mechanism of the onset of edema and bloating is not yet entirely clear.

L. I. Smirnov (1940) distinguishes local edema, which appears near the place of damage for brain tissue, and general/common/total traumatic edema of brain. Most frequent reason for local edema of brain - increased education of cerebrospinal fluid, connected with the local violations of blood circulation. However, general/common/total edema of brain appears in connection with the increased education of cerebrospinal fluid by the epitheliades cell of vascular webes/plexi and subarachnoid space.

Other authors assume that the reason for edema and bloating is the combination of the violations of blood circulation with a change in the hydrophilic behavior of brain tissue (P. Ye. Snesarev). The liberation/excretion of fluid/liquid with vessels is connected with their increased by permeability wall. With edema of brain the increased permeability of the walls of vessels is morphologically substantiated by thin changes in the argyrophil substance of capillaries and precapillaries.

With edema the secreted fluid/liquid is arranged/located in the substance of the brain between cells, locsening tissue.

On autopsy in dead persons from edema of brain is detected the tension of solid shell. The volume of brain is increased. Sub-arachnoidal space and tanks are overfilled by achromatic

transparent/hyaline fluid/liquid. Viens of soft cerebral shell are sharply expanded, overfilled with dark liquid blood. The consistency of brain flaccid, its tissue easily vomits with scanning. The surface of the section/cut of brain is the moist, bright. From the lumen of severed vessels protrude the drops of the blood. Ventricles are somewhat expanded and overfilled by transparent/hyaline achromatic fluid/liquid, ependyma their bright. Vascular webes/plexi are plethoric.

Most characteristic histological change with edema is an increase in the volume of the perivascular cells of oligodendroglia. Their protoplasm acquires macrovacuolar polythalamous character/nature. Is noted the expansion of perivascular slots and glioreticular ansa.

Frequently swelled brain, connected with the direct activity of injury, it led to death. Edema of brain as the reason for death, according to the data of sectional material, it is noted in limits of 0.4-12.0o/o. This considerable oscillation/vibration is caused by different conditions of a medical-tactical circumstances: by distance of therapeutic installation from front, by duration of the stay of wounded in therapeutic installation, etc. Sometimes diagnosis "edema of brain" as the reason for death was set only when on autopsy it was detected either the lethal decomposition of brain or complications,

but there was clinically tne expressed picture of edema of brain.

High value has the acute/sharp bloating cf brain which was observed frequently during the first days after delivering of injury. With bloating, in contrast to edema of brain, the fluid/liquid, which was secreted from vessels, is found in the protoplasm of the cells of the brain; between cells there is no fluid/liquid. On autopsy with acute/sharp bloating is observed a sharp increase in the volume of the brain; its tissue "bulges out" into the defect of bone and solid cerebral shell. With the exposure of brain is noted the smoothing of its windings. Sub-arachnoidal space fluid/liquid does not contain. In section/cut the substance of brain proves to be pale, dry.

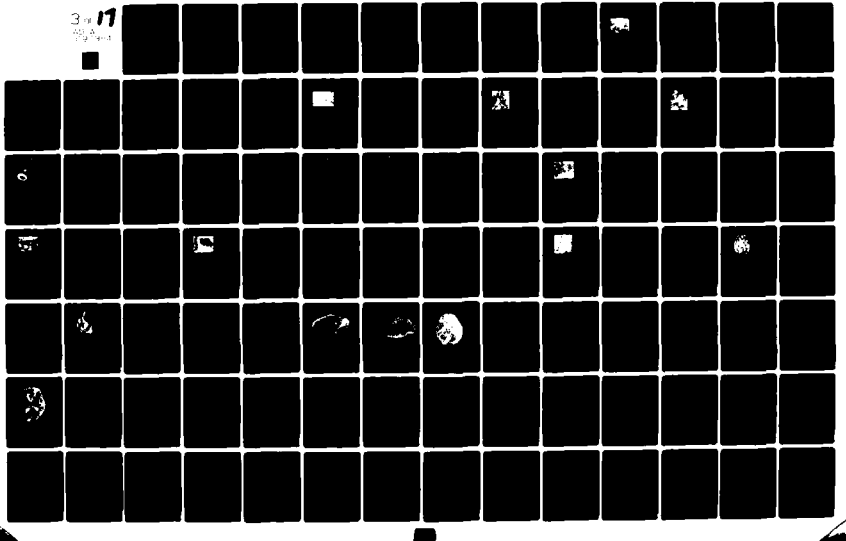
Page 81.

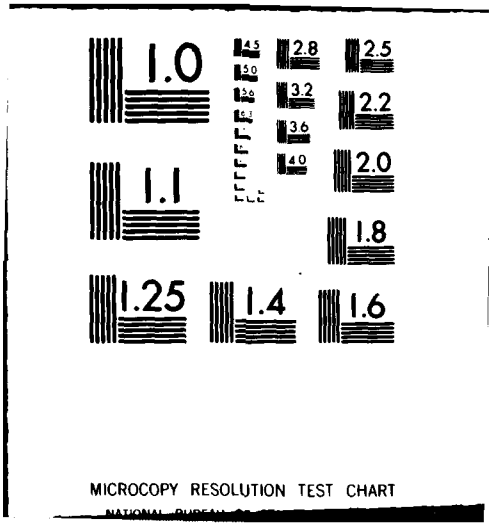
The ventricles of brain usually contain only small amount of liquid, their area frequently proves to be reduced. Vascular webes/plexi are anemic.

The most characteristic histological changes with this were bloating and clasmatodendrosis of astrocytes, bloating and basophilia of the cross-beams of glioreticulum.

The bloating of brain sometimes led to compression and jamming

AD-A090 984 FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OH F/G 6/5
THE EXPERIENCE OF SOVIET MEDICINE IN THE GREAT PATRIOTIC WAR 19--ETC(U)
FEB 80 V N SHAMOV, B A SAMOTOKIN
UNCLASSIFIED FTD-ID(RS)T-1925-79 NL




1.0
1.1
1.25
1.4
1.6
1.8
2.0
2.2
2.5
2.8
3.2
3.6
4.0
4.5
5.0
5.6
6.3
MICROCOPY RESOLUTION TEST CHART

of the hanger-on unit of the brain.

Internal hydrocephalus, which sometimes was observed in the acute/sharp period of the course of the wounds of skull and brain, was usually transitory. Rarely it was encountered even in the cases of minor injury. With acute/sharp internal hydrocephalus was observed the expansion of all ventricles, in particular the third and lateral.

The histological research of the walls of ventricles with acute/sharp hydrocephalus detected the scaling of ependyma, the disintegration of subependymal tissue, the expansion of subependymal vessels, fine focal/acincus necroses and hemorrhages.

The direct consequence of the violations of blood circulation and water metabolism/exchange in brain tissue, connected with the direct activity of injury, is outflow and early protrusion of the substance of brain.

Outflow of brain - peculiar phenomenon, in detail described of N. N. Burdenko. Upon the rough decomposition of brain tissue in the day of wound is visible the slightly protruding pink mass of the consistency of dense cream. Through the aperture in solid cerebral shell this mass is extruded to the surface of wound, "as paste from tube" (N. N. Burdenko). The outflow of brain, caused the

intra-cerebral pressure increase, can sometimes be observed during entire acute/sharp period.

Early protrusion (protrusion of the substance of brain into the defect of solid cerebral shell and bone), caused the intracranial pressure increase in connection with the direct activity of injury, was observed during the first days after injury. Usually early primary prolapse ("benign protrusion", as call its clinicians) it did not achieve large sizes/dimensions it began to fall toward the end of the acute/sharp period. In such cases prolapse underwent no pathological changes. Sometimes was observed the jamming of brain tissue in the narrow defect of bone. In this case were squeezed the feeding vessels, and the tissue became gangrenous. Such the case were frequently complicated by infectious process.

II. Tissue reactions to the damage of substance and shells of brain. Vital importance among the processes of this group they have:

a) changes, which occur in the zone of the primary fault of the substance of brain (in wound canal), up to the substitution of the defect of the brain tissue and education of the scar;

b) the jet phenomena, which appear in distance from the wound canal;

c) reaction to the presence of foreign bodies in the brain tissue and its shells.

a) during the histological research of the walls of wound canal after 2-3 days after wound in the periphery of it it is possible to distinguish several layers. Quite internal, which adjoin the lumen of wound canal, is the layer of the numbness of all elements/cells of brain tissue. Necrotic it is woven in this layer is continuously impregnated with the blood.

Page 82.

To periphery from internal, necrotic, layer it is possible to see the middle layer, which is characterized by the large number of localized hemorrhages. The elements/cells of connective tissue, micro-glia and oligodendroglia in this layer in essence are maintained. In astro-glia are expressed degenerate changes, astrocytes have amebiform form, is noted the decomposition of the extensions of astrocytes - clasmatodendrosis. Middle layer is characterized by the death of nerve cells. Within periods indicated above in middle layer are noted the signs/criteria of the activation of the endothelium of vessels, the incipient formation of argyrophil filaments and the conversion of the cells of the adventitia of vessels into granulated spheres. Some researchers detected granulated spheres after only 18-20 hours after the injury of brain.

In the skin, situated to periphery from the average, all elements/cells of glia and of connective tissue are maintained, while nerve cells take the same form as in middle layer. During the second day here is noted the explicit hyperplasia of the cells of micro-glia with their conversion into granulated spheres.

Beyond skin is found undamaged/uninjured brain tissue with the phenomena of stagnant plethora and edema.

At the beginning of the period of early reactions (end of the third day after equalization) in the region of damaging the substance of brain are developed the processes of self-purification. In them first participate leukocytes. They appear in brain with the issuing from blood, and also in connection with vascular reaction to the damage to brain tissue. Leukocytes contribute to digestion of dead particles and is fulfilled the function of microphages. Striking into the zone of numbness, leukocytes perish by masses.

Greatly early is noted the active reproduction/multiplication of the cells of the adventitia of the vessels of brain, micro-glia and oligodendroglia. Furthermore, in the process of self-purification active part take hematogenic histiocytes. All cellular elements/cells indicated are loaded by the fatty and oily substances, destroyed by erythrocytes, grains of hemosiderin, etc. and are converted into granulated spheres. To 5-7 day to day after wound the granulated spheres, which are formed in the middle layer of the wall of wound canal, encircle the latter by intimate shaft and pierce entire mass of decomposition/decay. During special stains/stainings in middle

layer it is possible to see a large quantity of granulated spheres, which are arranged/located with small groups around vessels and fulfilling the expanded and newly formed Verhoeff-Robenov spaces. To the 7-8th day after wound such accumulations of granulated spheres are detected also in the skin of the wall of wound canal. Granulated spheres fulfill the function of the self-purification of the wound of brain. The layer of granulated spheres which directly encircles the become numb tissue, it does not contain vessels. In middle layer are detected thin-walled vessels (Fig. 15).

Gradually the volume of the mass of the become numb tissue is decreased, which occurs because of the cleaning activity of granulated spheres and the straight/direct rejection/separation of the necrotic mass through the defect of solid cerebral shell and bone. Furthermore, the unit of the necrotic tissue, apparently is resolved by humoral route/path.

The processes of self-purification train/prepare soil for the substitution of wound defect and subsequent education of scar.

Page 83.

The substitution of wound defect in the substance of brain has some special features/peculiarities in comparison with analogous

processes in other tissues. Its peculiarity is caused by the presence in substance of the brain of the heterogeneous stroma of different origin, which consists, as is known, from glial and connective components. In the processes of substitution connective component is represented collagenic and argyrophil filaments, the latter can be converted into collagenic ones, but can remain argyrophil for months and year. The gliofibrillar, argyrophil and collagenic components of the scar of brain have their special features/peculiarities. The gliose component of the scar is soft, not stimulating tissue, little connected with vessels, argyrophil-more dense, is tightly closely related with vessels. Argyrophil filaments do not subtend, but "burst open" tissue, "are elastic", and serve as a good supporting framework/body for the contracting activity of vessels (P. Ye. Snesarev). The collagen component of the scar is the most rough, which subtends and which stimulates brain tissue.

As the source of the origin of the filaments, which form scar, serve the periosteum of the external surface of the bones of skull, shell of brain, intra-cerebral vessels and maintained cells of astro-glia.

The beginning of the process of the substitution of the defect of brain and its shells is related to the period of early reactions (3-4th days with the light and uncomplicated injury and 8-20th day

during heavy damages and complicated course). Within the periods indicated in the undamaged/uninjured brain tissue, which borders to the region of primary traumatic necrosis, is noted the reproduction/multiplication of fibrous and protoplasmic astrocytes with the conversion of the latter into the elements/cells, which form glial filaments.

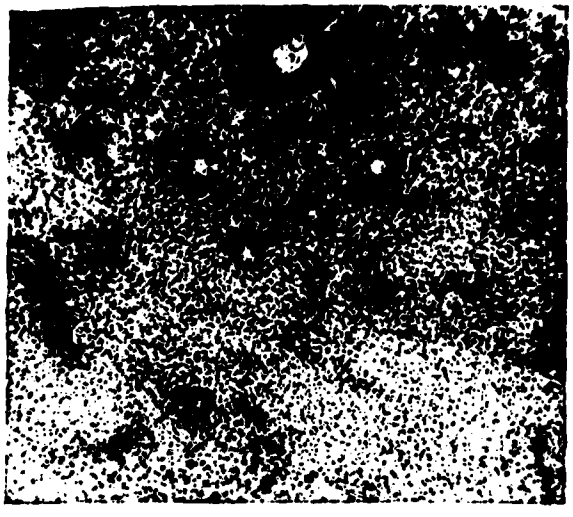


Fig. 15. Layer of granulated spheres, rich in vessels. Section/cut through the wound canal. Stain/staining with the thionine; increase 7x10.

Page 84.

It is still earlier in the zone of the neoformation of vessels it is possible to see the onset of the argyrophil filaments among which little by little begin to appear collagenic filaments. The abundant formation of argyrophil and collagenic filaments is detected toward the end of the first, to the beginning second week in soft

shells, endochondrial layer of solid shell and in the periosteum of the external surface of bone by the edges of defect. This hyperplasia of the elements/cells of connective tissue and glia is the beginning of the education of future scar. The gradually histological structures of early stage, lean in collagenic filaments and which carry the function of self-purification, are relieved by the new structures, which realize a substitution of defect. The accumulation of granulated spheres is interbedded by the growing beams and by the nets/systems of the collagenic filaments, among which is arranged/located a large quantity of vessels of different bore.

At the beginning and during the period of the elimination of early complications in the region of damaging the surface departments of brain is formed the dense connective mass, which occurs from periostea of the external surface of the bones of skull and meninges. It occludes the defect of bone and solid cerebral shell, encompassing their edge, and it continues into the depth of brain. Simultaneously from the depth of the focus of primary necrosis and layer, which borders to undamaged/uninjured tissue, grow connective tissue and glial elements/cells, which form the weaves of argyrophil, collagenic and glial filaments. Within the limits of healthy/sound tissue is formed/activated the shaft from glial filaments, which is arranged/located on boundary with that damaged tissue.

The processes of substitution in the different sectors of primary traumatic necrosis pass to different rate/tempo. During the third period the substitution of the defect of the bones of skull and meninges of brain approaches toward the end. Fission products, granulated spheres and granulating tissue disappear. Even in the cases of the extensive decomposition of the substance of brain, which are frequently escorted/tracked by complications, the formation of scar on the spot of the defect of bone and solid shell concludes on the fourth-fifth week, with exception of the cases of surgical intervention in the period of early reactions.

On the spot of the defect of bone and solid shell it is possible to distinguish two layers of the cicatrical tissue. The skin, which sometimes has the form/species of thick plate, is comprised of the dense mass of the disorderly inosculating beams of the collagenic filaments, which occur from pericsteum and solid cerebral shell. This plate is lean in cells and it only somewhere contains single thick-walled vessels. Frequently in it it is possible to see hyalinization and fine-lump granulated decomposition/decay of collagenic filaments.

To the described cicatrical plate which occurs from the periosteum of the external surface of the bones of the skull and solid cerebral meninges, from within adjoins another of the bones of

skull and solid cerebral shell, from within adjoins another layer, which consists of the less compact mass of collagenic filaments. These fibers, being interwoven between themselves, form small/fine sockets. The collagenic filaments of this layer occur from the endochondrial section of the hard cerebral meninges, subendothelial layer of its internal surface and soft cerebral meninges. In this layer many vessels, by the places are the accumulation of lymphocytes and macrophages, are encountered the granulomas of foreign bodies, the surrounding resolved bone fragments and hair. Kray the defect of solid shell they are connected into the described growths of collagenic filaments.

Page 85.

In the depth of the wound of brain the processes of substitution are developed slower. Up to the moment/torque of the termination of the formation of the external departments of scar the processes of substitution are here distant even from completion. In the sockets of the wide-loop connective growths, which proceed from intra-cerebral vessels and partially from soft shells, are detected many granulated spheres and sectors of the become numb substance of brain. In deeper arranged/located departments of brain the sockets of wide-loop growths become still more widely. Considerable place occupy here beams and nets/systems of argyrophil filaments.

Subsequently occurs coarsening of collagenic filaments with their hyalinization and wrinkling. On the periphery of the scar for a very long time is retained hyperplasia of astro-glia with the sharply pronounced formation of fibers. These glial filaments gradually replace the connective component of the periphery of scar. Thus, as a result of the growth of connective and glial filaments is formed scar the compact, then of poriferous form/species, sometimes containing cysts.

Building/structure of this scar can be represented as follows: the external departments of cicatrical complex are formed by a compact mass of the disorderly arranged/located collagenic filaments, which occur from the periosteum of skull and solid cerebral meninges. In internal departments these filaments detect tendency toward disposition in parallel to the surface of brain. This section of the scar is impoverished of cells and vessels; it is tightly joined with the edges of bone defect and fills the lumen of the latter. Frequently here are observed the processes of wrinkling, hyalinization and small-lump decomposition/decay of collagenic filaments.

Under the compact layer of cicatrical complex is

arranged/located a small-loop net/system of the tender bundles of the collagenic filaments, which occur from soft shells. Already toward the end of third-fifth day is evident the weave between themselves of the collagenic filaments, which protrude from the endochondral layer of solid cerebral meninges, subendothelial layer of its internal surface and soft cerebral shells. This it conducts to the intergrowth of all shells of brain and isolation of the region of damage from subdural and sub-arachnoidal space. In formed scar it is evident that the part of it, formed by soft shells, is connected with its external department by the bundles of the vertically arranged/located collagenic filaments, which go from solid shell and periosteum of the bones of skull. In the more deeply arranged/located unit of the scar, formed by soft shells, there is collagenic filaments it acquires large-loop character/nature; to it are mixed/added argyrophil filaments. This unit of the scar as external, contains a little vessels and cells.

Towards the inside from the fine-pored unit of the scar, formed by soft shells, is arranged/located the net/system of the collagenic and argyrophil filaments, which form large/coarse pores and sometimes small/fine cysts. In the area of cysts sometimes for a long time after injury are detected the small groups of granulated spheres. In the cross-beams between pores there are many vessels with the walls of different thickness. The filaments, which compose this unit of the

scar, occur from soft shells and vessels of cortex. This is - purely connective component of intra-cerebral scar, formed only by collagenic and argyrophil filaments. Glial filaments appear in composition the more deeply recumbent components of the scar. In the large/coarse sockets of the inosculating connective and glial filaments are arranged/located first the accumulations of granulated spheres, then the islets of nerve tissue. In the latter for a long time can be retained nerve cells, usually atrophic form/species, sometimes impregnated with calcium salts. This is - mixed (gliose and connective) unit of the cerebral scar (Fig. 16).

Page 86.

Very frequently the poriferous and cystic departments of intra-cerebral scar prove to be the crossed almost cylindrical strands of the compact or edematically loosened bundles of collagenic fibers. The systematic study of these strands showed that they are the trails of the former bone-fragment canals.

Finally, entire cicatrical complex, whatever complicated contours it had, proves to be the bordered from within continuous shaft of the glial filaments, among which are arranged/located the hypertrophied cells of astro-glia with the signs/criteria of the increased fiber formation.

The experiment/experience of war showed that the rates/tempos of the formation of scar and its structure are not entirely identical in the various forms of the combat injury of brain. In the overwhelming majority of the cases of the open injury the process of cicatrization proceeds more rapidly than with that closed. Sometimes in the uncomplicated cases the region of primary traumatic necrosis after only 2-3 weeks after wound proves to be the substituted by growths young connective tissue, among which remain only the small sectors of decomposition/decay and accumulation of granulated spheres.

b) the jet changes in response to the damage of substance and shells of brain, which appear far from wound canal, become apparent in the form of nonpustular inflammation, apparently of aseptic character/nature. More frequent and first of all is observed serous leptomeningitis, somewhat less frequent - perivascular encephalitis. The distant tissue reactions are characterized by a series/row of the general/common/total signs/criteria: 1) inflammation is deployed in the region of limiting separating membranes/diaphragms - internal, perivascular and external; 2) inflammation usually has serous character/nature, it is escorted/tracked by the onset of the infiltrates, formed by lymphocytes and macrophages; leukocytes in large quantities constantly participte in initial stages and

incidentally they appear during the inflammation; 3) is noted clear tendency toward the march/passage of exudative serous inflammation into productive with the intense proliferation of fibroblasts and cells of the astro-glia; 4) main moment/torque in the pathogenesis of these all forms of inflammation consists into entrances into liquor-carrying spaces and to the delay in them of the products of tissue and blood decomposition/decay.



Fig. 16. Mixed (glisone and connective) unit of the scar. Van Gieson staining; increase 7x10.

Page 87.

Microscopically, these forms of nonpustular inflammation are characterized as follows.

Nonpustular leptomeningitis. The wall and vascular shells are continuously infiltrated by lymphocytes and macrophages (Fig. 17); about vessels these cells are accumulated in the form of foci. In the region of the tanks of the basis of brain the dissemination of lymphocytic infiltrates bears maculose character/nature. To

lymphocytes and macrophages frequently are mixed/added the leukocytes, sometimes in a very large quantity. Rarely inflammatory infiltrate converts/transfers from shells on Verhoeff-Robenov spaces to brain core. The substance of cortex, with respect to the sectors of the inflammatory infiltration of shells, is usually moderately edematic. The nerve cells of the surface strata of cortex are found in the condition of the acute/sharp bloating; in them is observed the dustlike pulverization of the grain size of Nissl, increase in the volume of nucleus and emission (budding) of chromatospherite. In molecular layer is noted the hyperplasia of astrocytes, in deeper layers - moderate hyperplasia of the cells of micro- and oligodendrolgia. In this case the cells of micro-glia are converted into small rod-shaped formation, and the cells of oligodendroglia will swell and acquire edematic form/species (P. Ye. Snesarev's drainage cells).

The macroscopic diagnosis of aseptic serous leptomeningitis is difficult. The soft shells of brain in these cases slightly cloud and take the swollen form. Sub-arachnoidal slots and tanks contain more or less considerable quantity of achromatic transparent/hyaline fluid/liquid. These changes frequently resemble the picture of traumatic edema of brain.

At the end of the second, the beginning third week in the region

of the dissemination of nonpustular leptomeningitis usually already are clearly visible the signs/criteria of the march/passage of acute/sharp inflammation into chronic productive. These signs/criteria consist in the thickening of the fibrousness of arachnoid shell, the reproduction/multiplication of its epitheliades cell, swellings and increase in the quantity of subarachnoid trabeculae. Usually is observed the thickening of the glial edge/boundary halo of molecular layer.



Fig. 17. Nonpustular leptomeningitis. Stain/staining with the hematoxilineosin; increase 7x10.

Page 88.

Subsequently, in the period of the elimination of early complications, aseptic leptomeningitis it converts/transfers in chronic productive process, more expressed in the arachnoid shell (post-traumatic chronic arachnoiditis). The latter can be the outcome of acute/sharp serous leptomeningitis, and in certain cases from the very beginning to flow/occur/last as chronic productive process.

With arachnoiditis, the arachnoid shell it is thickened and it is condensed, frequently it is coalesced with solid and soft shells. On the extracted brain the surface of arachnoid shell dull, is rough. The rootlets of craniocerebral nerves in the places of their passage through the arachnoid shell are frequently constrained and ligated. In connection with the formation of growths between the arachnoid and soft shell is disrupted the circulation of cerebrospinal fluid in sub-arachnoidal space. in this case appear the local accumulations of fluid/liquid among sub-arachnoidal cross-beams and are formed the so-called sub-arachnoidal cysts.

The histologically soft shells, thickened due to the growth of collagenic filaments, are that they are dense and lean in cells, that it is edematically loosened and contain small quantities of lymphocytes, macrophages and sometimes plasma cells (Fig. 18). The tanks of the basis of brain into some cases are expanded, overfilled by cerebrospinal fluid, into others - drop down. Their areas are carried out by the mossy growth of connective cross-beams.

As a result of arachnoiditis constantly is observed internal hydrocephalia, which envelops these or other ventricles.

After nonpustular leptomeningitis in the period of late complications still it is possible to see changes from the side of soft shells in the form either simple fibrosis or with the explicit, although weakly expressed signs/criteria of the slowly progressive inflammation. In certain cases, as a result of the rough growths of connective tissue in the shells of the basis of brain and as a result of the expansion of cistern, occurs retying and compression of optical nerves and walls of the third ventricle, is developed the picture of optochiasmatic arachnoiditis.



Fig. 18. Chronic arachnoiditis. Split total preparation. Stain/staining with the hematoxilineosin; increase 7x20.

Page 89.

In other cases heaviest inflammatory changes of the soft shells are developed in the region of transverse tank. Appears its dropsy or, on the contrary, overgrowing of its lumen, education of sausage nodes and compressions of quadro-mounding, posterior wall of the third ventricle and sylvian aqueducts. In this case it is developed hydrocephalia of lateral and third ventricles. Such changes the

region of quadro-mounding and pineal system.

Cicatrical changes are developed also in the region of posterior tank, sometimes with the overgrowing of its lumen and education general/common/total, in certain cases of sharply pronounced hydrocephalia. In clinic such cases sometimes are treated as the neoplasm of posterior cranial pit.

Perivascular encephalitis is observed usually in the period of early reactions and is developed predominantly in white substance. More frequently are destroyed the sectors of the white substance, which lie directly under the cortex; sometimes process converts/transfers also to the adjacent secticns of the semioval center. In certain cases the region of the dissemination of this encephalitis occupies whole portions. The casualty sectors are characterized by diffuse demyelinization and bloating of axial cylinders with the retention/preservation/maintaining of their continuity. Changes of glia are characterized by the hyperplasia of the cells of oligodendroglia, which surround axons, sometimes with the formation of symplasts. Is noted hyperplasia and hypertrophy of astrocytes without the signs/criteria of the increased formation of filaments. Is very characteristic the connective reaction, which is represented the intra-adventitial and perivascular accumulations of lymphocytes and macrophages without their march/passage into strictly

brain tissue (Fig. 19).

During the third period aseptic perivascular encephalitis usually concludes, frequently leaving after itself no changes. In certain cases after perivascular encephalitis it is possible to see the annuli of gliose or border of perivascular softening. Nerve fibers sometimes remain without changes, sometimes they are demyelinated. Axial cylinders either are not changed or swelled, but without the signs/criteria of fragmentation.

In complicated cases, especially during the described below chronic festerings (festering the forming scar), the region of the dissemination of nonpustular perivascular encephalitis is expanded. Frequently it can become basis for the onset of the diffuse pustular encephalitis, which is complicated by hemorrhages (hemorrhagic pustular encephalitis). In these cases in region the disseminations of nonpustular encephalitis find the foci of aseptic softening and the metastatical foci of purulent melting.

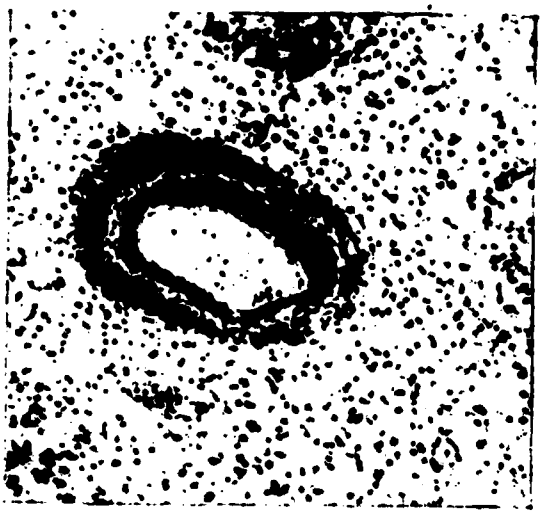


Fig. 19. Perivascular encephalitis. Infiltration of the wall of vessel. Stain/staining with the thionine; increase 7x10.

Page 90.

Perivascular encephalitis is not usually distinguished macroscopically. Frequently it can be only suspected on edematic form/species and dark gray color of white substance.

c) foreign bodies frequently are encountered in the various forms of the open wounds of skull. During war in skull detected the

most varied foreign bodies: zero and their units, fragments of shells, bombs, garnet and sin, bone fragments, small pieces of tree/wood, scraps of clothing, etc.

The disposition of foreign bodies in the area of skull in different cases was dissimilar. They were arranged/located the on solid cerebral meninges or in its thickness (small/fine bone fragments, metallic dust, hair, etc.), then in the substance of brain at one or the other depth. In rare cases the foreign bodies were detected in the region of ventricles, but it is still less frequent - in their area.

The fate of foreign bodies can be different. In essence it is determined by character/nature and degree of the infection of foreign body, on one hand, and by character/nature of wound, by presence of the disorders of blood circulation and liquor circulation, and also by presence of complications - on the other hand.

The cases, which were being escorted/tracked by festering around foreign bodies, are examined further (see infectious complications). Nonpustular tissue reactions to the presence of foreign body in substance or shells of brain became apparent differently. They were and diffuse, and focus.

Diffuse reactions were usually expressed by aseptic pachymeningitis or encephalitis.

Aseptic pachymeningitis. The ordinary reaction of solid shell to the foreign bodies, which are arranged/located on its surface, was external productive pachymeningitis. Macroscopically it was represented in the form of the peculiar thickening of solid cerebral shell and roughness of its external surface.

Histologically were noted the development of the connective tissue, at first rich in vessels, the growing from endochondral layer of hard cerebral meninges. In this tissue appeared many lymphocytes and macrophages, frequently was noted the education of giant cells around foreign bodies. Process usually began with the soldering of bone fragments to the surface of solid cerebral shell. Then occurred the enclosing with their cellular elements/cells and the growth of argyrophil filaments. subsequently occurred aging connective tissue, impoverishment by its cells and by vessels. Gradually in the thickness of solid cerebral shell appeared extensive growth of collagenic filaments.

The peculiar microscopic variant of productive pachymeningitis was micro-granulomatous pachymeningitis. Usually it was developed with the set of penetration into the depth of the hard cerebral

meninges of the smallest bone ones and, less frequently, metallic fragments (blind wound of hard cerebral meninges). Characteristic for this process was formation around each fragment of the typical granuloma of foreign body. In the presence of bone fragments the formation of granuloma was escorted/tracked by the penetration of macrophages and of giant cells into the thickness of bone fragment with the subsequent resorption of the substance of bone and by the substitution by its connective scar (period of the elimination of early complications).

Page 91.

Around small/fine metallic fragments cellular infiltration was relieved by the formation of connective capsule. Sometimes in it were observed the macrophages, loaded with metallic dust. Between granulomas were noted diffuse infiltration, solid shells by lymphocytes and macrophages.

Toward the end of the period of the elimination of early complications pachymeningitis concluded with diffuse development in the thickness of the solid cerebral sheathing of the collagenic filaments, frequently hyalinizing. In this case appeared the thickenings of solid cerebral sheathing (sometimes to 0.5 cm); usually there were intergrowth of solid cerebral sheathing with the

bones of the skull.

Productive pachymeningitis more frequently it was observed with nonpenetrating wounds. With the penetrating wounds it occurred in cases when small/fine foreign bodies stopped on external surface or in the thickness of solid cerebral sheathing.

Nonpustular periventricular encephalitis. The frequent diffuse reaction of the substance of brain to the introduction of foreign bodies was the development of periventricular encephalitis. The latter was observed only in cases when metallic or bone fragments were arranged/located near the walls of ventricles or damaged them.

Metallic foreign bodies struck into the area of ventricles not only with the straight/direct wound of their walls. Sometimes the period of early reactions they penetrated the area of ventricle as a result of the bedsore of its wall. This frequently led to surprise death of wounded.

Histologically in the cases of subependymal vessels by lymphocytes and by macrophages, hyperplasia and acute/sharp decomposition/decay of the cells of ependyma, hyperplasia of the astrocytes and cells of the micro-glia of the subependymal layer without the conversion of the latter into granulated spheres.

The development of periventricular of encephalitis usually was observed in the period of early reactions. It is later, in the period of the elimination of early complications, nonpustular periventricular encephalitis frequently converted/transferred into the chronic productive periventricular encephalitis; the latter sometimes appeared and independently. This was observed in the cases of the penetration of foreign body into the area of ventricle as a result of bedsore in its wall and in extremely rare cases - during the displacement of foreign body. In this case occurred the encapsulation of foreign body in the area of ventricle.

Macroscopically near foreign body were detected the magnificent dense growths of the granulating tissue, which frequently led to the coalescence of the opposite surfaces of the ventricles of brain. Outside of the grown sectors the wall of ventricle had granulated dull surface, was dense palpation. In a number of cases were observed the excessive growths of the granulating tissue, which sometimes fulfilled the area of ventricles for considerable elongation/extent and which led to occlusion of hydrocephalia. In this case changed the form of ventricles. Most frequently was encountered the pulling of the wall of ventricle tc bone defect with the education of the diverticulum whose external boundary was connected into the forming

scar tissue.

Focal nonpustular reactions to the introduction of foreign bodies into the substance of brain are diverse. Nevertheless in the final analysis they all are reduced to delimitation, encapsulation and in the specific cases to the resorption of foreign body.

Page 92.

About the resorbed small/fine bone fragments usually occurs the development of granulating tissue with polynuclear giant cells and macrophages. Large/coarse bone fragments undergo the changes, the analogous facts, which are observed during the autotransplantation of the bone tissue; as a result of this sometimes it is possible to see the accustoming of bone fragments into brain tissue.

About unresorbed foreign bodies (metallic fragments) occurs the reproduction/multiplication of fibroblasts, which leads to the education of connective capusules around foreign body. The completely formed capsule was observed already at the end of the second, in the beginning third week after wound. The formed capsule fits foreign body. In section/cut its interior layers, impregnated by salts of iron, are usually colored rusty or brown. Histologically interior layer of the capsule of foreign body consists of the fibrous connective tissue, which contains a small quantity of cells. Only somewhere it is possible to see the small/fine infiltrates, which consist of histiocytes, lymphocytes and macrophages, filled with iron (Fig. 20). The skin of capsule is formed by the filaments of glia.

Macroscopically around foreign body is detected the outlined ganglion/node of greyish tissue.

Sometimes around foreign body appears tumorous education of the type of granuloma, which is well separated/liberated from adjacent tissue. The detailed description of such granulomas on experience of the Great Patriotic War is in the work of A. I. Arutyunov and B. S. Khominskiy (1947). According to the description of these authors, macroscopically were observed the massive growths of tissue, several times the exceeding diameter of this foreign body. The boundary of granuloma is usually distinct.

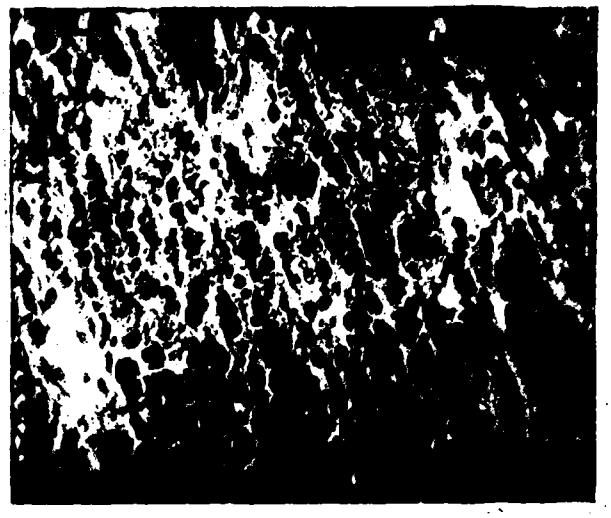


Fig. 20. Granulated spheres, which contain iron, in the capsule of metallic fragment. Stain/staining with the hematoxilineosin; increase 7x20.

Page 93.

The brown staining of its internal sectors, which are contacted with metallic fragment, is observed much more rarely and is expressed weaker than in the capsules of metallic fragments described above. With the places in the thickness of granuloma are visible the small sectors auger painted tissue. Histologically the described granulomas differ from the ordinary granulomas of the foreign bodies: their framework is formed by the large-loop net/system of the collagenic fiber; in the sockets between the latter are arranged/located the

cellular knots, which are sometimes directly adjacent to foreign body. The composition of cells in these knots is inhomogeneous: in their center there are accumulations of the partially necrotized leukocytes and monocytes, in other cases here is detected the continuous mass of coagulation necrosis with the small islets of leukocytes. Towards the outside are located enthelioid cells and macrophages with the small admixture/impurity of leukocytes and sometimes giant cells. Here is detected the tender net/system of argyrophil filaments. The quite skin of cellular knot is usually represented lymphocytes and plasma cells with the small admixture/impurity of epithelioid cells and leukocytes. The stroma of this layer is formed by the net/system of argyrophil filaments. The described granulomas were observed both in the presence of bone and metallic fragments. In contrast to the fibrous capsules of foreign bodies such granulomas gradually increase due to the dissemination of inflammatory infiltrate and growth of connective tissue in the periphery of granuloma. From the given description it is evident that the inflammatory process in the depth of the granuloma does not conclude, but long there exists. B. N. Mogil'nitskiy (1943) notes that even the insignificant damages the tissue, which surrounds foreign bodies, can lead to diffuse dissemination and generalization of infectious process.

The peculiar variant of nonpustular tissue reaction to foreign

body is the education of cysts.

It should be pointed out that with blind-end wounds patalogoanatomy always does not succeed in during the one-time research of brain finding foreign body. In such cases essential assistance can render the x-ray examination of preparation. For finding the foreign body in brain one should produce consecutive series sections.

III. Infectious complicatcns of the combat injury of skull and brain. Infectious complications appearing with injuries of skull also of brain, must attract attention both on their frequent and on their outcomes.

The specific gravity/weight of infectious complications, which served as a reason for death of those wounded into skull and brain, is various. According to the data of V. S. Klyachko, infectious complications were the reason for death in MSB in 2.0o/o of cases, in KhPPG of the first line - in 5.3o/o, in the specialized hospital of army the percentage was considerably above. According to V. L. Byalik's data, infectious complications were the reason for death in MSB in 4.4o/o of cases, in KhPPG of army and in the evacuation hospital of front the percentage of complications was above. Thus, in proportion to distance/separation from zero combat and lengthening of

the periods, which passed from the moment/torgue of wound, the percentage of infectious complications with the wounds of skull increases.

In the overwhelming majority of the cases was observed purulent infection, is considerably thinner/less frequent - the anaerobic infection of the wounds of skull and brain.

Page 94.

The forms/species of the purulent inflammation, which were being encountered with the injury of brain and its meninges, were diverse in the time of their origination, morphology, localization and extent; it was observed both restricted (local) festering and diffuse infiltratively spread purulent inflammation. To the development of purulent inflammation in substance and shells of brain frequently contributed the presence of foreign bodies and hematomas. Furthermore, the specific value had suppurations in soft tissues and bones of skull. Frequently in one and the same case was observed the combination of different forms/species of purulent inflammation. Frequently suppurations were combined with nonpurulent tissue reactions of the substance of brain and its shells. Purulent inflammation frequently served as a reason for continued and secondary prolabation.

The basic types of organic suppurations were festering wound canal, festering the forming scar, external purulent pachymeningitis, abscess of brain and festering the granuloma of foreign body.

The development of local festering occurred in different directions: into some cases the process according to one or the other reasons stopped and was relieved by the healing of the purulent focus; in others - appeared the education of the abscess; in the third - festering accepted chronic course without the education of the abscess; in the fourth - local festering it concluded with bursting of diffuse purulent inflammation in the form of secondary purulent leptomeningitis or spilled purulent encephalitis.

Festering wound canal usually was observed in the period of early reactions. Macroscopically it was characterized by softening the walls of wound canal, which acquired yellowish or yellowish-green color and pastelike consistency. Under microscope was detected continuous infiltration with leukocytes and the purulent melting of interior layers of the walls of wound canal (Fig. 21).

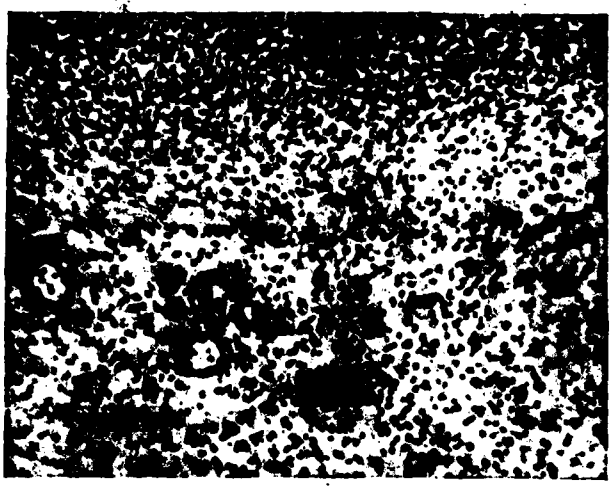


Fig. 21. Festering wound canal. Sector of march/passage into the unchanged brain tissue. Stain/staining with the thionine; increase 7x20.

Page 95.

Purulent melting underwent connective filaments, and newly formed vessels; moreover frequently were observed localized hemorrhages. The products of purulent melting were mixed/added to the mass of decomposition/decay, which was being located in the lumen of wound canal.

In the period of the elimination of early complications festering wound canal sometimes concluded with healing with the education of compact or poriferous scar, more or less filling the

defect of tissue. Formed in the cases of festering the wound canal scar was usually more roughly than during the uncomplicated course of healing of wound.

Sometimes occurred the incapsulation of purulent focus with the formation of the abscess of the brain (see below). In other cases the festering without tendency toward limitation continued among the growing connective filaments of the forming scar.

Festering the forming scar most frequently was observed in the third period of the course of the injury of the brain; it with difficulty usually yielded to treatment and frequently it led to death. As soon as which was indicated, festering scar into some cases could appear as the straight/direct and direct continuation of festering wound canal, in other cases - as the outbreak of festering in the scar, which was being formed on the spot of the wound canal, which healed without complication. In the latter case the festering was developed as a result of march/passage or metastastic spreading of the infection: either from the region of the development of external purulent pachymeningitis, or from the region of festering the wound of bone and soft tissues of skull, or finally from the focus festering, arranged/located out of skull.

Festering the forming scar flowed/occurred/lasted in the form of

diffuse pustular infiltration of cracks and pores between the filaments, composing scar. In other cases were observed multiple fine focal/acinous accumulaticns of pus, reminding miliary abscesses, but not had capsules, typical for an abscess (Fig. 22).



Fig. 22. Festering scar. Van Gieson staining; increase 7x10.

Page 96.

The ordinary picture of festering scar was sometimes complicated by the education of the abscesses, which appeared in different time and therefore had dissimilar size/dimension. Festering scar frequently led to the spilled purulent encephalitis, purulent leptomeningitis and purulent periventricular encephalitis.

Macroscopically the tissue of the cerebral scar, in which occurs the festering, appears edematic, flaccid, dull, frequently it is colored dark gray, sometimes with brown hue.

The histological picture of festering scar is very complicated.

The accumulations of pus in the form of thin strips and small/fine foci are arranged/located in slots and pores of scar. The cross-beams between them usually are densely infiltrated by macrophages, plasma cells and lymphocytes. Are more abundant the accumulations of pus in the sectors of scar, which adjoin the undamaged/uninjured brain tissue. Often in the purulent foci, which are arranged/located in the depth of scar, is detected a considerable quantity of bone fragments. In this case sometimes are observed the small/fine abscesses, joined under general/common/total capsule and divided from each other by thin cross-beams of the collagenic filaments. Usually these cross-beams are infiltrated from both sides by macrophages and lymphocytes and are covered with the tender nets/systems of argyrophil filaments.

The phenomena of festering wound canal and festering of scar, replacing it, which freguently develop in different sectors of wound canal, give to it very complicated building/structure. Sometimes wound canal is divided into the series/row of the isolated/insulated cuts, in which the phenomena of cicatrization are alternated with the phenomena of festering. Frequently the festering, imperceptible in inlet, is arranged/located in the depth of wound canal. In some cases the wound canal whose walls on their building/structure correspond to pyogenic membrane/diaphragm, has tubular, spindle-shaped or egg-shaped form. In other cases on the course of wound canal appear

the alternating expansicns and contractions, up to to adhesion and complete coalescence of its walls. In this case in the expanded sectors appear the globular areas, filled with pus. With blind-end wounds sometimes about inlet is found ampoule-like expansion of wound canal, which is opened/disclosed by fistula course outside. In proportion to removal frcm inlet this expansicn gradually is narrowed, occurs the joining of the walls of canal with the substitution of its lumen by scar. Then follows tubular course or area with the walls of the forming or formed abscess. Sometimes from this sector will withdraw bay diverticula whose walls separate/liberate pus. Even further can be observed the complete cicatrization of wound canal, which is ended in the encapsulated metallic fragment; sometimes here is detected abscess.

This complicated building/structure of wound canal, which frequently explains heavy unexpected contingencies in the course of process, can present kncwn difficulties for a diagnosis.

External purulent pachymeningitis is the focus purulent inflammation of the external surface of solid cerebral shell. Macroscopically during this process on the external surface of solid cerebral shell was detected the sector of the growth of granulating tissue with purulent discharge.

Was histologically stated/established the rich by vessels granulating tissue, which occurred from the endochondral layer of solid cerebral shell. Among the cellular elements/cells of granulating tissue is fcund a large quantity of leukocytes.

Page 97.

Pus was arranged/located on the surface of granulating tissue in its thickness in the form of the miliary foci of purulent melting. Interior layers of solid cerebral shell frequently remained unchanged. Sometimes in them was noted the insignificant bloating of collagenic filaments, the expansion of the slcts between filaments and around vessels. Rarely were noted the small accumulations of leptocytes around vessels.

In the period of the elimination of early reactions purulent pachymeningitis converted/transferred in chronic the productive pachymeningitis (see above).

Extremely rarely was observed the diffuse dissemination of suppuration all over surface of solid cerebral meninges and in its depth. In such cases pachymeningitis from external and restricted it was converted into diffuse purulent. In more detail about purulent pachymeningitis see below - in section the "nonpenetrating wounds of

skull".

Abscess of brain. The abscesses of brain play especially important role in the course of the injury of skull and brain. According to sectional data, the abscesses of brain in dead persons from the wounds of skull were encountered in army area (T. I. Stankevich) into 9.8o/o, in army area (V. S. Klyachko) - into 18.8o/o, in front line area (G. A. Margulis) - into 22.3o/o, in the deep rear this percentage was above.

The onset of abscesses was observed into the most varied periods after injury, more frequently - in the third and fourth period.

Abscesses appeared during festering around foreign body, during festering of the contusion focus, wound canal or forming scar, by metastatical route/path, etc.

Generally abscesses more frequently were developed in those departments of the rotting traumatic necrosis where most for long were retained the fission products of brain tissue. Were observed single and multiple abscesses.

Morphologically abscesses with the injury of skull and brain according to their certain signs/criteria differed from the abscesses

of another origin (A. M. Stepanyan-Tarakonova, 1943).

So, in contrast to nontraumatic, the capsule traumatic abscesses in different sectors had dissimilar building/structure. Frequently in it were noted pockets and deepenings; around the abscesses of traumatic origin usually were observed wide sectors of the necrosis of brain tissue; traumatic abscesses were encircled by a limited perifocal reaction.



Fig. 23. Sector of the wall of abscess - elephant of organization. Snesarev stain; enlargement 7x10.

Page 98.

The wall of the completely formed abscess consists of four layers: 1) the layer of necrosis, formed by pustular fused tissue, granular spheres and the purulent corpuscles/bodies; 2) the layer of organization, constructed from thin-loop net/system of argyrophil filaments and thin-walled vessels (Fig. 23); its tissue is infiltrated by the inflammatory cells among which there are in large quantities the leukocytes; 3) the layer of encapsulation, formed by the thick bundles of collagenic filaments and by the thick-walled vessels; 4) the layer of delimitation, which is the substance of the

brain in which the walls of vessels are infiltrated by lymphocytes, macrophages and the plasma cells; here usually expressed the phenomena of the hyperplasia of glia.

Actually all layers of the capsule of abscess, with exception of external, are developed from pyogenic membrane/diaphragm. Some authors (P. Ye. Snesarev, A. M. Stepanyan-Tarakanova, P. P. Ochkur) write about the three-layered building/structure of the wall of abscess, uniting after giving interior layers into overall regenerative layer.

The periods of the formation of capsules of abscess, given by different authors, are not identical.

P. Ye. Snesarev and A. M. Stepanyan-Tarakkanova correctly emphasize that the formation of capsule is connected not only with the periods of delivering injury. The period of the education of capsule depends on a number of factors. Basic of them are: the period of wound, the virulence of infection, the resistivity of organism, the degree of the traumatic decompcsition of brain tissue, surgical intervention, etc. P. Ye. Snesarev attaches principal value to a local descent in the vital processes, vastness and to the depth of the necrosis of brain tissue.

The character/nature of abscess is connected with the method of its origination. The abscesses, which develop from festering of wound canal, in the unit of the cases are arranged/located superficially, on the spot of inlet with perforating and blind-end wounds (Fig. 24). Outside such abscesses are covered by scar growths, which proceed from the periosteum of the external surface of the bones of skull and hard cerebral meninges. Some of these abscesses are locked from all sides areas, which contain pus, others - are communicated with external medium by fistula path that penetrates cicatrical growths and being finished on surface by navel-like retraction. From within fistula course is covered by the layer of the tissue, which is the straight/direct continuation of the capsule of abscess.



Fig. 24. Blind-end fragmentation wound of left postcranial portion. Abscess in the inlet; hydrocephalia.

Page 99.

In other cases the abscesses are arranged/located they are more deeply and separate/liberated from external medium by the mass of the forming scar. The latter is usually rich in cells (lymphocytes, macrophages and plasma cells). The education of such abscesses is most frequently connected with festering around foreign bodies, especially bone fragments. Abcess formation of bone fragment wound channels - one of the main reasons for the education of multiple abscesses. The abscesses, which were formed on the spot of the wound

canal, which heals with festering, have at first thin walls which subsequently gradually are thickened. The brain tissue, directly adjacent to the capsule of abscess, usually undergoes edematic softening. This "sequestration" of abscess during the aseptic course of softening creates favorable conditions for the operational distance/separation of abscess together with its capsule.

During festering of wound canal only in inlet usually is developed the monothalamous abscess of spherical or ellipsoid form (Fig. 25). During festering on the course of wound canal appear the abscesses of diverse form. Sometimes - these are conglomerate from several abscesses, not connected with each other or which are communicated by thin slots (Fig. 26). Less frequently it is possible to see the polythalamous abscess in which individual chambers/cameras are disconnected from each other by powerful/thick folds and mastoidal apophyses, protruding into the area of abscess. In certain cases individual chambers/cameras are connected by general/common/total barrel and appear as racemose to it extra weights.

Special form/species were the abscesses, which appeared as a result of festering of subdural and intra-cerebral hemorrhages or contusion foci. The capsule of such abscesses was rusty color, in its thickness there was large quantity of the granulated spheres

containing iron and free small lumps of hemosiderin. The subdural abscesses, which developed on the soil of subdural hematomas, were frequently multiple and they had ellipsoid form.

Sometimes, in the period of late complications, abscesses appeared after the prolonged period of clinical prosperity. To the outbreak of infection in such cases frequently contributed the occlusion of fistula courses.



Fig. 25. Abscess of right parietooccipital region.

Page 100.

In a number of cases were observed the abscesses of metastatical origin. As the source of metastastic spreading in this case they served: the purulent inflammation of the sinus of the bones of skull, festering wound and cracks of the bones of skull and described above foci of local festering in substance and shells of the brain (most rarely - a purulent pachymeningitis).

The development of abscesses was frequently escorted/tracked by

the onset of the series/row of complications. Most essential of them they were purulent leptomeningitis and spilled purulent encephalitis. The appearance of these complications obuslovlivalos6 on the aggravation of purulent inflammation in the wall of abscess, on its necrosis and dissemination of infection to the substance of brain or its shell (V. G. Shipachev and S. M. Milenkov). The abscess of brain, complicated by encephalitis or purulent leptomeningitis, frequently led to death. Sometimes infection from abscess burst open into the area of ventricle. This occurred by two methods. More rare of them was the straight/direct melting of the wall of abscess and sector of the substance of the brain, lying between abscess and wall of ventricle. In these cases the wounded frequently perished. More frequently was observed the march/passage of infection from abscess to the area of the ventricle through their anatomically undamaged/uninjured walls. In the latter/last cases the substance of brain, which was being arranged/located between the abscess and ventricle, was edematic, colored greyish. Under microscope was here detected the infiltration of the walls of vessels, and sometimes also brain tissue with a large quantity of the leukocytes; by places were noted miliary abscesses. Frequently with the penetration of infection into ventricles appeared secondary periventricular purulent encephalitis.

Among other complications of the abscess of brain should be

noted the hemorrhages into its area or the wall, which appeared either as a result of the corrosion of the wall of vessel by suppuration, or via diapedesis. Serious complication was the onset of secondary edema of brain. Sometimes was observed regional metastastic spreading from abscess from the origination of small/fine daughter abscesses around basic ulcer.

The peculiar manifestation of local pustulation was festering the granuloma of foreign body which was observed within different periods after wound. As a result was obtained the area with thick wall numerous layers of which they reflected abscess formation, and the reverse development of the granuloma of foreign body, its encapsulation and sequestration.

The basic types of the diffuse suppurations, which appeared during injury skulls and brain, were general/common/total purulent leptomeningitis, bilious and periventricular purulent encephalitis.

General/common/total purulent leptomeningitis. In the unit of the cases the infection without preliminary local festering acquired diffuse dissemination and malignant nature, most frequently in the form of purulent leptomeningitis. Primary general/common/total pustular leptomeningitis sometimes it was enccuntered in acute/sharp, initial, period, but it is considerably more frequent in the period

of early reactions and complications.

Within later periods was observed secondary diffuse purulent leptomeningitis, that appeared as the complication of local suppurations. Usually secondary purulent leptomeningitis appeared during festering of wound canal, forming scar, hematoma, festering in the periphery of foreign body and abscess of brain. Sometimes purulent leptomeningitis was connected to diffuse suppurations in the substance of brain (periventricular and bilious purulent encephalitis). Comparatively rarely with nonpenetrating wounds purulent leptomeningitis appeared by metastatical route/path from purulent focus in soft tissues, in bones or solid cerebral shell. Almost always purulent leptomeningitis it complicated the cases of the break of the base of the skull.

Page 100a.



Pig. 26. Two-chamber abscess of postcranial portion. (Artist V. V. Vorotilova.).

Page 100b.

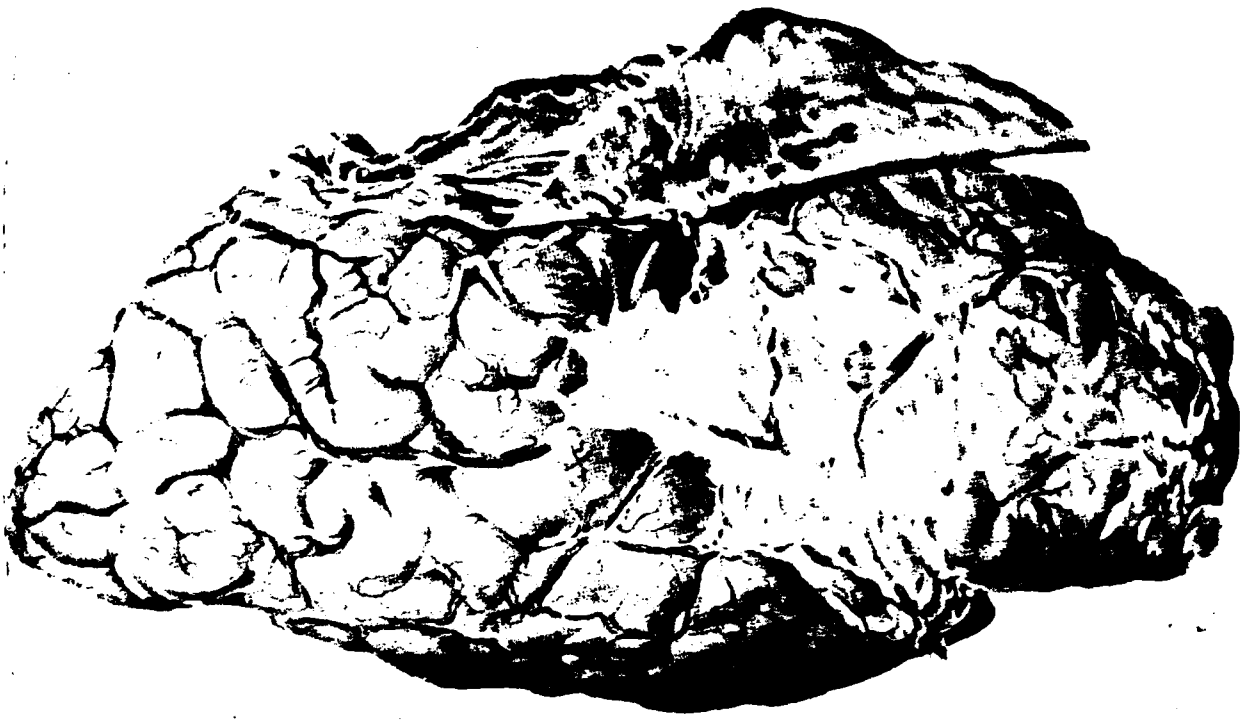


Fig. 27. Purulent leptomeningitis. (Artist of T. V. Belyayev.).

Page 100c.



Fig. 28. Contusion foci on the basis of brain. Basal purulent leptomeningitis. (Artist M. N. Skulyari).

Page 101.

According to sectional data, purulent leptomenengitis in army area it was the reason for death of those wounded skull into 47.0o/o of cases (T. I. Stankevich, 1943). In those wounded skull, dead persons from complications, purulent leptomenengitis it was observed into 62.4o/o of cases (T. I. Stankevich, 1946). According to S. S. Vayl's data (hospitals of the rear), meningitis was observed into 58.0o/o of cases of the penetrating wounds. Some authors give the lower numerals of the frequency of meningitis, which, apparently is caused by recording the sectional cases of secondary purulent leptomenengitis under other headings according to the form/species of the basic complication: the abscess of brain, encephalitis, etc.

Primary purulent leptomenengitis morphologically little it differs from purulent leptomenengitis of nontraumatic origin. Upon detection it was characterized by the more or less massive accumulations of liquid or dense pus in sub-arachnoidal space, and sometimes also it is direct under solid cerebral shell (Fig. 27). On Virkhoff-Robenoff spaces pus was spread into brain core and infiltrated the intertissue slots of its molecular layer. Sometimes

in this case in brain core appeared the miliary foci of purulent encephalitis (purulent meningoencephalitis). Primary purulent leptomeningitis it destroyed the predominantly convex surface of brain, but it was frequently escorted/tracked by the abundant accumulations of pus in the tanks of basis. In the large unit of the cases was observed the march/passage of purulent inflammation to the vascular webes/plexi of lateral ventricles with the development of pyocephalus and secondary periventricular nonpurulent or purulent encephalitis. Frequently the course of primary purulent leptomenengitis was complicated by sharp edema of both hemispheres and by sometimes extended sub-arachnoidal hemorrhages. Sometimes, with one-sided wounds, was observed the development of primary purulent leptomenengitis only on undamaged/uninjured side.

Secondary purulent leptomenengitis it was localized both on the convex surface of brain and on its basis, moreover more frequently was observed basal meningitis (Fig. 28). All cases of purulent periventricular encephalitis (epidemitis) were complicated by precisely basal meningitis. In this case the shells of the convex surface of brain sometimes remained unchanged. As with primary purulent leptomenengitis, in the cases of secondary leptomenengitis was observed the damage/defeat of brain core.

The histological expression of purulent leptomenengitis did not

present essential differences from the commonly known picture of nontraumatic purulent leptomenengitis. Characteristic was frequent combination in one and the same case of purulent inflammation with the nonpurulent reaction of soft shells.

In cases when was carried out treatment by sulfanilamide preparations, was observed the march/passage of purulent inflammation into productive with the education of the infiltrates, consisting of lymphocytes and plasma cells, and with the phenomena of the intense proliferation of the connective elements/cells of shells.

Spilled purulent encephalitis. By that spilled the purulent encephalitis, frequently called phlegmoncus encephalitis, was usually observed into the beginnings of tne period of early reactions and complications. Actually this extremely heavy process was extended purulent inflammation of brain tissue. Macroscopically in initial stages the casualty region in section/cut had a pale pink and sometimes smoked color. Subsequently the casualty sectors were converted into the paste-like mass of the dirty yellow color.

Page 102.

During war were observed the cases of the continuous damage/defeat of the large hemispheres of brain by purulent encephalitis. In this case

in section/cut the substance of brain took the form of the crawling dirty yellow pulp with the complete absence of the figure of gray and white substance. Unmelted remained only the hanger-on unit of the brain. Such cases were always escorted/tracked by general/common/total purulent leptomenengitis, ependymitis and pyocephalus. Tendency to be spread towards the ventricles of brain is generally characteristic for the spilled purulent encephalitis. Sometimes spilled purulent encephalitis was not the primary appearing process, but complicated the abscess of the brain in wall of which were developed necrotic changes.

With the spilled purulent encephalitis was histologically detected the diffuse infiltration of intertissue and perivascular slots with leukocytes with the education of the confluent foci of purulent melting. In primary tissue were noted heavy degenerate and necrotic changes.

The periventricular purulent encephalitis (ependymitis) frequently appeared as a result of the march/passage of purulent inflammation on the continuation: with the spilled purulent encephalitis, reaching the wall of ventricle with its softening, with purulent leptomenengitis with the march/passage of purulent inflammation to vascular webes/plexi, during festering of the focus of the primary necrosis of the wall of ventricle, with the necroses

of the wall of the abscess, which is arranged/located near from ventricle.

Sometimes was observed the metastatical periventricular purulent encephalitis (ependymitis). As the source of metastastic spreading in this case served the foci of festering, arranged/located at distance from ventricles. Sometimes periventricular purulent encephalitis appeared without the presence of the preceding focus of local festering (primary periventricular purulent encephalitis). This was observed more frequently in the beginning of the period of early complications in the cases of the wounds of ventricles.

Macroscopically with periventricular purulent encephalitis was noted the purulent softening of the sector of the wall of ventricle. subepidymal layer had yellowish stain/staining. During research under magnifier in it were detected the smallest foci of purulent melting. Frequently in the place of the damage of the wall of ventricle were growths of the granulating tissue, which were being stuck out into the area of ventricle. Usually in the area of ventricles there was an accumulation of pus (pyocephalus; Fig. 29).

During histological research in the cases of periventricular purulent encephalitis is found the granulating tissue of ordinary building/structure, separating/liberating pus. In subependymal layer

there were perivascular and diffuse leukocyte infiltrates and small foci of purulent melting. The elements/cells of glia were found in the condition of regressive metamorphosis. In subependymal vessels was detected the hyperplasia of endothelium, which sometimes gave the pictures of obliterating endovasculitis.

Continued and secondary prolabation of the substance of brain. With infectious complications connected the onset of continued and secondary prolabation of the substance of brain ("malignant protusion") according to clinicians' terminology).

Sometimes upon the appearance of early complications, in the case of the delay of the reverse/inverse development of disorders roof and fluid formation is held up retraction of primary prolapse, which was being formed in acute/snarp period. Protuding part of the substance of brain increases in volume and is pinched in the defect of bone and solid cerebral shell.

Page 102a.

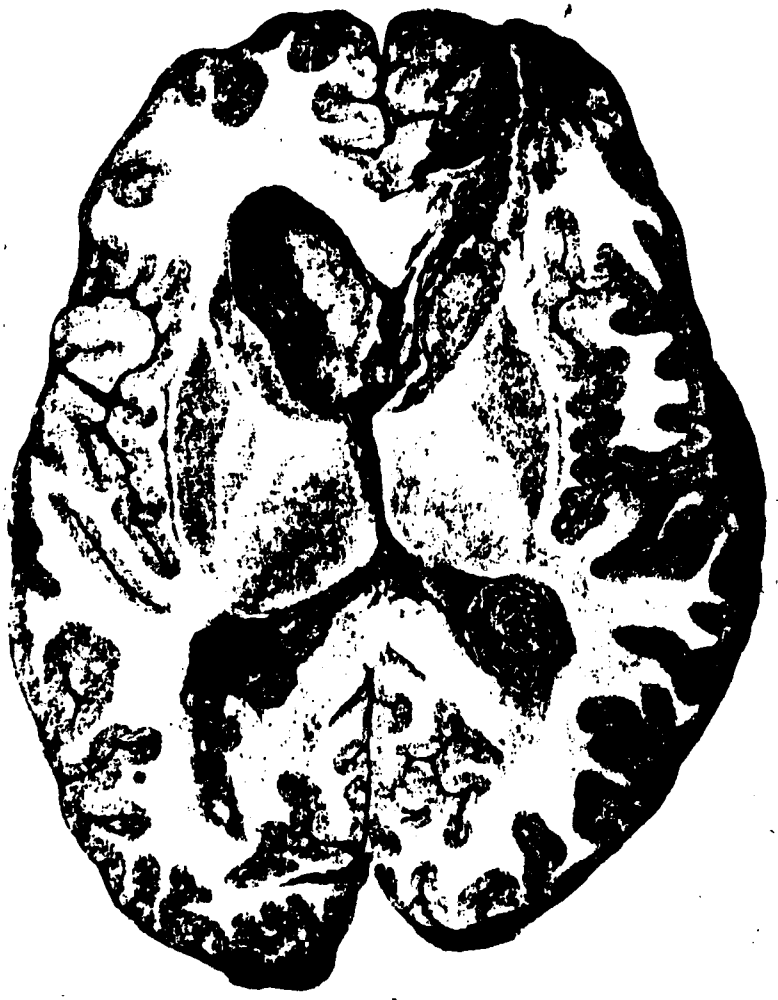


Fig. 29. Blind-end fragmentation wound of front/leading crescent of right lateral ventricle, periventicular purulent encephalitis. (Artist is M. Skulyari).

Page 103. In this case are squeezed the vessels of soft shell and the

brain tissues, feeding the protruding tissue which therefore dies away. Thus, is developed continued prolapse.

The morphological picture of continued prolapse was represented in the following form. Macroscopically (V. V. Arkhangel'skiy, 1942) of protruding unit of the brain tissue took the form of the decomposing mass, impregnated with the blood or pus. Decomposition/decay encompassed substaintially more the substance; in adjacent, the yet not had time to be necrotized brain tissue were detected many localized hemorrhages and phenomena of edema.

Histologically were noted degenerate changes in the nerve cells and astrocytes, hyperplasia of oligodendrology. In vessels there were phenomena of hyalinosis and numbness of their wall. Were observed also many perivascular hemorrhages and infiltrates, consisting of leukocytes and lymphocytes.

With the penetrating wounds, complicated by infectious processes, sometimes in the period of early complications was observed protrusion of the substance of brain, not depending on the presence of prolapse in the past (in acute/sharp period). This secondary prolapse morphologically did not differ from that continued. In the period of late complications the onset of secondary prolapse was usually connected with the development of the abscess of

brain.

The education of secondary prolapse unfavorably was reflected in the course of injury. Was observed an increase in the sizes/dimensions of necrosis, which supported the existence of inflammatory processes and held up the healing of the wound of brain. Particularly unfavorably flowed/occurred/lasted the cases of prolapse where into prolapse were implicated the crescents of lateral ventricles. As a result was observed the autopsy of the area of ventricle into the mass of necrosis with the subsequent infection of ventricle and the development of periventricular purulent encephalitis.

Secondary prolapse was important moment/torque upon transfer of the local festering of shells and substance of brain into the general/common/total purulent inflammation.

In the cases of the happy formation of scar and reverse/inverse development of disorders roof and fluid formation secondary prolapse in the period of the elimination of early complications gradually began to fall. Was torn away the mass of the become numb tissue, and the unit of the substance of brain, which was being arranged/located nearer to undamaged/uninjured brain tissue, it cicatrized.

Chapter IV.

GENERAL QUESTIONS OF CLINIC OF BULLET WOUNDS AND DAMAGES of SKULL AND BRAIN.

Course of the bullet wounds of skull and brain, beginning with the moment/torque of injury.

The course of the bullet wounds of skull and brain, beginning with the moment/torque of injury to the final healing of wound, is very complicated and prolonged process. The complexity of this process obuslovlivaets4 on the special features/peculiarities of the morphology of wound and infecticn.

Entire process of the healing of the wound of skull and brain is determined by the series/row of local and general/common/total factors.

Local factors are: the resistivity of tissues for infection, their regenerative capability, character/nature of wound, form/species and localization of wound, character/nature of bacterial

flora, etc. A number of total factors includes the condition of the organism of wounded both at the moment of injury and in the subsequent time.

The special features/peculiarities of morphology are equal skull they consist in its multistage building/structure with the layers of the tissues of different functional value and histological structure. On one hand, are poorly differentiated cover tissues, with another - highly differentiated brain tissue.

The abundant vascularization of the integuments of skull and their high regenerative capability favor the healing of wound. However, the excessively rapid healing of the cover unit of the wound is negative moment/torque, since sometimes it leads to the delay of discharge from deep departments of wound. The loose layers of the soft integuments of the arch/summary of skull, in particular, between galea aponeurotica to by periosteum, create the possibility of the light scaling galea aponeurotica and educating hematomas. However, the scaling of periosteum can contribute to the development of necrotic processes in bone a in the presence of infection lead to osteomyelitis.

The inclination of the flat/plane bones of skull to craze far beyond the limits of defect can sometimes complicate the course of

wound, and the diffuse dissemination of infection on diploe can lead to the development of osteomyelitis all over bone. Solid cerebral shell is a good barrier, which impedes penetration of infection into cerebral tissue. However, in the presence of extensive hematoma or contusion focus in brain this barrier sometimes plays negative role, since hides the development of abscess.

Page 105.

Abundant supply of blood to skin of skull contributes to stability and its resistivity with respect to to the infection; the underlying layers (galea and bone are characterized by considerably smaller resistivity to infection. Is higher the resistivity of solid cerebral shell. Brain tissue, as is known, it possesses poor stability to the physicochemical factors of environment and low resistivity with respect to infection.

The course of the wound of brain manifests itself the extremely slow absorption of contents, which can last not only by weeks, but months and years.

Especially influences the course of wound the dissimilar regenerative capability of its tissues. While the soft tissues of integuments rapidly heal, the reduction process in brain tissue

proceeds slowly.

one of the most important factors is also the taking root in wound microflora.

At present it is virtually necessary to consider that any bullet wound of skull is contaminated bacteria.

On the research of P. P. Saxarov, of 6-7 wounded with the bullet penetrating wounds of skull only in two wounds it proved to be sterile.

However, any wound, which is primary microbial contaminated, flows/occurs/lasts subsequently with infectious complications, as is evident from Table 14.

Volume and form of the foci of the primary necrosis of brain tissue depend on the character/nature of wound, form and value of bullet shell, from direction and distribution of kinetic energy of shell, and also energy, reported by the introduced in brain bone fragment.

Simultaneously with the phenomena of primary necrosis and the disorders of blood circulation in the acute/sharp period of the

course of wound are developed the disorders of fluid reversal and also water metabolism/exchange.

The overwhelming majority of the bullet wounds of skull in initial period is characterized by the liberation/excretion of outside liquid and semi-fluid masses in the form crumble, spinal chord fluid/liquid, cerebral detrite, and also by fallout into the wound of the destroyed sector of brain. Upon the considerable decomposition of brain tissue the latter ensues/escapes/flows out in the form of cream-like emulsion (fluxus cerebri). In the cases of the small-splintered blind-end penetrating wounds the liberations/excretions from wound are insignificant.

With the perforating penetrating wounds such masses are secreted mainly from outlet.

Table 14. Characteristic of the course of the wounds of skull.

(1) Характер ранений черепа	(2) Осложнений не было	(3) Чистота инфекционных осложнений
(4) Ранения мягких тканей	98,7	1,3
(5) Непроникающие ранения	80,2	19,8
(6) Проникающие ранения	54,3	45,7

Key: (1). Character/nature of the wounds of skull. (2). complications it was not. (3). Cleanliness of infectious complications. (4). Wounds of soft tissues. (5). Nonpenetrating wounds. (6). Penetrating wounds.

Page 106.

Outflow from wound continues usually in the course of first hours and twenty-four hours; to the second day it frequently ceases. However, hemorrhage into the area of skull can still continue to the durations entire of initial period, giving the picture of the growing compression syndrome with the hanger-on phenomena of different degree of intensity or to sub-arachnoidal hemorrhage.

Toward the end of the initial period is observed usually serous-blood-containing discharge from wound, frequently in minute quantity, without odor.

The processes of cleansing and regeneration, that take place in the wound of the soft tissues of skull, actually do not differ from the analogous processes of the healing of wound in any another region of body. Abundant vascularization, high stability and plasticity of the tissues of the integuments of skull contribute to the fastest cleansing of wound and to the earlier development of the processes of the substitution of the defects, even significant magnitude. Beginning from the fourth, and sometimes also from the end of the third day, is noted the neoformation of vessels in all layers of the wound; are observed the active processes of cleansing with intense leukocyte reaction. These processes in soft tissues proceed more rapidly than in brain tissue. To the 5th day skin- aponeurotic of the edge of the wound begins to be covered by granulatins, by 7 - to the 9th day of granulation, covering/coating periosteum, are spread to the surface of bone, while to the outcome of the second week frequently already entire/all surface of wound, including not only bone, but also solid cerebral shell, is covered/coated with granulating tissue.

To the outcome of the second week the wound to a considerable degree is cleaned in all layers. Tissue decomposition/decay in the cover unit of the wound disappears almost completely, gradually it is decreased and a quantity of decomposing tissue in the cerebral unit of the wound. Known role plays in this case the absorption which

occurs with the aid of the restored systems of blood and fluid circulation.

Simultaneously with the cleansing of wound from the very beginning of the second period gradually are developed the productive processes which in the cover unit of the skull begin considerably earlier than in cerebral, and they flow/occur/last more rapidly.

The restoration/reduction cerebrospinal fluid and blood circulation in the second period decreases edema of brain and phenomenon of internal and external dropsy.

Subsequently period especially intensely continue the processes of organization. Productive processes predominate above the processes of the cleansing of wound.

In more detail the process of the healing of the wound of brain is presented above, in chapter "Pathological anatomy".

More heavily flows/occurs/lasts the healing of the complicated wound of skull and brain. The vastness of damage, character/nature, localization, bacterial contamination of wound and series/row of other factors affect the course of process.

The average percentage of complications with the bullet penetrating wounds of skull is equal to 45.7. The frequency of the infectious complications of the bullet wounds of brain, depending on the means of the penetrating wound, it is shown in Table 15.

Form/species and virulence of wound microflora it is far not insignificant for the process of healing. From pyogenic flora hemolytic streptococcus is the most frequent causative agent of complications (in particular, meningitides and abscesses of brain). From the anaerobic flora Clostridium perfringens it sometimes proved to be the causative agent of the gaseous gangrene of brain.

Page 107.

One of the general/common/total factors, which facilitate the development of the complications of the wound of skull in brain, can be the weakened general condition of wounded and reduced reactivity of his organism. The poor conditions of transport, defective primary processing, incorrect treatment also play very considerable role and the development of complications.

Complications can be different in etiology, localization and special features/peculiarities of course.

All appearing in the wound of skull and brain infectious complications on majority of the enumerated signs/criteria (etiology, localization, peculiarities of course) it is possible to divide into two groups: a) the complications, which are limited by the zone of wound itself, and b) the complications, going far beyond the limits of wound.

On the special features/peculiarities of course should be secreted: a) the complications, which take place sharply, and b) the complications, occuring chronically.

Finally, depending on the form/species of the complication of the wound process I could be observed is many various forms of the complications of wound. This question is in detail illuminated in the special unit of the present section.

Suppurative processes in different layers of the cover unit of the wound usually are revealed/detected in the second period of the course of the wound of skull and brain. The complications of this form/species are characterized by appearance in the periphery of the wound of the signs/criteria of inflammation in by the abundant, for long not ceasing liberations/excretions.

Inflammatory processes in soft tissues are characterized by

inclination to dissemination and education of flows with the delay of discharge, particularly with localization of wound in temporal or postcranial region. Then it is possible to talk about the inflammatory processes, which develop between aponeurosis and periostenum, and also between periosteum and bone.

Suppurative process in soft tissues of the wound of skull sometimes leads to osteomyelitis.

Important condition for the development of suppurative inflammatory process in bone is the damage of the periosteum of the external surface of bone, that not only drastically makes its nourishment worse, but also deprives the bone of protection both from the harmful conditions of environment and from infection. The presence in wound of the sectors of bone, deprived to the nourishments also of the contusion foci with intraosseous/intraosteal/endoosteal hemorrhage and also the crack propagation of bone the limits of traumatic focus they far beyond contribute to the development of osteomyelitis.

Table 15.

(1) Характер огнестрельных проникающих ранений черепа	(2) Процент инфекционных осложнений
(3) Слепые	45,2
(4) Касательные	46,6
(5) Сегментарные	50,8
(6) Диаметральные	49,0
(7) Рикошетирующие	40,5

Key: (1). Character/nature of bullet penetrating of the wound of skull. (2). Percentage of infectious complications. (3). Blind (cecal) . (4). Tangents. (5). Segmental. (6) Diametric. (7). Ricochet.

Page 108.

Purulent inflammatcry processes can be spread to different layers of the bone: external plate, porous substance, internal plate and to entire thickness cf bone. Osteomyelitis complicates the wound of skull rarely (1.8o/o of all wounds of skull); more frequent it is observed with the nonpenetrating wounds of skull, which are escorted/tracked by the exposure of bone for extensive elongation/extent and by the presence of the foci of contusion and necrosis. Osteomyelitis is developed not earlier than the third apparitors after wound and usually when wound was processed or processed badly, poorly.

In cover unit the wound in this case continues to steadily decrease in volume, giving somewhat surplus granulations and abundant separated. The complete healing of wound is held up by formation in cover scar of markedly visible fistula which can exist long time and give relapses.

Considerably more rarely is encountered the sharper and more terrible course of ostecmyelitis, which is escorted/tracked by the large destruction of bone. Latter/last is frequently the reason for the development of such serious complications as extradural, subdural or cerebral abscess, meningitis or encephalitis.

The majority of the infectious complications of the bullet wounds of brain is escorted/tracked by the protrusion of brain which can be early or late, benign or malignant by nature, course and outcome (to this question is dedicated special chapter).

With festering of the wound canal of brain attacks/advances the purulent melting of its walls. As a result of festering the wound of brain the region of the damaged cerebral tissue considerably is expanded, which, naturally, leads to the education of more extensive and coarse-in scar.

Festering usually captures wound canal almost for entire its elongation/extent, but within later periods it can flow/occur/last very unevenly, being limited to the individual sections of wound canal.

Course of both forms of festering wcund can have the following outcome:

1) the spontaneous cessation of festering and the subsequent cicatrization;

2) festering the forming scar;

3) the education of the abscess of the brain;

4) dissemination of festering of process beyond the limits of wound into integuments, shells, brain and fluid routes/paths.

Festering the wound of skull and brain relatively rarely ceases independently. Most frequently festering is spread to the surrounding brain tissue with march/passage into abscess, purulent encephalitis, meningoencephalitis or into festering of the forming scar.

One of the serious complications of wound is the abscess of brain. To the development of this complication contribute different reasons: the character/nature of infection, form and building/structure of wound canal, biological special features/peculiarities of brain tissue, foci of necrosis, poor processing of the wound after which can remain unremoved/uneliminated bone and metallic fragments and, etc.

In particular, the wounds of skull and brain are complicated by development of abscess most frequently with blind-end, and in case of tangential wounds (table 16).

Frequently for the elongation/extent of wound canal at different levels its or different offs-shoot is formed the series/row of abscesses.

Unrecognized and not treated in proper time abscess of brain most frequently leads to the generalization of infection in the area of skull (as a result of the penetration of abscess into ventricle or into the surrounding cerebral tissue) with the subsequent development of meningitis, spilled purulent encephalitis or periventricular encephalitis.

Page 109.

Diffuse pyo- necrotic encephalitis, meningitis ependymitis they are the severe complications of the wounds of brain, which give the greatest percentage of unfavorable results.

It is most risky, although very rare, complication is the anaerobic infection of brain. In the known unit of the cases the virulence of the carried microflora and the fast developing activity of pathological process are such, that anaerobic infection from wound is spread to entire contents of the area of skull.

The wounds of brain are complicated by anaerobic infection most frequently with blind-end wounds. The developing anaerobic infection gives to wound very characteristic form/species. In first two or three for after the wound of edge the wounds are rather dry and covered with dull gray film. From the depth of wound is secreted at first in a small quantity the dirty brown decomposing mass with putrefactive odor, in which sometimes it is possible to note gas bubbles. The rapidly swelling cerebral tissue is begun protrude beyond the limits of bone defect. Soon into the wound, complicated by anaerobic begins to protrude the brain tissue, which protrudes above

the level of skin. Skin in the periphery of wound is edematic, by places has crimson hue, it is covered with the dirty brown raid with liquid malodorous discharge. The protrusion of brain in the first week after wound is unformulated greyish contaminated mass with the sectors of different stain/staining (from crimson, almost black, to greyish-green and violet). The sectors of different stain/staining - these are the meltted foci of hemorrhages and necrosis. Is observed also the series/row of the large/coarse foci of fresher hemorrhages and necrosis. Brain tissue is edematic, necrotized and imbibed by by the blood, sometimes on chapters independently it is broken and is torn away. In individual sections there are dry shreds of the necrotizing tissue, usually in the form of dirty green molten ductile mass with putrefactive odor.

In the wounds, complicated by anaerobic infection, the process basically is developed in two forms: 1) with the predominance of the phenomena of edema even 2) with the rapidly progressive melting of the brain tissue, which is converted into viscous, liquid mass, sometimes from admixtures of bubbles of gas and with malodorous smell. The complication of wound of anaerobic infection in the majority of the cases causes lethal outcome during the first week.

Table 16. Frequency of the complications of the wounds of brain of abscesses with the penetrating wounds of skull.

(1) Характер ранений	(2) Частота осложнений ранений мозга абсцессами (в %)
(3) Слепое	13,3
(4) Касательное	12,5
(5) Сегментарное	9,8
(6) Диаметральное	7,7
(7) Рикошетирующее	4,7
(8) Всего	12,2

Key: (1). Character/nature of wounds. (2). Frequency of complication of wounds of brain of abscesses (in o/o). (3). Blind. (4). Tangent. (5). Segmental. (6). Diametric. (7). Ricocheting. (8). In all.

Page 110.

Changes from the side of nervous system.

INITIAL PERIOD AND PERIOD OF EARLY REACTIONS AND COMPLICATIONS.

The clinical picture of gun wounds of skull and brain is extremely complicated, but into the first several days and it is extremely variable.

In present chapter will be given only the general/common/total characteristic of changes in the nervous system with the penetrating wounds of brain. The details, which concern neurologic clinic of the closed injury of skull, nonpenetrating bullet wounds, and also different complications, will be described in the subsequent chapters.

The basic reasons for complexity and rapid mutability/variability, especially in initial period, clinical picture with the penetrating wounds they are: 1. Diversity of the

wounding shells, their sizes/dimensions and form. 2. Diversity of elements/cells on which they simultaneously perform (bone, sheathings, vessels, substance of brain, cerebro-spinal fluid), and complexity of their activity (straight/direct decomposition, contusion, displacement, jolt, compression), and also called by them instantaneous, but frequently achieving vast force change in intracranial pressure. 3. Connection to results of direct activity of wounding shells a nearest hours and day of heavy dynamic disorders of blood circulation, violations of spinal fluid supply and spinal fluid circulation, formation of hematomas, appearance of edema and bloating of brain. These secondary pathogenetic factors lead to the intracranial pressure increase, to the general/common/total and local compression of brain, to the shift of its individual sections, and sometimes also to the jamming of its adjacent departments in the slot of Bichat or in large foramen. Appearing in one or the other combinations and sequence, causing the additional disorders of the general/common/total and local activity of brain, they create that "randomness" in the clinical picture in the first twenty-four hours after wound, which so it noticed well he vividly described N. N. Burdenko.

Further changes in the clinical course of the penetrating wound depend on frequently those observing also moreover, of the frequently uniquely elapsing complications.

Finally, in late and in residual period peculiar impression on the clinical picture of the wounds of brain lay intra-cerebral and tunicary-cerebral scars.

According to decision of VII session of neuro-surgical advice/council, in the course of the penetrating wound of brain accept to secrete five fundamental periods. In neurologic sense each of these periods is characterized by their special features/peculiarities, and also by those specific problems which must solve the neuropathologist. The liberation/excretion of these special features/peculiarities, based on clinical and pathomorphological observations, in its significant part is the result of the collective experience of the neuropathologists and neurosurgeons in the Great Patriotic War.

Initial, or acute/sharp, period. In its clinical sense they divide into three stages: initial, "chaotic" and stages of partially early complications.

Page 111.

Initial stage envelops the first day. For it are characteristic

the phenomena of shock and the disorders of the general/common/total and local (focus of symptom) activity of brain, caused by the direct effect of the wounding shell and bone scrap. Wounded in this stage rarely struck under the observation of neuropathologist.

Chaotic stage (" chaotic" N. N. Burdenko's period) in essence envelops the following 2-3 days, but the phenomena, inherent in it, can be begun, also, in the first twenty-four hours and tighten itself for more prolonged period. In this period to the obtained injury the brain reacts by the mentioned above jet processes (edema and bloating), and also by the phenomena, connected with the violations of spinal fluid formation and spinal fluid circulation and with growing intracranial hematomas. In clinical sense for this stage are characteristic the rapid, chaotic shift/relief of phenomena and the shading of focus phenomena by the growing general cerebral symptoms.

With heavy wounds the march/passage from initial stage to chaotic is accomplished unnoticeably. In the less heavy cases can occur the bright gap/interval of different duration.

In initial period with heavy cerebral wounds is solved a basic question about the fate of wounded.

In essence this struggle lasts the first 2-3 days. According to

L. I. Smirnov's data, the lethality among wounded, who survived these tragic for them days, in all cases almost depends no longer on the traumatic damage of brain, but on the complications among which in the first place will cost the suppurations.

The basic special features/peculiarities of the clinical course of acute/sharp period they determine the conduct of neuropathologist and neurosurgeon in the bed of wounded.

Neuropathologist's main attention, especially after the mass entrance of wounded, must be directed not nct focus symptoms and their detailed description (how this not is important for observation of their further changes), but is determined by the severity of the condition of wounded (N. N. Burdenko). In the presence of heavy condition it is necessary to maximally rapidly recognize its reasons and to determine together with surgeon the proper measures. In this case in the relation tc many wounded does advance extremely the difficult question, which requires, however, the immediate decision/solution: does make it possible the condition of wounded to produce urgent surgical intervention or it is so hopeless which is better to leave wounded in rest? For whom from neuropathologists and surgeons it was not necessary to survive the agonizing doubts of the correctness of the decision/solution accepted by this problem?

Because of the need of deciding/solving these most difficult questions much attention was given during the Great Patriotic War to the development/detection of the totality of the neurologic symptoms, characteristic for the threatening or hopeless condition. In this respect, besides the totality of symptoms (comatose condition, bradycardia, heavy disorders of respiration and violation of the ingestions) which were emphasized by N. N. Burdenko, important value have extreme contraction ratios or expansion of pupils with weakening or loss of their reaction to light/world, tonic spasms of the type decerebration rigidity, and also the arterial pressure increase with lag or descent in the venous.

Page 112.

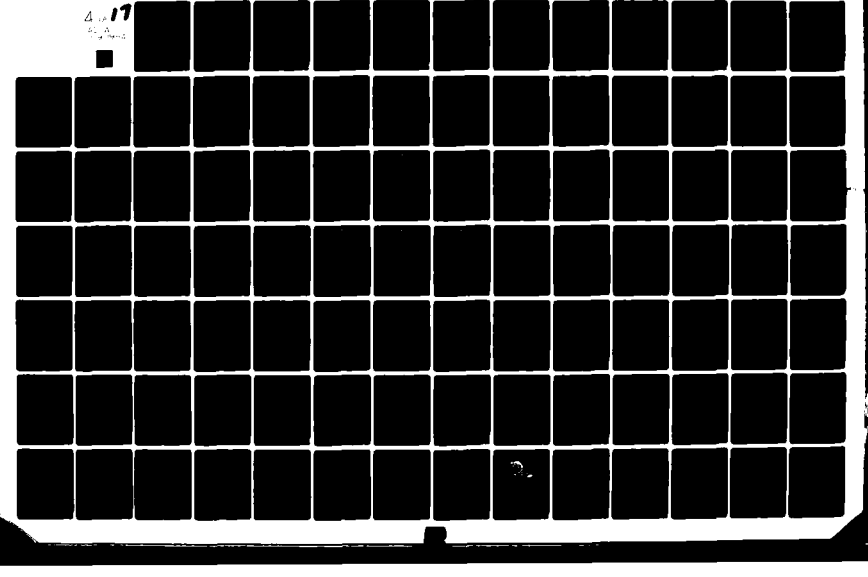
If the consciousness of wounded is very dimor it is lost, pulse is delayed, respiration normally or somewhat accelerated, pupils narrow or moderately dilated, wounded fixed or exhibits motor restlessness/anxiety, the pressure of the blood is normal or slightly changed to that or other side, ingestion is normal or is slightly hindered/hampered, this condition of wounded one should recognize as threatening. This wounded is not transportable and in the presence of readings (absence or insufficient primary processing of wound, etc.) must be urgently operated.

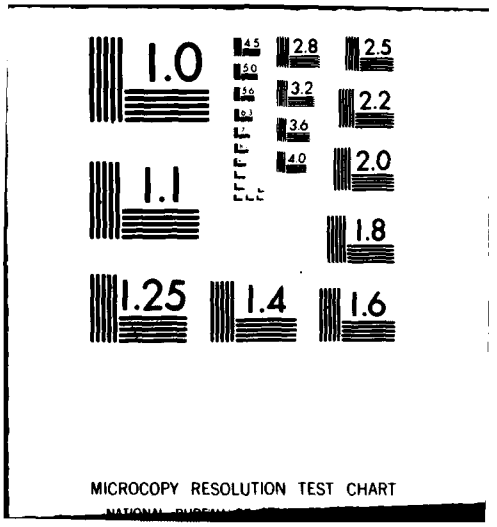
If consciousness is lost, pulse is sharply quickened or available bradycardia is relieved by frequency increase, respiration frequent, surface, which wheezes, arrhythmical, on the jaws is foam, pupils are expanded, tc light/world they do nct react or react weakly, the pressure of the blood high, there are or not long before this were observed tonic spasms, ingestion is extremely hindered/hampered or is paralyzed, temperature high, this condition of wounded should be recognized as inoperable. Surgical intervention can be shown only with weighty suspicions to hematoma. In the remaining cases should be attempted taken the wcunded away from the condition indicated by ccnservative measures.

Of course during evaluation of the condition of wounded it is necessary to accept into attention and massiveness of the damage of the brain (approximate idea about which can give the sizes/dimensions of bone damages, character/nature and value of the wounding shell), and its localization.

So, extremely poor vital prognosis present the wounds of the region of posterior cranial pit, and also the diametric wounds of the large hemispheres, with which are noted more than 90.0o/o lethal outcomes. It is important to consider the condition of internal organs/controls (heavy associated wound or disease).

AD-A090 984 FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OH F/G 6/5
THE EXPERIENCE OF SOVIET MEDICINE IN THE GREAT PATRIOTIC WAR 19--ETC(U)
FEB 80 V N SHAMOV, B A SAMOTOKIN
UNCLASSIFIED FTD-ID(RS)T-1925-79 NL




1.0
1.1
1.25
1.4
1.6
1.8
2.0
2.2
2.5
2.8
3.2
3.6
4.0
4.5
5.0
5.6
6.3
MICROCOPY RESOLUTION TEST CHART

After establishing the heavy condition of wounded, neuropathologist and neurosurgeon must attempt to maximally rapidly recognize his reasons.

The experiment/experience of the Great Patriotic War shows that the basic reasons of the heavy condition of wounded in the first 12-18 hours after wound are: the massive damage of brain or the wound of brain stem, rapidly developing hematomas in connection with the damage of large/coarse arterial branches, massive hemorrhages into the ventricles of brain, which rapidly grow reflector or jet edema and bloating of brain. First of all it is necessary to think that the reason of the heavy condition of wounded is the vastness of the damage of brain. Statistical data indicate that the severity of the injury of brain was the reason for lethal outcome into 17.7o/o of all penetrating wounds of brain. Remaining factors in the first 12-18 hours after wound are comparatively rarely the reason for heavy condition.

Assumption about rapidly developing hematoma must appear with the wounds of temporal and temporoparietal region, and about intra-ventricular hemorrhage - with the wounds where the disposition of intake and outlet or inlet and foreign body allows/assumes the possibility of the wound of ventricles. The deposited blood clots can completely plug sylvian aqueducts. The presence of this occlusion was

observed in 2.5o/o those been killed from the wounds of brain. Reflector edema should be assumed during the damages of the basis of brain in the region of average/mean cranial pit (wound of hypothalamus).

Heavy condition after 24 hours from the moment/torque of wound can be connected with the severity of the damage of brain. On than is prolonged the period which passed from the moment/torque of wound, the greater the foundations for searching for the reasons for heavy condition in action of any or several of the enumerated above factors.

Page 113.

If this condition is developed after bright gap/interval or even after temporary/time improvement, then assumption about its dependence on the severity of the damage of brain must fall.

Frequently the reason for heavy condition are hematomas - epidural or subdural (it is more frequent). Among the reasons for lethal outcomes with the penetrating wounds the skulls of hematoma compose 4.2o/o. G. P. Kornyanskiy, for example, with interventions apropos of these wounds found hematoma in 9.0o/o of operated by it wounded. The rapid build-up/growth general cerebral symptoms,

reinforcing of focus phenomena, local or general/common/total spasms and rapid build-up/growth of the protrusion of brain can give suspicion to arterial hematoma, usually epidural. The slow build-up/growth of general cerebral phenomena, the absence or insignificant reinforcing of focus symptoms, also localization of wounds in the region of the disposition of large/coarse sinuses testify about the presence of venous hematoma. The expressed tunicary syndrome indicates sub-arachnoidal hemorrhage or acute purulent meningitis. To establish/install diagnosis such cases helps puncture. When abundant liquorrhea and the protrusion of brain is absent, heavy condition can be connected with intracranial hypotension.

Finally, already at the end of the first period besides meningitis, a deterioration in the condition of wounded can be caused and by other purulent complications: festering of wound, by early abscess, purulent encephalitis. The examination/inspection of wound and its contents for the identification of these complications frequently gives more than the research of the blood or temperature. With these forms/species of early purulent complications the picture of the blood is not changed or in leukocyte formula is noted small left-shift. Temperature reaction is also expressed usually blurred.

Period of early reactions and complications. In the uncomplicated cases in the beginning of this period primary edema and

bloating of brain begin to undergo reverse/inverse development, is improved blood circulation, is decreased the hypersecretion of cerebro-spinal fluid. General cerebral symptoms, and partially also the symptoms, caused by local edema and bloating of brain, by its compression, disorders of blood circulation, disappear and it is more distinct to that the shaded focus symptoms of decomposition.

In this period focus symptoms make it possible to tentatively explain sizes/dimensions and localization of the damage of brain, to judge about the most probable limits of the restoration/reduction of the disrupted functions, and to also in proper time recognize the connected complications and their character/nature. Available in the literature statistical data are based on the analysis of a comparatively small number of wounds and besides they are related mainly to later periods. Therefore doubtless interest are of the given below data, obtained as a result of the deepened development of the histories of disease/sickness/illness/malady and based on the analysis of a very considerable number of observations which are related mainly to the period of early reactions and complications.

Consciousness. N. N. Burdenko's instruction, which it made on the basis of the experiment/experience still of the first world war, that the loss of consciousness to a certain degree is observed almost with all bullet wounds of skull, obtained complete confirmation.

Page 114.

The maps/charts/cards of the deepened characteristic came to light/detected/exposed the following data. Minus 3.4o/o histories of diseases/sicknesses/illnesses/maladies, in which the instructions about the condition of ccnsciousness in that wounded the skull were insufficient clear, in all forms of the wounds of skull (soft tissues, nonpenetrating, the penetrating wounds) the violation of consciousness is noted into 75.9o/o of cases. According to the character/nature of the violation of consciousness the wounded were distributed as follows: the loss of consciousness - 64.1o/o, changes in the consciousness without its total loss - 2.9o/o, mental disorders - 0.9o/o. From the total number of wounded, in which was noted the violation of consciousness, into 8.0o/o it was combined with changes in the psychics/psyche. Further, in 56.7o/o of wounded the violation of consciousness arose immediately after wound, in 0.6o/o - after short bright gap/interval. In 6.8o/o of wounded the repeated violations of consciousness appeared in connection with different complications, basic infectious.

With the heavy wounds of brain the consciousness is lost, as a rule, suddenly. But also with relatively light wounds, especially by

fragments, development of a deep blackout or total loss of consciousness occur during seconds and minutes. These wounded recall, that they perceived "accurately the strike/shock into head", "rocked", "it turned itself head", "darkened in eyes" and the like and that only then "lost memory". Wounded, who did not lose consciousness, they noted that their comrades, who obtained the wounds of head, frequently accomplished different automatic activities, sometimes sufficiently complicated.

After the first world war relative to connection/communication between localization of wound and loss of consciousness were voiced different opinions. Some authors recognized this dependence, asserting that the nearer the wound is localized to postcranial region, the more frequently the loss of consciousness is observed. Others denied this dependence. The experiment/experience of the Great Patriotic War confirmed the presence of this dependence; however, to that mildly expressed. From those wounded the frontal, frontal-orbital, frontotemporal and frontoparietal region the skulls lost consciousness 82.4o/o, while from those wounded the postcranial, postcranial-sincipital and postcranial-temporal region - 95.1o/o.

The frequency of the violation of consciousness depends on the form/species of the wounding shell, its sizes/dimensions and character/nature of wound canal. With bullet wounds after suffering

they retain consciousness exclusively rarely. In those all cases when that wounded the skull retained consciousness, wound was plotted/applied usually by fragments. In this case with blind-end wounds the consciousness was not disrupted into 12.2o/o, with segmental ones - into 10.0o/o and with tangents - into 4.6o/o of cases.

Pathogenesis of the loss of consciousness is not clear. At the beginning of the Great Patriotic War in regard to this existed two theories: it is vascular and mechanical. According to the first, the loss of consciousness sets in as a result of the suddenly developing disorder of the cerebral blood circulation, caused by the suppression of the functions of the medulla oblongata, or, in the opinion of other authors, mainly as a result of the suppression of the activity of visual mound and center of sleep. According to the second theory, important role in the pathogenesis of the violations of consciousness is assigned to straight/direct damage or caused by other reasons violation of the functions of the subcortical vegetative centers, which support the condition of wakefulness.

Being based on his observations, N. N. Burdenko considers that there is no single pathogenesis of the disorder of consciousness immediately after wound; primary meaning it assigns to the sharply developing disorder of blood circulation. The latter can be caused by

both the straight/direct damage of vasomotor centers (in the medulla oblongata, brain stem or intermediate) and by their reflector suppression as a result either massiveness of the injury of brain or damage of special reflexogenic ones the sleep to which it first of all relates subthalamic region.

Page 115.

N. N. Burdenko even on the basis of his experience in the first world war asserted that the tightening itself unconscious condition in the unit of the cases is only the result of the action of the initial factor, which turned off the consciousness; in the overwhelming majority of the cases unconscious condition is the consequence of the connection of the new factors of which as bases serves the intracranial pressure increase. These positions/situations are confirmed by the observations, made during the Great Patriotic War.

Emergence from unconscious condition sometimes occurs without transfer stage, whereas more frequent is observed mental suppression, apathy, pallor of integuments, cold perspiration, frequent and low pulse, temperature drop and lowering the pressure of the blood. Amnesia is absent or is short-term (N. N. Burdenko et al.) I. Ya. Razdol'skiy it noted the absence of amnesia with the wounds of brain

by small/fine fragments. With these wounds of any considerable general/common/total action on brain it is not observed, and the loss of consciousness obuslovlivaets4 not on brain concussion, but by the reflector violation of cerebral blood circulation.

In 1.2o/o of cases after bright gap/interval was observed the repeated loss of consciousness, usually in connection with growing intracranial hematoma. The speed of the build-up/growth of the repeated suppression of consciousness has important diagnostic value.

With arterial hematomas it grows considerably more rapid than with venous ones.

Against the background of the oppressed consciousness or after emergence from this condition, and also subsequently in connection with early complications, can appear different disorders of mental sphere (psychomotor excitation, euphoria, sharp mental suppression, etc.). During the Great Patriotic War these disorders are noted in 18.3o/o of wounded with the penetrating wounds of brain.

The tunicary symptoms, not connected with infectious complications, in the first twenty-four hours after wound are observed frequently. However, the total numer of the cases with tunicary symptoms, according to the data of the maps/charts/cards of

the deepened characteristic, independent of the period, which passed from the moment/torque cf wound, it achieves 16.7o/o (including here and the wounds of the soft tissues of skull).

In the majority of cases, not complicated by infection, the onset of tunicary syndrcme was connected with the outflow of the blood into sub-arachnoidal space (62.3o/o), with epi- and subdural hematomas (15.3o/o); in the remaining cases - with the outflow of the blood into ventricles, with aseptic meningitis, or by straight/direct wound or by stimulation of the departments of solid cerebral sheathing, having especially rich innervation (average/mean and posterior departments of longitudinal sinus, transverse sinus, departments of the sheathing, lining/covering average/mean cranial pit). To the possibility of the onset of tunicary symptoms with the wounds of solid cerebral sheathing indicate the prewar observations of N. N. Burdenko and ctservation of M. Yu. Rapoport during the Great Patriotic War.

Page 116.

In contrast to sub-arachnoidal hemorrhages, with epi- and subdural hematomas to the foreground in comparison with the symptoms of Kerning and Brudzinskiy came forward postcranial muscle tension, and these symptoms on the side of hematoma occurred expressed

sharper.

Hanger-on symptoms were observed into 27.2o/o of cases of the penetrating wounds of skull. Frequency and their intensity depended on severity and localization of the damage/defeat of brain. The nearer to posterior cranial pit was localized the wound, the sharper was expressed the intensity of hanger-on symptoms even with the identical approximately/exemplarily severity of the damage of brain.

According to the data of the maps/charts/cards of the deepened characteristic, the first place in frequency among hanger-on symptoms occupied bradycardia. It followed the disorders of respiration and ingestion. In 17.5o/o cf wounded these disorders appeared in different combinations. Vomiting was noted in 16.8o/o of those wounded the skull.

The pathogenesis cf hanger-on symptoms is complex. Only in the small unit of the cases they are the consequence of the straight/direct or distant damage of brain stem or rootlets of nerves, which exit from it. In these cases hanger-on symptoms appear immediately after wound. In considerably the larger percentage of the cases hanger-on syndromes are connected with the intracranial pressure increase, with the contusion of bottom of IV ventricle liquor wave, with jet edema of brain stem, with its jamming in the

slot of Bichat, with compression by the cerebellum, which are squeezed into foramen, or peribulbar accumulations of the blood during abundant sub-arachnoidal hemorrhages. Therefore hanger-on syndromes are frequently developed not immediately after wound, but into the near ones are frequent days, in proportion to the deployment of the enumerated above pathophysiological mechanisms.

The rapidly transient hanger-on syndrome sometimes can have, apparently, and purely reflector pathogenesis. In this case is noted the sharp incidence/drop or an increase in the blood pressure, the strong frequency increase of the respiratory movements, which acquire sometimes convulsive character/nature, appearance of hanger-on syndrome with interventions on the spot of merging/coalescence of sinuses and on rear sections of longitudinal sinus. These data are confirmed by the observations, noted with comparatively high frequency of the rapidly passing hanger-on symptoms with the wounds of longitudinal and transverse sunuses or of solid cerebral sheathing in juxtaposition with them.

Motor disorders - very frequent symptom of the penetrating wounds of brain. The data of the maps/charts/cards of the deepened characteristic came to light/detected/exposed their presence in 41.8o/o of wounded with the penetrating wounds of skull. According to character/nature they were distributed as follows: monoparesis or,

are thinner/less frequent, monoplegia - 3.2o/o, hemiparesis or hemiplegia - 29.8o/o, paraparesis either paraplegia - 1.5o/o, tri- or quadriparesis (plegia) - 1.5o/o, the alternating paresis - 0.1o/o, the combination of motor and cerebellar violations - 2.3o/o. In 3.3o/o of cases were observed cerebellar violations.

Two basic special features/peculiarities are characteristic for the motor violations, which are observed with the penetrating wounds of the brain: 1) their onset with the wounds of the departments of brain, considerably removed from the motor zone of cortex, or pyramidal bundle, 2) the extremely slow restoration/reduction of initially lost motor disturbances even with the wounds, localized far from the motor zone of brain.

Page 117.

Both these special features/peculiarities of motor violations were noted also in the first world war. This large nonconformity between the initial and final degree of motor violations is explained by the fact that at the basis of the latter in many instances lies/rests the straight/direct damage of the motor cells of Betz or waste/exiting from them filaments, but the violation of synaptic connection/communication between them and by cells of other departments of brain. Betz's cells - these are the operating units of

brain. If are disrupted connections/communications between them and by other departments of brain, then the tendency of wounded to fulfill active movement cannot be realized. In such cases tendinous reflexes usually are not increased or increased moderately, pathological - are absent or are weakly expressed.

Convulsive conditions in early period are observed rarely. If they appear, then most frequently there are the attacks/seizures/paroxysms of tonic spasms of the type of decerebral rigidity and focus or general/common/total epileptic fits. The attacks/seizures/paroxysms of tonic spasms are characteristic for massive hemorrhages into ventricles, but they can be observed, also, upon the extensive decomposition of large hemispheres. The appearance of tonic spasms extremely darkens the vital prognosis of wounded. The onset of Jackson either general/common/total convulsive fits into the first several days after wound - most important sign/criterion of developing epi- or subdural hematoma, during the subsequent days - focus encephalitis or, it is more frequently, abscess.

Cerebellar violations are not frequent. They were noted in 3.2o/o of those wounded the skull. So low a numeral of cerebellar violations is explained not only by a comparative rarity of wounds of cerebellum, but also by that fact that the suppressing number of such wounded, together with those obtained simultaneously the injury of

the medulla oblongata, perishes on field of combat.

Sensitive violations were observed considerably thinner/less frequent than motor. Sharply predominated the half type; spinal sensitive syndrome on the soil of the parasagittal wounds was noted into 3.5o/o of cases. In acute/sharp and early period sensitive violations bear usually massive and diffuse character/nature and do not have any special features/peculiarities. The peculiar disorders of sensitivity (pseudo-radicular and pseudo-segmental character/nature) are described by the Soviet authors in the period of limitation of infectious focus and late complications. Were observed also the cases of the pains, reminding by nature of causalgia during the damages/defeats of sincipital portion on the side, contradictory/opposite to focus. In the period of early reactions were observed different disorders of the scheme of body and besides with the wounds not only of the sincipital portion of the right hemisphere (it is more frequent), but also left (in right).

Vocal violations were noted into 13.7o/o of cases of the penetrating wounds of skull. Subsequently frequently were noted the disorders of vocal functions, connected with different complications. In initial and early period these violations are more frequently little differentiated. Besides this, condition the works in foremost stages do not favor the research of the vocal functions of wounded.

Therefore the given below numerals are related to the rough forms of vocal violations.

It is very probable that so considerable a predominance of the violations of the motor activity of the speech above remaining violations is only seeming, since first more easily are detected than, for example, the violation of mnestic vocal function. If we take all violations of speech as 100, then the violation of the motor activity of vocal function, according to the data of the maps/charts/cards of the deepened characteristic, was noted in 47.1o/o of wounded, mnestic vocal function - in 8.1o/o, sensory - in 4.9o/o. In 21.6o/o of wounded during the nearest hours and days after wound was noted total aphasia, in 18.3o/o - dysarthria.

Page 118.

Vocal violations usually greatly rapidly passed. So, among the wounded, in whom there were initially the gross violations of the function of speech, these functions completely were restored toward the end of the 6th month, in 20.0o/o - in the course of the first month (A. V. Lebedinskiy).

As opposed to what occurs in clinic of peacetime, violation of vocal functions, in particular, capability to set forth its thoughts

in writing, to read and to count, they can be observed in right also during the bullet damages/defeats of the right hemisphere of brain. Of 84 wounded with these violations which observed A. V. Lebedinskiy, 12 they had wounds of right hemisphere. As the characteristic feature of such violations with right-side foci is answered the peculiar automatism, which was being expressed in multiple repetition with letter of one and the same word. The restoration/reduction of the motor activity of speech during the bullet damages/defeats of brain can pass through the phase, which closely reminds stuttering.

Violations of view. According to the data of the maps/charts/cards of the deepened characteristic, the gross violations of visual function with the penetrating wounds in early period were in 37.6o/o of wounded. From this number in 2.8o/o of wounded within the next few days after wound developed the various forms hemianospia.

Any stable cortical blindness is observed, apparently is exclusively rare, not more than in 0.2-0.1o/o of wounded. Attention is drawn to the extreme rarity of the disturbance of the fields of view. Since the research of the fields of view was conducted usually after expiration of 6-10 days after wound, then the frequency of such violations in earlier periods must be above.

From the less frequent disorders, revealed by the special and purposeful research, in early period are frequent monocular diplopia, perception of that surrounding "upward struts", the disorders of the perception of depth and forward motion, hemianopic hallucinations, optical agnosia, etc. But nevertheless these means of visual violations in more distinct form come forward in the third and fourth period.

The disorders of the functions of external ocular muscles are rarely. Squint and dividing are noted in 3.1o/o of the wounded, who obtained the penetrating wounds. During the first days after wound are sufficiently frequent the difficulties during the movements of the eyeballs and their sickliness. These data confirm the old observations of M. O. Gurevich. Considerably more frequently is observed the disorder of the functions of internal ocular muscles.

The violations of the reactions of pupils to light/world - from flaccid to total loss - were noted in 24.7o/o of the wounded, who had the penetrating wounds. The nonuniformity of pupils was observed frequently. Blurred anisocoria can appear, also, with hemispheric wounds, sharp - during the damages/defeats of the visual mound, average/mean and medulla oblongata. The expansion of pupil on one side into first 1-3 for after wound - important sympton of hematoma on the same side, but is later - abscess.

The bilateral expansion of pupils(mydriasis) is observed with the heavy forms of the shock; wide, the not reacting to light/world pupils - prognostically extremely serious symptom. The expressed contraction of pupils (miosis) is noted rarely and it is considered characteristic during sub-arachnoidal hemorrhages.

Page 119.

Eyeground. The changes in the eyeground, nct connected with purulent complications, in the first world war are noted in 10.0-19.0o/o of wounded with the damage/defeat of brain. According to the data of the maps/charts/cards of the deepened characteristic, among wounded with the penetrating damages the skulls and brain during the Great Patriotic War of a change of the eyeground in early period were noted into 5.7o/o of cases.

Such considerable disagreements in the numerals of the frequency of changes of the eyegrcund are explained in essence by that fact that data for the first world war are acquired during the observations, produced mainly in the later periods of wounds.

The violations of rumor were observed in 4.7o/o, and complete

deafness - in 0.4o/o of wounded. In 9.9o/o of cases the violation of rumor was combined with the disorders of vestibular function. The isolated/insulated discrder of vestibular function was noted in 28.6o/o wounded.

The damage/defeat of other craniocerebral nerves was observed considerably thinner/less frequent and mainly with the wound of the basis of skull.

PERIOD OF THE ELIMINATION OF EARLY COMPLICATIONS AND PERIOD OF LATE COMPLICATIONS.

The beginning of the period of the elimination of early complications is related to the 2-3rd week after the wound; its duration sometimes achieves 3 months.

Morphologically this period is characterized by the fact that in the places of the former necroses are formed the gliomesodermal scars or cysts. Protrusions of brain are decreased and undergo cicatrization. The former festering of the wound of brain frequently is delimited. The capsule of such early abscesses gradually is thickened. However, during this period can develop festering the forming cerebral scar with march/passage into multiple or polythalamous abscesses, and sometimes also into diffuse encephalitis

and meningitis. During more favorable course festering cerebral scar can be restricted to the education of the individual foci of a hemorrhagic-purulent melting and brain tissue, to its secondary edema, formation of hydrocephalus and sub-arachnoidal cysts.

In light of these morphological data appears the need for the correct understanding of the clinical course of wounds, so kA the methods of their treatment in this case are different.

The clinical course of wounds always does not reflect/represent the character/nature of morphological processes in brain. Frequently against the background of the decrease of focus symptoms under the effect of opposite develcpment edema of brain, resorption of hemorrhages and decrease of local encephalic phenomena takes place the concealed/latent formation cf the abscess of brain. The build-up/growth of focus phenomena can be revealed in this case too late, when in the surrounding abscess brain tissue is developed edema or encephalitis. So unnoticeably can be develcped during this period and the meningoencephalites.

Experiment/experience showed that the timely detection of these phenomena was possibly only during the most careful observation of the course of process and the attentive analysis of all data, beginning from the moment/torque of wound. Therefore are very

important were important the written recordings of all surgical measures during perfecting of the wound of brain and changes in the neurologic symptomatology, and also in the observation of the course of wound and X-ray analysis. Research of cerebro-spinal fluid also shed light/world on the understanding of the processes, which occur in brain. In 60.0o/o, the cases of observations the cerebrospinal fluid proved to be changed. To the similar intensified study of clinical phenomena contributed the fact that the wounded during this period were situated, as a rule, in the specialized separations/sections of front line and rear hospitals.

Page 120.

Changes in the cerebro-spinal fluid were distinct when the unhealing wound of brain is present, and were decreased usually with healing wounds. However, the inflammatory processes, which occurred in deep departments of cerebral scar, sometimes did not manifest themselves the composition of cerebro-spinal fluid. Only the dissemination of inflammatory process to the surface of brain or the entrance of festering products from the depth of brain to its surface immediately had effect on the composition of cerebrospinal fluid and frequently entailed the development of meningitis.

The end of the period of the elimination of early complications during favorable course was characterized by the normal composition of cerebrospinal fluid. With the smoothly healing in the course of 1 1/2-2 1/2 months wound of the brain of the general/common/total symptoms of the inflammatory or hypertensive character/nature usually it did not become apparent.

In the more rare cases when the course of process and the data

of the research of cerebrospinal fluid did not suggest fears, nevertheless in the forming cerebral scar could exist areas with bone fragments, moreover frequently already occurred the rotting decomposition/decay of cerebral tissue. Thus, normal cytosis yet did not guarantee the absence of ulcer in scar tissue.

An increase in the content of protein in cerebrospinal fluid frequently was observed during the uncomplicated course, as a result of the considerable decomposition of brain, which arose even with wound. However, there were the cases when the increased content of protein in cerebrospinal fluid was noted with festering of cerebral scar and normal cytosis.

Thus, the period of the elimination of early complications into 40.0o/o of cases was characterized by the normal composition of cerebrospinal fluid, that yet it did not eliminate complications from the side of cerebral scar. In 60o/o of cases were noted different changes of the cerebrospinal fluid that in turn, she did not indicate the presence of complications.

Attentive observation of the dynamics of changes in the cerebrospinal fluid and the clinical course of process allowed, however, with the known portion of likelihood to judge about pathomorphological changes in brain.

For the uncomplicated course was characteristic the small lymphocytic pleocytosis upper boundary of which in the beginning of this period were 25-30 cells into 1 mm^2, to the middle of period a number of cells descended to 6-10, and then came to norm. An increase in the content of protein upon the large decomposition of brain tissue did not suggest fears. Thus, during the uncomplicated course in the period of the delimitation of infectious focus was characteristic the known reaction of the soft sheathings of brain to injury and hemorrhages in them in the form of small lymphocytic pleocytosis and hyperalbuminosis.

Somewhat differently flowed/occurred/lasted festering of the non-healing cerebral wound. In these cases there was usually more considerable lymphocytic pleocytosis (from 30 to 250 cells in 1 mm^3), with a small number of neutrophils and the quantity of protein, not exceeding 1‰. If wound was tangent or belled and condition of the outflow of pus favorable, the course of wound in this period could be finished, also, without abcess formation. With the abundant festering of the wound of brain usually were combined small meningeal symptoms, blurred hypertension manifestations and focus symptoms which gradually passed. All phenomena were decreased in proportion to the cicatrization of the unit of the wound, directly adjoining the inlet.

Page 121.

However, in deep departments of wound, especially in the presence in them of bone fragments, complete cicatrization usually it did not attack/advance. Saved/accumulated pus formed one or several areas. Abcess in the depth of brain for some time could convert/transfer during the concealed/latent phase. The dynamics of a similar process in the absence of the phenomena of the growing encephalitis frequently was not distinguished.

As the signal of the making more active of infectious complications from the side of cerebral scar cr approximation/approach of purulent area to the surface of brain usually served the rapid build-up of clinical symptoms. In these cases grew/rose lymphocytic pleocytosis, appeared the small admixture/impurity of neutrophils. Subsequently rapidly were developed violent general/common/total and deep symptoms.

The development of complications indicated the neutrophilic pleocytosis of cerebrospinal fluid. Although the cases of the smooth healing of wound with a quantity of neutrophils in cerebrospinal fluid to 150-300 cells in 1 mm^3 were observed in practice however in

the immense majority of the cases a considerable increase of the quantity of neutrophils indicated the development of complications from the side of cerebral scar.

High value had in this case the comparison of changes in the cerebrospinal fluid with clinical picture.

The development of encephalitis or meningitis, and also local edema of the corresponding portion of brain was characterized by an increase in the temperature, by the delay pulsation of wound, by the protrusion of brain, by appearance and build-up of stagnant phenomena on ocular day and usually was combined with the shift/relief of lymphocytic pleocytosis by neutrophilic. In cerebrospinal fluid appeared the deformed and decomposed neutrophils. The gradually growing neutrophilic pleccytosis frequently testified about metastatical septic encephalitis in the periphery of abscess. The similar flow of process sometimes caused the rapid development of meningitis, especially if abscess or secondary encephalitis was arranged/located closely to the cortex of brain. With these complications was required urgent operational intervention. If wounded was operated in the initial stages of development of complication during the surface disposition of purulent focus, prognosis was usually good.

In far visited cases was developed generalized meningitis with high neutrophilic pleocytosis. The experiment/experience of war made possible to distinguish four forms of similar meningitides. Most frequently meningitis proved to be secondary as a result of the dissemination of purulent infection from encephalitic focus into a tunicary-liquor space. In these cases with different speed progressively grew/rose meningeal focus symptoms, and also neutrophilic pleocytosis.

With the second form meningitis was developed violently as a result of the "penetration" of pus into liquor space from the restricted and sometimes encysted ulcer. In cerebrospinal fluid was determined by very high the pleccytosis, although to the "penetration" of abscess and it was no data for perifocal encephalitis. In the similar cases, even with the violent picture of generalized meningitis, considered shown urgent operational intervention for purpose of the emptying of abscess. Frequently the similar tactics led to good results.

The third form of meningitis was caused by the surprise entrance of a small quantity of pus into liquor space from the small foci of traumatic softening in the region of tunicary-crust intergrowth.

Clinically similar form was characterized by rapidly developing meningeal symptoms with neutrophilic pleocytosis (sometimes to 1000 cells in 1 mm^3). However, during the first days symptoms weakened, and wounded soon got better.

Finally, latter/last fourth, form of meningitis composed adhesive arachnoiditis. They flowed/occurred/lasted limply, benign, in cerebrospinal fluid was noted the pleocytosis (sometimes to 500 cells in 1 mm^3). This form was determined via encephalography. The introduction of air to sub-arachnoidal space in these cases exerted therapeutic effect. More frequent this form of meningitis was developed with wounds by the fragments, which remained in the region of sheathings.

Special importance in the period of early complications was given to encephalitic forms which were in detail studied by Yu. V. Konovalov. Experiment/experience showed that with the insufficiently processed penetrating wounds of skull always are these or other jet phenomena from the side of brain. More mild cases under conditions of rest pass usually by themselves. The forms of average/mean severity after reworking flow/occur/last also favorably under the condition of applying of a dehydration therapy and antibiotics.

The heavy forms of encephalitis it was frequently very difficult to differentiate from the abscesses of brain. Frequently there was protrusion of brain. The clinical symptomatology of the heavy forms of encephalitis, and also their course they were very diverse.

It was important to come to light/detect/expose localization of encephalitic process, i.e., the depth of the damage/defeat of cerebral substance.

With surface crust focus encephalitides frequently was noted the protrusion of brain. Neurologic symptoms bore local character/nature. Similar forms were frequently escorted/tracked by the symptoms of the stimulation of sheathings with the appropriate changes in the cerebrospinal fluid (lymphocytic pleocytosis and increase in the quantity of protein). The repeated research of cerebro-spinal fluid in combination with clinical observations helped to explain the character/nature of process. The predominance of polynuclears made it necessary to think about abscess.

The subcortical forms of focus encephalitis flowed/occurred/lasted frequently more malignantly, and their diagnosis proved to be more difficult. For the mild cases of the

subcortical forms of encephalitis are characteristic the manifestations of the hypertension syndrome, together with an increase of the protein in cerebrospinal fluid and relatively insignificant lymphocytic pleocytosis. Experiment/experience showed that at first, with small protrusion of brain, these forms of focus encephalitis can flow/occur/last hidden, that causes certain suppression of wounded and it gives one or the other local symptomatology. However, sometimes process rapidly was generalized, which was characterized, first of all, by the build-up/growth of general cerebral and local symptoms, and also by an increase in the protrusion of brain. The latter with an increase in the volume ceased to fluctuate, and then pulsation although appeared, it bore surface and uneven character/nature. Appearance in cerebrospinal fluid of a large number of neutrophils and increase of the quantitative content of protein on drove to thought about the presence of abscess.

In the majority of the cases subcortical encephalitides were developed in the direction of cortex and subsequently flowed/occurred/lasted in the form of encephalo-meningitides. However, process, as this indicated V. N. Shamov (1916), frequently was spread also into the depth of brain, to lateral ventricles.

Most difficult was recognize the paraventricular forms of encephalitides - them they often examined/scanned even in clinical circumstances. The treatment of these wounded groups was almost always prolonged, it led to general/common/total depletion, and frequently also to lethal outcome. Wound itself usually gave few strong points for a diagnosis. Of the protrusions of brain usually it was not. The slightly protruding bottom of wound frequently had the changed on intensity pulsation. Frequently similar forms flowed/occurred/lasted almost asymptomatically.

Small motor fallouts, together with the difference in the tone of extremities, little helped identification. The appearance of extrapyramidal symptoms was already solider diagnostic sign/criterion.

In far visited cases were formed ventricular liquor fistulas. To perforation of ventricle was noted the characteristic dynamics of cerebrospinal fluid.

The composition of cerebrospinal fluid with each day was changed - increased a quantity albumin and neutrophilic pleocytosis. After the perforation of ventricle and development of ependymitis characteristic changes were noted in different fractions of cerebrospinal fluid (T. S. Malysheva).

Thus, the weakly expressed clinical symptoms in the period of early complications, and also their diversity and complexity considerably impeded diagnosis. In the favorably elapsing cases are always possible purulent complications in deep departments of the forming cerebral scar, nct to mention the complicated course of the wounds when the outbreaks of infection appeared frequently. Therefore one of the important and difficult problems was the timely diagnosis of festering the forming scar or education of abscess in its depth. For determining of localization and value of abscess and its difference from the associated perifocal encephalitis first of all it was applied pneumo- and abscessography which were connected with the specific limitations into the procedure of the composite examination/inspection cf wounded in front line and rear hospitals.

March/passage from the period of the elimination of early to period late complications clinically flows/occurs/lasts sufficiently slowly. The infectious complications, which are encountered in the period of early complications, can be observed also later, the latter/last period in essence is characterized by two forms/species of complications - abscesses of late period and festering the forming scar.

Festering scar (isolated by L. I. Smirnov in the independent form of late complication) is the straight/direct continuation of festering cerebral wound in the period of early complications and the period of the delimitation of infectious focus, although actually these processes sharply differ from each other.

This difference consists, first of all, in the chronic character/nature of festering against the background of the ending education of scar. Conditions with which proceeds this chronic suppurative process, they are peculiar. The fact is that the formation of scar in its different departments occurs unevenly.

The suppurative processes of longer anything are held up in the relatively deeper departments of scar. Is very difficult the differential diagnosis between festering of cerebral scar and abscess of brain or limited meningoencephalitis.

Page 124.

Is clinically for festering the scar characteristic the surprise march/passage of the benign course of process into malignant. Developing edema and bloating of brain frequently cause the appearance of protrusion of scar tissue and adjacent to it cerebral substance with diffuse hemorrhagic inhibitions, hematomas and

necroses.

On autopsy are determined the phenomena of the diffuse dissemination of infection from sub-arachnoidal and intertissue slots, edema of brain, deployment and compression of barrel, and also penetration of abscess in the area of ventricles.

The described above phenomena are frequently combined with the phenomena, characteristic to other forms of suppurative inflammatory processes in brain and in the bones of skull.

The distant changes during festering of scar are more extensive and rougher than with other forms. Almost in each case the dissemination of nonpurulent productive encephalitis captures large territory.

The escorting/tracking festering scar phlegmonous encephalitis frequently forms the extensive foci of the purulent melting of the cerebral substance which are revealed first on the surface of brain, then in the area of ventricular system.

Among the individual forms of festering scar should be distinguished their three basic forms/species: small-focus form with the diffuse purulent infiltration of the scar; festering scar with

the education of abscesses, more frequent than sets, and finally the form, which takes place with the cavitation of purulent melting, hemorrhages and secondary necroses of scar and brain tissue.

Thus, for clinicians it was necessary to study the symptomatology of this complication and the differential diagnosis of the forms of festering the forming scar.

First of all one ought not to have considered the sufficiently complicated clinical picture of the chronic nonpurulent processes in the region of the former wound, which were being combined frequently with atrophic Rubtsovs by processes and violations of liquor dynamics.

After considerable time after wound, in the presence of the already well formed scar and during reverse/inverse development of focus symptoms in that wounded attacked/advanced the signs/criteria of deterioration in health status: appeared subfebrile temperature and weakness, deteriorated health, grew general cerebral and focus symptoms. Against this background frequently appeared epileptic attacks/seizures/paroxysms. This period of deterioration was drawn to month or was repeated through the indefinite time intervals. In mild cases the affair was limited to the small subfebrile temperature, moderated by a deterioration in the general/common/total health, by

reinforcing of headaches, by appearance of stress/voltage in scar and by short-term increase in hemiparesis. More complicatedly flowed/occurred/lasted the heavy cases where all these signs/criteria steadily progressed. Known diagnostic value in the similar cases acquired observation of cerebrospinal fluid.

Changes in the cerebro-spinal fluid were not characterized by constancy. Were observed the cases when during the build-up/growth of clinical symptoms the composition of cerebrospinal fluid barely changed. Cerebrospinal pressure frequently corresponded to average numerals or moderately rose. Deflections in the composition of cerebrospinal fluid were reduced in essence to a blurred increase in the quantity of protein (0.5-0.8o/oo), small lymphocytic pleocytosis (5-10 cells in 1 mm^3) and in the unit cases to the appearance of neutrophils. Substantial changes in the picture of the blood frequently at first it was not noted.

All changes in the cerebrospinal fluid and blood sharply grew during rapid development and spread of festering cerebral scar with that connecting moreover, by the meningoencephalitis. Inflammatory process most frequently appeared in the cases of early complications in wound.

It is doubtless, high value for the late manifestations of inflammatory process had depth and vastness of the decomposition of the substance of brain, especially if the remaining in wound bone fragments or foreign bodies supported local inflammatory processes.

Important diagnostic role in the similar cases played encephalography in combination with the attentive analysis of neurologic data.

Clinical complex of symptoms of late nonpurulent inflammatory processes it is developed by A. Ya. Podgorny. In these cases very important value had the complaints of patient, his general condition, manifestation of general cerebral and local symptoms and also change in liquor dynamics.

During the smooth course of wound the periods of deterioration had at their basis the inflammatory process; with the abatement of this process the general condition of wounded was improved, although the changes in the composition of cerebrospinal fluid could remain.

The clinical manifestations of chronic nonpurulent inflammatory process in scar were developed usually within later periods. Local

changes in tissues were combined frequently with the continuous chronic productive inflammation. High value had the presence of the associated circulatory violations, an abundance of reactive-inflammatory changes, and also a character/nature of the infection, which penetrated with wound or in the process of the healing of wound. It is logical that all these facts, considerably expressed in initial periods, complicated the processes of the cicatrization of wound, also, subsequently.

Thus, the presence of the clinical forms of chronic nonpurulent inflammatory process in the region of the former wound of skull and brain led to the need for delimiting them from the local suppurations, occurring in cerebral scar. Therapeutic measures with chronic nonpurulent inflammation in the region of the former wound of skull and brain were different, in this case successfully was applied the treatment by antiseptics and antibiotics. Operational intervention it was not required.

Period of the distant consequences. The processes of cicatrization can continue still later many years after the wound of brain, especially during its extensive damages. These processes Caused the development of the series/row of the secondary manifestations of cerebral pathology, also, first of all epilepsy, adhesive arachnoiditis, hydroencephalus, painful Rubtsovs

forms, encephalopathy, etc.

The clinical picture of secondary manifestations is different: frequently it it was possible tc establish/install only with the aid of the contrast methods cf rcentgenological examination/inspection in comparison with the neurologic symptomatology (see Chapter IV of special unit about the penetrating wounds of skull).

Changes from the side of mental sphere.

Diverse mental viclations with the bullet wounds of brain become apparent both in the initial period and in all others, ending by the period of the distant consequences. In this case are encountered different psychopathological symptoms and syndromes, up to the expressed protracted psychoses, which signal about the damage/defeat of different departments of central nervcus system. Correct evaluation of the psychopathological syndromes indicated and correct selection of the method cf treatment are possible only in such a case, when a clinico-psychopathclogical method will be based on the newest achievements of general/common/total and cerebral pathology.

Page 126.

Pathological condition of cerebral tissue after its bullet injury and

localization of process are basis for the understanding of clinic of traumatic psychoses. Mental violations, according to the data of the maps/charts/cards of the deepened characteristic, are noted in 1.1o/o of wounded with the penetrating wounds skulls and brain.

In development and course of cerebral damage/defeat the leading role play pathological processes, their quality and intensity. Together with basic stricken area, the character/nature of liquor vascular violations, infectious complications, factor of reactivity, avitaminotic-exchange violations also anoxemia compose the essential pathogenic mechanisms, which are determining development, course and outcome of process. The general pathological exercise, developed by Soviet psychiatrists during the Great Patriotic War, raised on considerable height/altitude questions of psychopathology of the injuries of brain.

Using these data, it is possible to explain clinical polymorphism of mental disorders and different types of their course with identical localization of damage/defeat. Here is observed the development first of general cerebral, then of the localized types of reactions, from those weakly expressed, almost asymptomatic ones, to bright massive psychopathic pictures, early reverse/inverse development and restoration/reduction of cerebral violations, tendency toward the chronic and progressive turning. Fragmentation

wounds present individual morbid form on the generality of etiology, pathogenetic mechanisms and pathological anatomy, and also on characteristic clinical pictures and complications.

The accepted in neurosurgery anatomical-topographical analysis of bullet wounds with their division into those penetrating and nonpenetrating ones, damage with that penetrating of the wound only of sheathings or brain itself, depth and intensity of damage/defeat, different degrees and seans of the necrotization of cerebral tissue, their complicated and uncomplicated course - all these principles of differentiation of wounds is exceptionally important for understanding the nature of the encountered with them psychical disorders.

Of all described above forms most frequently is encountered the combination of nonpenetrating wound with air contusion (injury by blast). In these cases clinical picture is determined in essence by the intensity of jolt and closed contusion of brain. After the period of the loss of conciousness, stupor, apathy and somnolency comes forward characteristic general cerebral symptomatology with headaches, vestibular vertigoes, disorders of sleep, with extensive functional violations according to the type of deaf-mutism, motor and sensitive disorders against the background of asthenia and apathy. These clinical phenomena sometimes stably keep, in spite of the

healing of wound without complications. The uncomplicated penetrating wound with aseptic healing after the acute/sharp period of the disorders of consciousness is escorted/tracked by usually focus violations with tendency toward regression and restoration/reduction of cerebral violations. Whereas with the uncomplicated wound early is detected the tendency toward reverse/inverse development, local delimitation and insulation of cerebral violations, with the complicated wounds is observed another type of course with aggravations and great variety of clinical picture. By this it is explained the frequency of massive bright psychopathological syndromes with the penetrating wounds (complicated by infection), including different forms/species of the disorders of consciousness, bright hallucinoses, delirious or stuporous-catonic conditions.

Page 127.

With these wounds, depending on the intensity of process, predominate first general cerebral, then the more localized types of reaction.

The overwhelming majority of psychoses with the bullet wounds of brain is developed in connection with complications.

Clinic of mental disorders in the acute/sharp and subacute period of the bullet injury of brain. Each case of the injury of

brain must be examined in its entire dynamics in different development stages of process.

In clinic of initial period they predominate the general cerebral disorders above focus ones; however, from the very beginning of the wound of the boundary between them it is not possible to conduct. In the center of the clinical picture of this period comes forward basic cardinal syndrome in the form of the loss of consciousness and its subsequent disorders. The disorders of consciousness are vital risky signals of the damage/defeat of brain. To them first of all are related: the coma, sleep-like stupor, pathological sleep, different forms/species of stupor, tangled nature and amnestic-delirious conditions. The dynamics of the phases of the detumed consciousness in initial period is characterized by vast oscillations with aggravations and deteriorations and can be clear in light of the relationships/ratios of local injury and general pathological reactions (shock, disorders of blood circulation, edema, bloating, arachno-encephalitis and shift of brain). With bullet wound these general pathological reactions can arise not immediately, but after certain time. In such cases during the first days is noted areactive period with the focus symptomatology, which is relieved by heavy general cerebral violations, with deep dimming of consciousness in proportion to the development of hypertension syndrome, edema, bloating, wound meningoencephalitis. By this are explained the cases

of the independent departure/attendance of those wounded the skull with the field of combat; the disorders of consciousness appear in them only subsequently, with a deterioration in the general condition. So, with the penetrating left-side wounds of temporal region it was possible to observe during the first days the development of amnestic or sensor aphasia without the disorders of the consciousnesses which attacked/advanced only subsequently according to the type of tangled nature. Sometimes operational intervention in this period, in connection with circulatory disorders and infectious complications, contributes to the rapid development of general pathological reactions with dimming of consciousness. In other cases during the benign course of wound, especially with the surface wounds of cerebral cortex, timely and full-valued operational intervention clinical picture can become apparent by predominantly focus symptomatology. The heavy wounds of brain are always escorted/tracked by loss and disorder of the consciousness of different intensity and duration. On the dynamics of unconscious condition it is possible to a certain extent to place prognosis. Heavy coma with bulbar symptomatology (disorder of blood circulation, respiration, ingestion) indicates the preferred damages/defeats of barrel and usually gives poor prognosis. The extinction of consciousness is the here biological expression of the extinction of life. In connection with this those obtained bullet wound into the region of the barrel of brain usually perish on the field of battle

or in the foremost stages of evacuation. On this reason rarely survive the wounded with the deep penetrating damages of postcranial portion, since with such wounds usually simultaneously suffers the cerebellum and the medulla oblongata, which frequently leads to death.

Page 128.

Bullet damages with hemorrhage into lateral ventricle are escorted/tracked by heavy hanger-on violations with general/common/total rigidity and frequently also conclude with death. Another prognosis give unconscious conditions during primary-crust damages/defeats. Here unconscious condition at first also bears the threatening character/nature; however, at the termination of the sharpest period disappear terrible symptoms from the side of vital functions and to the foregrcund it comes forward characteristic dissociation - deep disorders of consciousness in satisfactory somatic condition. Coma and sopor are relieved by sleep-like stupefaction with sharp retardation, apathy, adynamia, with a deep misleading action, the disorders of thinking and memory. These conditions frequently are disrupted by psycho-motor excitation with inconsistent thinking and conduct. Actually this condition of tangled nature presents the phase of output/yield from unconscious condition. During this period toward the end of the acute/sharp

phase, in proportion to weakening intensity of general pathological reactions, come forward the clinical pictures, which should be estimated as the focus ones. The development of infectious complications according to the type of diffuse or focus meningoencephalitis and abscess is escorted/tracked by the repeated disorders of consciousness (tangled nature, asential-delirious conditions).

This dynamic replacement of clinical pictures and their diversity, appearance first general cerebral, then of predominantly focus disorders it is especially characteristic for the severe complications of cerebral wound. So, frequently serious bullet wound with the wound canal, opened for the outflow of pus, is escorted/tracked by the palely expressed clinical picture with the predominantly focus symptomatology which during the occlusion of wound canal is suddenly relieved by heavy and violent general cerebral violations with deep dimming of consciousness, up to coma. The discovery/opening wound canal, the decrease of edema and hypertension again lead to a rapid and sharp improvement in the clinical picture, and to the foreground again come forward focus violations.

Focus psychopathological symptoms and syndromes in different development periods of traumatic process are in detail studied and

refined by Soviet psychiatrists in the year of the Great Patriotic War. In the number of research is given the detailed characteristic of frontal, frontobasal, temporal, sincipital, sincipital-postcranial, subcortical and hanger-on psychopathological syndromes.

In the first place in brightness, fundamentality and depth of psychotic manifestations should be placed the damages/defeats of frontal cortex, its polar- basal departments with front-naso-orbital wounds. With the heavy penetrating wounds of a front-orbital region the fragment of shell or the bullet of limber causes the extensive diffuse damages/defeats of frontal cortex, frequently destroying the frontotemporal or frontoparietal departments of brain. Sometimes such diffuse damages/defeats capture entire hemisphere to postcranial pole. It is completely understandable that in these cases appear the complicated, varied clinical pictures, where not only in acute/sharp, but also in late period polar- basal symptoms come forward in the form of general cerebral or other focus violations and are escorted/tracked mnestic-intellectual and vocal disorders, up to the expressed stable amnestic syndrome.

Page 129.

These general cerebral violations usually suppress active

frontobasal symptoms and their to secrete in these cases is difficult. However, the majority of front-orbital wounds is escorted/tracked by the selective damage/defeat of the basis of frontal cortex, during which to the foreground come forward effective and engine brake releasing, euphoria, hypomaniacal condition with the excitation of inclinations (bulisia, eroticism). Patients, in spite of severity of wound, frequently complete blindness, are lighthearted, merry, active. Most essential in this condition - good health, absence of complaints, complacent-optimistic mood in the gross violation of the criticism of its condition. The contemporary data of the pathology of brain make it possible to secrete the psychopathological syndromes of the basis of frontal portion and to delimit them from general cerebral disorders, from the syndromes of the damage/defeat of the convex surface of frontal cortex. It is most difficult to demarcate clinic of the damage/defeat of basal cortex from the primary damage/defeat of interstitial brain, since here anatomical-physiological interrelations are so/such intimate and intimal, which frequently is necessary to speak about frontal-basal-diencephalic syndromes. Especially tightly are interwoven frontal, frontal-basal and diencephalic symptoms in the initial period of front-orbital wounds. In late and residual period diencephalic symptoms calm down or entirely disappear, and to the foreground come forward changes in the individual with effective simplification and violation of criticism, what is the expression of

primary frontal-basal violations. During the damage/defeat of the convex surface of frontal portion comes forward the loss of initiative, activity, apathies, motor inhibition, impoverishment of speech and thinking. During the violation of left hemisphere the speech and thinking suffer more roughly, even when there are no disturbances of specially speech region.

During temporal, sincipital and sincipital-postcranial damages/defeats are disrupted the recognition, the understanding of speech, activities, alignment in space, in time and in its own body, together with the more complicated disorders of perception and hallucinatory phenomena. Are especially frequent in clinic of temporoparietal wounds diverse paresthesias and painful, unpleasant, not defined, variable, unusual for the sick perception, which go both from the internal organs/controls and from body surface. Most frequently these conditions are combined with unaccountable alert/alarm, fear of death and resemble anginose attacks/seizures/paroxysms with painful gastrcintestinal and urino-genital perceptions, with hypochondriac introspection, and sometimes by delirious interpretations. These painful painful sensory and psychosensory syndromes with delirious and hallucinatory experiences appear with the limply current encephalitides, complicated by generl symptomatic disorders against the background of the lowered/reduced general/common/total reactivity of organism.

From entire diversity of delirious syndromes with complicated wounds of brain it is possible tc secrete group with a hallucinatory-the deliricus syndrome, where as a rule, was established/installed primary localization in the sensitive regions of cortex (temporal, sincipital regions). The onset of hallucinatory-delirious syndrome in these cases precedes the series/row of the phases which approximately/exemplarily can be described as follows: 1) the sharpest and acute/sharp period with comatose condition and tangled nature of the consciousness; 2) the phase of apathetic condition with hyperpathia and hyperalgesia; 3) the slow or acute/sharp development of a depressive-paranoid condition with the fears, painful by perceptions and by hallucinations. It is doubtless, there are intimate genetic interrelations between the phase of hyperpathia and hyperalgesia and further development of a depressive-paranoid and catasthesic-delirious syndrome.

Page 130.

The mechanism of the latter resembles the mechanism of the development of psychopathological syndromes with causalgias. It is known that the damage/defeat of sincipital portion can produce the

central type of pain, very close to picture of causalgia; they precede psychopathological symptomatology with psychosensory hallucinatory-delirious experiences. From anatomical-physiological side in the onset of these syndromes the leading role play cortico-thalamic violations.

The described above psychopathological syndromes with the complicated wounds of brain although are encountered rarely however they are characterized by protracted course with gradual transition in late period.

Mental violations in the period of late complications and distant consequences of the bullet wounds of brain. The basic law, characteristic for the majority of the traumatic damages/defeats of brain, is favorable course with the expressed phenomena of restoration/reduction and compensation cerebral violations. The uncomplicated penetrating wound of brain during full-valued primary processing rapidly heals, cerebral focus disorders pass. In the contemporary system of treatment (sulfanilamide preparations, penicillin, timely full-valued primary processing) the complicated wounds in the majority of the cases flow/occur/last favorably, transition in late periods is connected with the elimination of basic complications. The late period of the bullet wounds of brain is characterized by the elimination of the complications of early

phases, by the healing of defects and by the processes of cicatrization. In this period especially clearly come forward the laws governing the reverse/inverse development of cerebral violations with the considerable restoration/reduction of the functional activity of brain, that also leads to the gradual transition of the late period in the period of the distant consequences. The study of the mechanisms of compensation during the damage/defeat of the highest departments of the cerebral cortex shows far going functional rearrangement with the creation of new alternate routes and intra-neuronal connections/communications. Is especially remarkable the capability of brain for restoration/reduction and compensation in young, healthy people prior to wound. At any intensity of traumatic damage/defeat always becomes apparent the maximum tendency of organism to resist all destructions and to be held down/retained in life.

In young people agnostic ones, apractical, disorders even during the rough damages of brain bear the transient, regressive character/nature. Together with agnostic disorders, apractic, aphatic disorders in wounded during the damages of sincipital portion flow/occur/last favorably. Were observed the cases of the perforating bilateral wound of parietal lobes and calloused body, with which apractic disorders against the background of apathy and akinesia rapidly disappeared, and remained only the phenomena of structural/design aproxia, amnestic aphasia and agnosia of

fingers/pins. But also the latter gradually passed. These laws governing of the restoration/reduction and compensation are connected with the condition of reactivity and immunobiologic forces of organism and can serve as the important indicator of a difference in the residual post-wound defect from active wound process in connection with severe infectious complications (chronic osteomyelitis, meningoencephalites, abscesses). So, with the heavy (especially bilateral) wound of frontal cortex are noted the massive violations of intellect and affectivity, frequently in the structure of amnestic syndrome.

Page 131.

Under favorable conditions these violations can undergo the reverse/inverse development: disappears the syndrome of amnestic imbecility with tranquillity, remains only defect in the form of insufficient activity, purposefulness and criticism. In case of hidden of the septic process taking place with the prolonged formation of abscess amnestic or pseudo-paralytic syndrome during frontal damages/defeats remains stable with tendency toward aggravations and deterioration.

In late period it is possible to secrete two basic groups of the damages/defeats: the predominant group with favorable course and

other - with the stabilization of the complications, which accept flaccid, chronic coursing with late outbreaks of aggravations and deteriorations. In latter/last group it is possible to secrete the progressive forms of the late period in the form of late meningoencephalites, abscesses, cysts, progressive atrophy of brain with cicatrization and hydrocelphaly. On the basis of necrotic, inflammatory and degenerate process is developed subsequently the atrophy of nerve elements/cells with hydrocephaly. Very high value in late period have the periodically amplifying cerebrospinal fluid and hemodynamic violations against the background of additional general somatic or exchange-toxic pathogenic factors. Specifically, the dynamic disorders roof and liquor circulation against the background of the necrotic foci and Rubtsovs of the education of different localization play the leading role in the onset of the incidental, periodic or intermittent psychoses of late period. Frequently these incidental, periodic psychoses, with which in clinical picture are most frequent the productive oneiric and twilight conditions of consciousness, are prelude to the development of late traumatic epilepsy. The atrophy of cerebral tissue with the education of rough collagenic scar and liquor dynamic violations with localization of basic stricken area in frontal, temporal or sensory-motor region of the cerebral cortex - here is the pathomorphological basis of different pictures of epilepsy of late period.

The data, obtained during the study of the consequences of the bullet wounds of brain, convince of the correctness of the liberation/excretion of special epileptogenic zones in front of front/leading adversive field in frontal and basal cortex. Specifically, the epileptic processes of excitation in these regions with the participation of deep periventricular formation are escorted/tracked by the various complicated disorders of consciousness and by general/common/total epileptic fits with the early and deep loss of consciousness. In late period are frequent limply current meningoencephalites against the background of the sharp suppression of general/common/total and cerebral reactivity with hypovitaminosis, vascular hypotonia and anoxia. The interstratification of general pathogenetic, general cerebral and local factor is the most important basis of the onset of the psychoses of late period. In these cases in clinical picture come forward depressive-brdovye, catasthesic-delirious, hypochondriac, hallucinatory, apathetic-stuporoznye conditions, up to the expressed schizophric-like.

Separately in clinic of late period must be isolated laws governing the development of psychopathological syndromes with late abscesses and cysts. These psychopathological syndromes and symptoms are related to the early forerunners of the incipient abscess, in connection with how they acquire high diagnostic value. In the period

is hidden of the inflammatory process taking place in brain with the prolonged formation of abscess the restoration/reduction of cerebral violations minimally, symptomatology always remains stable with tendency toward aggravation and deterioration.

Page 132.

Patient is flaccid, apathetic, asthenized, irritable, weakly-suffocated, it complains about the frequent attacks/seizures/paroxysms of headaches, vertigoes, suppressed mood, alarm in its conduct become apparent confusion and stupor. Against this background come forward focus neurologic and psychopathological symptoms with respect to the place of damage/defeat.

Exception of the described above general/common/total characteristic are the abscesses of frontal portions (especially polar-basal departments), when patient does not present subjective complaints, denies disease/sickness/illness/malady and is adjusted complacent-carelessly. Specifically, these abscesses sometimes are not distinguished and lead to surprise death. Psychopathological syndromes with abscesses, accurately the same as with the neoplasms of brain, are the important signs/criteria of localization and intensity of process. During the analysis of the clinical pictures of late abscesses it is very important to distinguish the symptoms of

stimulation, connected with perifocal encephalitic reaction, and the symptoms of fallout, frequently anechoic, few expressed and few noticeable, but indicating the primary stricken area and its localization. The bright perifocal symptoms of stimulation frequently mask truly primary symptoms and can be the reason for erroneous diagnosis.

The clinical pictures of late abscesses it is sometimes difficult to distinguish of post-traumatic cysts and internal hydroencephali.

With the complicated frontal and temporal wounds with the subsequent atrophy of cerebral tissue and the development of extensive internal and external hydroencephali can come forward stable amnestic and pseudo-paralytic syndromes. The latter it is very difficult to distinguish of clinical pictures with the late abscesses of frontal region, which develop in connection with areactive septic meningoencephalitis. The development of extensive internal hydrencephali with the atrophy of cerebral tissue and the damage/defeat of periependimary formation of lateral ventricles presents the pathomorphological basis of the psychotic conditions of late period. The high value in this case has localizations of the damage/defeat: in the first place stand the consequences of bilateral front- orbital, frontal-callous, sincipital-callous and temporal

wounds.

The mental violations of late period substantially differ from the clinical manifestations of the period of the distant consequences. In contrast to late in the period of the distant consequences disappear all active pathogenic factors of infectious complications and exchange violations, in connection with which to the foreground come forward stable defective conditions. However, also the period of the distant consequences is not absolutely stable, known dynamics is inherent in it.

Defect itself is the dynamic education, connected first of all with the positive compensator tendencies, which go from individual with its strivings to a social-labor activity.

Psychopathology of residual condition is characterized by the disappearance of psychotic manifestations, as they are bright and massive they not were massive. To the foreground come forward stable cerebral asthenia, descent in the activity, amnestico-intellectual and affective violations, isolated/insulated symptoms and syndromes, picture residual epilepsy which can find its explanation in the contemporary exercise about localization of cerebral violations.

Page 133.

Changes from the side of visual apparatus.

Changes in the visual apparatus with the bullet wounds of skull and brain are secondary and become apparent in a decrease in the visual acuity, the disturbance of the fields of views change in the eyeground, pupil reactions, crust visual functions and movements of the eyeballs. Depending on character/nature and severity of wounds is observed either the entire group of these signs/criteria, or only some of them.

The unconscious condition by which is frequently escorted/tracked the wound of skull and brain, it impedes the research of the visual acuity, fields of view and oculomotor apparatus. However, study of eyeground and pupil reactions to light/world is possible in the unconscious condition of wounded. The visible on ocular day vessels of retina and optic nerve anatomically and functionally are closely connected with the vessels of brain. Central artery is the branch of the eye socket artery, which exits in the area of skull from internal carotid artery. Hypothalamus is the

single regulator center of the vessels of brain and retina. The vessels of retina and optical nerve in their structure are close to by capillary which, as is known, are very sensitive to pathological irritations.

Therefore ophthamological changes in the retina and optical nerve should be considered as repulsing the pathology of brain and its shells. Changes in the majority of the cases are vascular in the form of hyperemia, neuritis, stagnant it is mammillary and papillitis/papilledema.

This is why the research of eyeground, visual acuity, fields of view and *oculomotor apparatus presents* for neurosurgeon one of the most valuable diagnostic substances. Observation of the dynamics of changes in the functions indicated, which reflect the course of intracranial process, can help neurosurgeon to find correct tactics in the treatment of wounded.

Anatomical-topographical interactions of the bones of orbit with the bones of skull with the combined wounds of this region define for a neurosurgeon the value of these injuries as the composite/compound component part of the complicated, but single wound.

The medical service of armies during the first world war did not

have the specialized aid. Therefore a question about changes it optical apparatus with the wounds of skull and brain did not obtain in that period of proper illumination in the literature.

However, N. N. Burdenko in tne first world war already noted that 12-36 hours after the wound of skull and brain are developed the stagnant nipples.

Reason for the development of stagnant ones it is mammillary it served the intracranial pressure increase as result of a sharp increase in the quantity of secreted cerebrospinal fluid/liquid, intracranial hemorrhages and traumatic edema of brain. Later, in 1928, M. Z. Popov on the basis of experimental research and analysis of observations with stagnant nipples in patients with the neoplasms of brain attached the leading value in the mechanism of the development of stagnant ones it was mammillary to weakening or to cessation of the pulse oscillations of brain. In norm the pulsation of brain "sucks" a centripetal-venous and tissue current of the barrel of optical nerve, which is guided for the area of skull. The delay of this centripetal current as a result of attenuation or cessation of the pulse oscillations of brain causes the development of stagnant ones it is mammillary.

Page 134.

In the Great Patriotic War the ordered organization of the specialized aid made it possible to widely deploy the study of the violations of view with the bullet wounds of skull. Based on data of the maps/charts/cards of the deepened characteristic, with the wounds of soft tissues the skulls of the violation of visual apparatus were observed into 6.0o/o of cases, with the nonpenetrating wounds of skull - into 21.7o/o, with the penetrating wounds of skull - into 37.6o/o cases.

Differentiated characteristic of the violations of view is represented according to the same data in Table 17 (in percentages).

The violations of visual apparatus with the wounds of the soft tissues of skull were observed predominantly in the cases, which were being escorted/tracked by the phenomena of concussion or contusion of brain. In the lungs and average/mean on severity cases they are noted hyperemia it is mammillary optical nerves, the expansion of the veins of retina or light dimming of retina around it is mammillary optical nerves.

In the heavier cases with a sharp the intracranial pressure increase are noted stagnant nipples, and also disturbances of the

fields of view in the form of hemianopsia.

Changes of the bottom eyes appeared sometimes immediately after injury, independent of its severity.

The mechanism of the violations optical apparatus is drawn in the following form: light changes of the eyeground in the form of hyperemia it is mammillary optical nerves and expansions of the veins of retina is caused by the injury of hypothalamus by fluid wave. But hypothalamus, as is known, it is arranged/located about the tank of brain and is the single regulatory center of the vessels of retina, optical nerve and brain.

In the cases of a stable the intracranial pressure increase vascular changes of the eyeground in the form of the expanded veins could be retained very for long (from 2-3 months to year). Stagnant nipples were caused by traumatic edema of brain. Was feasible another mechanism of the effect of injury. Cerebrospinal fluid/liquid, being incompressible, was displaced with air strike/shock and was delivered strike/shock on the nucleus of oculomotor nerve on the day aqueduct of Sylvius. In result this the reaction of pupil to light/world were reduced, were developed the phenomena of diplopia and the nystagmus, connected with weakening of the function of oculomotor nerve and vestibular apparatus.

Table 17.

(1) Характер ранений черепа / (2) Изменения зрения	(3) Ранения мягких тканей	(4) Непроникающие ранения черепа	(5) Проникающие ранения черепа
(6) Ослабление остроты зрения вследствие травмы зрительных нервов или центров	2,5	8,0	5,7
(7) Слепота на один глаз	0,6	2,4	5,0
(8) Слепота на оба глаза	0,1	0,2	1,2
(9) Нарушения движений глазных яблок и диплопия	0,7	3,5	8,1
(10) Изменения реакции зрачка на свет	0,5	3,2	24,7
(11) Ограничение полей зрения	0,2	1,3	2,8
(12) Изменения глазного дна	0,4	3,0	5,7
(13) Комбинации нарушений	1,0	6,0	9,0

Key: (1). Character/nature of the wounds of skull. (2). Changes of view. (3). Wounds of soft tissues. (4). Nonpenetrating wounds of skull. (5). Penetrating wounds of skull. (6). Weakening visual acuity as a result of injury of optical nerves or centers. (7). Blindness to one eye. (8). Blindness to both eyes. (9). Violation of movements of eyeballs and diplopia. (10). Changes of reacting pupil to light/world. (11). Limitation of fields of view. (12). Changes in eyeground. (13). Combinations of violations.

Page 135.

With general/common/total favorable clinical courses of change of visual apparatus disappeared by poly-spine.

With the nonpenetrating wounds of the bones of frontal region and face skeleton in the lungs and average/mean on severity cases was observed a decrease in the visual acuity of the corresponding eye. Objective symptomatology in this case was extremely lean. Only during attentive ophthalmological research in the early cases was noted the expansion blood vessels, hyperemia of its surface and tender dimming of its boundaries; in later cases - paling of papilla as a result of light atrophy.

With the X-ray analysis of visual canals sometimes were detected the cracks in the walls of visual canal.

In the heavy cases of the nonpenetrating wounds of the bones of skull the wounded sometimes lost view by rule of thumb on the side of damage/defeat, at that time as the state of the papilla of optical nerve of ophthalmologically proved to be normal.

The forward reaction of pupil to light/world in the similar cases almost always was absent. The friendly reaction of pupil with healthy eye to patient was retained, from sick eye to healthy/sound it was absent. This pathological condition of the reaction of pupils to light/world indicated the complete interruption of the sensitive unit of the arc of pupil reflex to light on the side of damage/defeat.

Subsequently was developed the picture of the descending simple atrophy of optical nerve. The reason for similar damage/defeat of optical nerve is considered the presence of cracks from to the wall of its canal, the jamming of optical nerve by small/fine bone fragments, compression by hemorrhage or even complete break it is first.

In this case cracks in the walls of canal were formed with most diverse localizations of primary break. During damages to the frontal region also of the bottom of the front/leading cranial pit the cracks went along the upper wall of orbit and frequently they were spread to the canal of optical nerve.

With the breaks the bases of skull in the region of the average/mean cranial pit of crack went in the frontal plane through sella turcica from the low wing of basic bone on the one hand to another, capturing, thus, the wall of the canal of optical nerve.

With the breaks the bases of skull in the posterior cranial pit of crack frequently were spread to front/leading cranial pit and to the walls of the canal of optical nerve. The cracks of the canal of optical nerve were observed also with the breaks of the bones of face

skeleton. With the breaks of the basis of skull, in addition to the damage/defeat of oculomotor and discharge nerves, were noted also the damages/defeats and other craniocerebral nerves, for example, face, auditory and trigeminal this fact indicated localization and direction of breaks. So, the combination of the damages/defeats discharge, oculomotor and block nerves in combination with the damage/defeat of visual indicated the break in the region of the upper orbital slot of eye socket, the damage/defeat of olfactory and oculomotor - to crack in front/leading cranial pit. The bilateral damage/defeat of the discharge nerve was caused cracks in posterior cranial pit. For localization of damage in the region of pons [pons varolii, confirmed] was characteristic the simultaneous paresis of face and discharge nerves.

Page 136.

With the cracks of the basis of skull, propagated into front/leading and average cranial pits with action on optical nerve in its orbital unit, within canal and in region chiasmuies, was noted the change in the fields of view, having a differential-diagnostic value.

The infectious complications of the wounds of skull and brain were frequently escorted/tracked by the appropriate changes in the

bottom of eye. With the early abscesses of brain was observed the vasodilation of eyeground, and then small dimming of boundaries it was mammillary. This picture of eyeground was not stable; by it affected the severity of the course of process. However, with the late abscesses of brain and the infected cysts was observed a similar picture. However, with the abscesses of brain of one of the special features/peculiarities of the ophthalmological picture of stagnant ones they were mammillary early hemorrhages both into the tissue of nipple and into adjacent retina. Reason for this - damage of the permeability of the walls of the vessels of retina under the action of the toxins, which are drawn out from inflammatory focus.

With the meningoencephalites to the ordinary ophthalmological picture of stagnant ones it is mammillary it was added the contraction of veins. Was explained this by the fact that with the meningoencephalites, together with the conditions, facilitating the development of stagnant ones it was mammillary (edema of brain), the toxicoinfectious agents exerted considerable destructive destructive influence on the walls of capillaries. As a result of this this were developed the exudations in the perivascular slots of both brain and retina. Under the effect of these exudations occurred the mechanical compression of pliable venous walls. With respect to reinforcing of necrosis in brain tissue, to development of meningoencephalitic phenomena and to decrease of the pulsating oscillations of brain grew

ophthalmological changes in the bottom of eye. However, with the large defects of bone and solid cerebral shell ophthalmological changes on the side of wound were developed slower and they were less expressed, rather than on opposite side. The presence of the large defects of bone created favorable decompressive conditions, brain retained pulsation, which eliminated prerequisites/premises for the development of stagnant phenomena on nipple.

With the penetrating wounds of the postcranial, parietal and temporal regions were noted the damages of the central neuron of visual route/path and crust visual centers. With the maintained visual acuity the damages of the central neuron of visual route/path and crust visual centers were escorted/tracked by predominantly complete homonymous hemianopsia or hemianopsic scotoma. In this case direct dependence and parallelism between the severity of basic wound and the degree of the damage of visual routes/paths and centers it was not observed. From pupil symptoms with the bullet wounds of the central neuron of visual route/path and crust centers is noted anisocoria.

The penetrating through the eye socket wounds of skull and brain were extremely complicated on the clinical picture; with them the wounded required the composite examination/inspection by many specialists.

Orbit—cranial wounds with the heavy cerebral phenomena of concussion and contusion were frequently escorted/tracked by the breaks of the basis of skull in the region of upper orbital wall. With the wounds of eye socket, together with the considerable decomposition of the arch/summary of orbit, were noted cracks in the low wing of cuneate bone.

Orbit—cranial wounds were also frequently escorted/tracked by basal meningoencephalites and abscesses of brain with the development of stagnant nipple on undamaged/uninjured eye. Are noted the cases, when with the small penetrating wounds of century and superciliary arc were developed severe intracranial complications in the form of the thrombosis of cavernous sinus.

Page 137.

This obuslovlivalos6 on anatomical connection/communication of cavernous sinus with the veins of century and superciliary region. With orbit—cranial wounds greatly frequently was observed the complete destruction of eyeball and bones of the sinuses of nose.

Wounded with similar damages underwent early primary processing.

The surgical processing of orbit-cranial wounds to a considerable degree removed the possibility of the infection of cerebral wound and provided free to it access. Process/operation flowed/occurred/lasted usually in the following sequence: first was processed skin wound, then were driven out free bone fragments and foreign bodies of the orbital and cerebral wound and finally depending on readings, produced the enucleation of eye, simple orbitotomy or enventration of the eye sockets with the retention/preservation/maintaining of periosteum. Further followed processing the damaged sinuses of nose and their isolation via tamponades from cerebral wound for the purpose of warning/prevention of infection. In post-operation period to wounded they assigned energetic sulfanilamide therapy.

Changes from the side of ear and paranasal sinuses.

The wounds of skull and brain can be escorted/tracked by the straight/direct damages of ear, nose and its additional sinuses/antrums, since these organs/controls compose the unit of the cerebral and face skull. According to the data of the maps/charts/cards of the deepened characteristic, the combined wounds of ear and frontal sinus with the bullet wounds of skull during the Great Patriotic War were observed into 4.3o/o of cases of all wounds of skull (Table 18).

According to the same statistical data, the noise in ears, weakening of rumor, vertigo were observed in 2/3 all wounded the skull and the brain, moreover most frequently (irto 31.4o/o) were noted vertigoes. The violaticns of rumor are noted in 7.4o/o of wounded, whereas up to the moment/torque of extraction stable decrease in hearing was observed in all in 1.5o/o of wounded. In actuality these damages, probably, it is more. Frequently and in postwar period it is possible to meet people, sustaining the injury of head and complaining about vertigo, decrease in the rumor, disorder of smell and speech.

Known interest with the wounds of skull are of the data of the examinations/inspections of wounded by otiatrists.

Table 18.

(1) Поражения уха и лобной пазухи	(2) Комбинированные непроникающие ранения черепа (в %)	(3) Комбинированные проникающие ранения головного мозга (в %)
(4) Лоб и лобная пазуха	1,7	1,3
(5) Височная область и ухо	0,5	0,8
(6) Всего . . .	2,2	2,1

Key: (1). Damages/defeats of ear and frontal sinus. (2). Combined nonpenetrating wounds of skull (in o/o). (3). Combined penetrating wounds of brain (in o/o). (4). Forehead and frontal sinus. (5). Temporal region and ear. (6). In all.

Page 138.

Statistical data relative to wounded who were treated in ENT clinics and whose center of gravity of damage lay/rested at the injury of ENT organs, show that the combined injury of skull, brain and organs/controls of ear and paranasal sinuses is encountered into 10.0-12.0o/o.

Otologists which inspected heavily wounded, who were being treated in neuro-surgical separations/sections, note that the injury

of ear and paranasal sinuses with the bullet wounds of skull was encountered into 40.7o/o of cases. From them 20.0o/o fell to straight lines, and 17.1o/o - to the indirect damages of ear and paranasal sinuses. In remaining wounded were noted the associated diseases of ear and paranasal sinuses.

The peculiarity of the anatomical building/structure of auditory and vestibular apparatus makes with their especially sensitive ones to any jolts (vibration trauma), which under the same force do not exert any action on other, less sensitive organs/controls of body.

On the basis of the detailed otological examination/inspection of a considerable number of wounded it is established/installed, that with gun wounds of the skull and brain, the ear always suffered to some extent, even if wound was not connected with its direct damage. A considerable number of those wounded the skull complained about the suffering of the organs/controls of rumor, the violation of rumor occurring more frequently than the violation of the function of vestibular apparatus.

A decrease in the rumor had a character/nature of the damage/defeat of the sound receptor apparatus. A stable decrease in the rumor was observed in 19.8o/ of wounded, the temporary/time disorder of rumor - in 38.2o/o, and noises in the ears of 78.7o/o of wounded. Vertigo, disequilibrium, deflection in gait, and sometimes

also spontaneous labyrinth nystagmus were observed in 26.4o/o of all inspected wounded. The probable reason for these changes should be considered hemorrhages, vasomotor disorders, the intracranial and intra-labyrinth pressure increase with the mechanical or air injury of ear itself, with concussion or head impact. Although into 90.0o/o of observations of the injury of skull was noted a decrease in the rumor to a certain degree however the wound of ear itself was recorded only into 5.0o/o of cases. Examination/inspection 500 wounded the head showed that distrubance of the functions of rumor and equilibrium with these wounds is encountered frequently and does not depend on distance, on which was located the wound from ear. Therefore otosymptomatics with the wounds of brain had a value not so much for the topic diagnosis of damage/defeat, it as served as indication of the abundance of the damage/defeat of brain.

Otosymptoms were especially frequent with wounds in the region of average/mean or posterior cranial pit. The violation of rumor (in particular, bone conduction) was observed in 90.0o/o of those wounded the skull. The violation of vestibular functicn, as has already been indicated, was encountered somewhat less frequent. The dynamics of these violations of rumor and vestibular function went usually in parallel with the course of wound process.

Implication in the injury of the organs/controls of rumor and

equilibrium is detected with the appropriate symptoms: with the jolt of brain - by vertigo, and with contusion (contusion)- by the decrease in the rumor, which, as a rule, is incomplete and is more frequently on the side of contusion. With the break of the basis of skull frequently was observed the hemorrhage, and sometimes also liquorrhea from nose, mouth or ears. With the break of the wall of front/leading cranial pit suffered the smell, while with the injury of posterior cranial pit - a rumor and vestibular function (deafness, vertigo, spontaneous nystagmus).

Page 139.

Frequently the wounds of skull or brain and without the break of the basis of skull were escorted/tracked by the indirect damages/defeats of the organ/control of rumor whose degree depended on the impact force and place of the application/appendix of bullet or fragment. It is understandable that the nearer to ear is arranged/located the wound, all the more probably its damage.

A decrease in hearing of whisper speech was frequently escorted/tracked by the sharp shortening of bone conduction with a good perception of tuning forks through air, which indicated the deafness of central origin.

The described above cochleo—vestibular violations can be restored, but sometimes they are stabilized, and a decrease in the rumor can even progress.

Thus, with the bullet wounds of skull and brain most frequently suffers rumor (from complete deafness to the most varied degrees of a decrease in the rumor to one or both ears).

The second in frequency symptom is the disorder of smell during the damage to region of primary olfactory education (i.e. front/leading cranial pit), and sometimes also with the injury of the region of secondary olfactory education (i.e. the basal departments of temporal region, average/mean cranial pit). Vestibular symptoms are observed more rarely.

However, all these disorders can depend not only on the damage of peripheral apparatus, but also on the damage/defeat of auditory, vestibular and olfactory centers. Organic and functional deafness can depend on the injury of the region of the corresponding sectors of cortex and white substance of hemispheres and other departments of brain. Setting diagnosis helps the careful analysis of otosymptoms and neurologic data.

The distinguishing features of the deafness of central

character/nature are the associated symptoms. For example, with localization in pons varolii are observed the symptoms of damage/defeat IV, V, VI and VII pair of cranial nerves, with injury in the region of aqueduct of Sylvius - a decrease in the view, paralysis of ocular muscles, ataxia.

With incomplete deafness the violation of ototopia can indicate the central localization of damage/defeat, since the binaural effect of rumor is a property of auditory centers (V. I. Voyachek).

During central vestibular damages/defeats (region IV ventricle) was noted the nystagmus of position/situation and the absence of the peripheral excitability of vestibular nerve in the presence of rumor.

It is possible to think that pressure of cerebro-spinal fluid with the bullet wounds of brain sometimes also causes vestibular disorders.

In certain cases vestibular disorders prove to be connected with the damage of vasomotor centers and with vascular violations in inner ear or in the region of Deiters' of nucleus. In this case are observed prolonged vertigoes and ataxia, that are escorted/tracked by vegetative symptoms (reddening or pallor of face, of mucous

membranes, appearance of perspiration, disturbance of pulse, etc.). Sometimes, however, ataxia coresponds to the damage of the frontal portion of brain, and then it differs from the vestibular and cerebral the fact that the latter is frequently escorted/tracked by rotary nystagmus (K. L. Khilov).

Page 140.

Frequently were encountered those wounded the skull, in which the retention/preservation/maintaining rumor and presence simultaneously of the violent symptoms of vestibular character/nature (strong vertigo, nystagmus of position/situation or pendulum spontaneous nystagmus) made it necessary to assume central vestibular damage/defeat, especially if anamnesis indicated the transferred brain concussion.

With the bullet wounds of skull are encountered also the straight/direct and indirect damages of the nerves, which refer to the injury of the ear: the paresis of the mimic musculature of face (VII pair), paresis or even complete paralysis of the soft palate and limitation or complete immobility of the true vocal chords of similar/analogous side (X pair), deafness during damage/defeat of VIII pair and the like very frequently these damages/defeats proved to be irreversible. However, individual observations show that the

restoration/reduction of some functions is possible due to compensator mechanisms. So, the disorder of ingestion during the damage/defeat of the vagus nerve was removed in 1-2 months, and speech - 4-6 months after injury.

Complaints on pain in the region of heart, difficulty of respiration, vertigo, unsteady gait, noise in ears and head, the decrease in the rumor and other symptoms can be caused by violations in the region of vegetative centers, in the region of cerebellum and VIII pair of nerves, each sector individually or as a result of effect their on each other.

The treatment of such damages of ear with the bullet wounds of skull is conducted according to the principles of neurosurgery and otolaryngology: the sparing processing of wounds and the distance/separation of the taking root fragments. In the post-operation treatment of the combined wounds of ear and brain one should apply the hypertonic solutions with which is impregnated the material for bandages. From conservative methods wide preventive and therapeutic use/application obtained sulfanilamide preparations and penicillin as substances the struggles against one of frequent ones and riskiest complicatior-meningitis. During the Great Patriotic War with great success was applied the treatment of wounds by streptocide, pyophage, nitrobenzine and iodoform. The success of

treatment depends on skillful combination of principles oto- and neurosurgery.

The combined wounds of skull, brain and paranasal sinuses were encountered fairly ofter.

The wounds of frontal sinuses into 9.0o/o of cases were escorted/tracked by the wound of the posterior wall of sinus/antrum with damage to solid cerebral membranes or the substance of brain.

The wounds of paranasal sinuses, depending on the zone of the damage and of combination with the wounds of adjacent regions, should be divided into three groups (V. F. Undrits). The first group includes the heaviest and risky damages of upper cranial zone, where enter frontal, latticed and basic sinuses.

The severity of the wounds of this zone is caused by the possibility of the light march/passage of infection from paranasal sinuses into the area of skull, since upper paranasal sinuses are isolated from basis and forward section of the frontal portion of brain only by bone plate,which it is frequently damaged together with its lining/covering from within mucous membrane. Through the walls of sinuses/antrums pass also the veins, which inflow directly into the veins of solid meninges as a result of which is easy formed

thrombophlebitides. Is not eliminated the penetration of infection into lymphatic vessels and through bone slots. Is feasible the march/passage of infection into the area of skull from paranasal sinuses from the side of eye socket as a result of the education of the thrombosis of cavernous sinus/antrum or on the course of optical nerve when pus from sinus/antrum bursts open into eye socket. This group of the wounds of paranasal sinuses composes 27.3o/o of all wounds of sinuses/antrums.

Page 141.

The bullet wounds of skull and frontal sinuses are subject to surgical intervention in the form of the wide disclosure/expansion of the damaged sinus/antrum and exposure of the corresponding sectors of brain to healthy/sound units with the cautious distance/separation of available of metallic ones and on the possibility all bone fragments, and also by the emptying of area from the decomposed cerebral tissue and blood clots. Anastomosis with nasal area, as a rule, in these cases was not done and operating wound did not sew itself.

After supplying sum said, one should agree with V. I. Voyachek, that the wounds of paranasal sinuses, which are escorted/tracked by intracranial trauma, are most heavy, which require urgent aid and frequently joint operation of different specialists. The seriousness

of this injury grows/rises still and because the wounding shell, being most infected, carries, furthermore, into brain infection from the destroyed frontal sinuses/antrums. By especially unfavorable moment/torque is considered perforation the as wounding shell of the screenlike plate damage to which by larger unit is lethal, although are described the individual cases of the favorable outcome of similar wounds. With combined wounds of skull most frequently are damaged frontal sinuses, then latticed and basic.

The experiment/experience of war showed that in the similar combined wounds the neuro-surgical processing must correspond also to the rhinological principles of the treatment of paranasal sinuses. In a number of cases where this rule/handspike was not observed, it was possible to obtain the final recovery of wounded only after the secondary process/operations of rhinological character/nature.

The basic question, which must be solved during process/operation, is reduced to the need for the imposition of anastomosis with nasal area. As a rule, this wound is most successfully treated by the first open method and only the week through 3-4, after the disappearance of the danger of intracranial complications, to take up plastic surgery of the external wall of sinus/antrum and creation of wide anastomosis with nasal area. Foreign bodies during their deep disposition frequently were

extracted with the aid of long Killian speculum mirror or even bronchoesophagoscopic instrumentation.

The basic condition of the successful treatment of the combined wounds of skull, ear and paranasal sinuses during the Great Patriotic War was the close contact of the neurosurgeons and otiatrists in the specialized hospitals.

Some changes from the side of internal organs/controls [1].

FOOTNOTE [1]. In this chapter are contained only most basic elements/cells, which characterize the diseases of internal organs/controls with the wounds of skull, since to in detail this question is dedicated special section in unit "Therapy". ENDFOOTNOTE.

The observations of the Soviet therapeutists and surgeons during the Great Patriotic War showed that the diseases of internal organs/controls in wounded are observed very frequently. These observations refuted the data of a number of the foreign authors, indicating the relative rarity of similar diseases.

The work experience of the Soviet therapeutists convinces that with the wounds of the skull of different localization frequently are developed not only the diseases of the lungs, but also the disease of

other organs/controls and systems. At the present time Soviet scientists accumulated the large experimental and clinical experiment/experience, which concerns changes in the internal organs/controls with the injuries of skull.

The Soviet physiologists of the school I. P. Pavlov, L. A. Orbeli, K. M. Bykov, A. D. Speranskogo established/installed the intimate interconnection between the central and vegetative nervous system and internal organs/controls.

Page 142.

Already V. M. Bekhterev and A. V. Myslovskiy, and also A. Ya. Danilevskiy distance are individual indications of the functional connection of brain core with the work of internal organs/controls. This question as a whole was developed by K. M. Bykov's school. As a result of the made by it work at present it is possible to consider it completely established/installed that in all internal organs/controls there are receptors, which react to mechanical, thermal and chemical irritants. Furthermore, it is established/installed, that the impulses/momenta/pulses from internal organs/controls enter into interaction in brain core with the impulses/momenta/pulses, which attached from the environment through the organs/controls of feelings. In connection with this it was

possible to assume that action on these or other the departments of central and vegetative nervous system they can be escorted/tracked by different changes from the side of internal organs/controls.

The observations, carried out in this direction by our physiologists, established/installed the considerable damage of the function of different systems and organs/controls with the injury of central and vegetative nervous system. A. D. Speranskiy, irritating the brain of experimental animals by foreign bodies, he showed the possibility of the appearance of hemorrhages in the lungs (the "macula of leopard"). A. V. Lebedinskiy observed "red hepatization " by one or two portion of the lung in rabbits, by which suboccipitally introduced the emulsion of turpentine. N. N. Burdenko and B. N. Mognil'nitskiy observed hemorrhages and ulcerations/pittings in stomach in dogs the destruction of the unit of the hypothalamus behind infundibulum.

These experimental data already made it necessary to assume series of changes from the side of internal organs/controls with the wounds of different departments of nervous system. The experience, acquired by clinicians during the Great Patrictic War, showed that these changes are even more diverse and they are very frequently noted with the closed and open injuries of skull. Many Soviet authors' data show that with the injury of skull most frequently

occurs the reaction from the side of circulatory apparatus, lungs, gastrointestinal tract and blood.

Especially frequently are observed changes from the side of cardiovascular system. In this respect large interest are vasomotor violations, changes in the arterial pressure, violation of coronary blood circulation, change in the rhythm of heart, dystrophic phenomena in myocardium. M. A. Volin indicates the appearance of disorders of vegetative functions into 50.0o/o of cases of the open injuries of skull. These disorders can become apparent in the violation of sleep, enctional sphere, thermostatic control, metabolism, and also rhythm of heart and respiration, etc.

Very frequent reaction from the side of cardiovascular system to injury with the bullet wounds of skull was bradycardia (into 35.0o/o). It kept sufficiently for long - to 20 days and subsequently it was frequently relieved by tachycardia. The latter appeared especially frequently in the cases, which were being escorted/tracked by intoxication. Should be also noted in this case the expressed lability of pulse. Within the later periods frequently (22.0o/o) there appeared arrhythmia.

A number of the authors with the wound of skull in young people sometimes observed spastic pains in the region of a heart of the type

of stenocardia. Studying in those wounded the skull electrocardiogram, N. S. Molchanov stated/established already within early periods after wound series of changes: sinus bradycardia, change in position/situation ST of cut with respect to isoline, sometimes strain T. These phenomena were retained for a while, and then gradually were equalized.

Page 143.

Changes in the rhythm of heart and the violation of the function of coronary vessels must be placed in connection/communication with the stimulation of extracardial nerves with the explicit predominance of stimulation n vagi. In the case of the long existing vasomotor disorders in the series/row of wounded were developed the phenomena of myocardial dystrophy. This especially frequently was noted in those cases when wound was escorted/tracked by infection or intoxication.

Considerable oscillations in those wounded the skull underwent arterial blood pressure. Immediately after wound it frequently was reduced, but through the short period it rose again. T. S. Instamanova revealed/detected an increase in the arterial blood pressure (higher than 130/70) in 60.0o/o of wounded with the closed injuries of skull and only in 25.5o/o of wounded with the open

damages. Lowering the blood pressure was observed with the closed injuries of skull into 24.0o/o of cases, and with the open wounds - into 10.5o/o. These data show that the pressure increase attacked/advanced within the early periods, into the basic not later than 20 days, but in the considerable majority of the cases even during the first days after injury.

With the bullet wounds of skull were very frequently developed the diseases of the lungs - hemorrhage, atelectases and pneumonia. Hemorrhages in the lungs clinically usually were expressed in the appearance of hemoptysis and in the appropriate physical and roentgenological changes. In those wounded the skull, that passed away as a result of wound, already during the first days after wound were noted the disorders of blood circulation in the lungs that it was expressed during histological research in presence stases, thrombi, hemorrhages, hemorrhagic infarctions.

For the illustration of the aforesaid is given the photograph from the frontal section/cut of the unit of right lung (Fig. 30).

Extraction from the record sheet of autopsy. Death 8 hours after wound. Blind-end fragmentation wound of skull with the perforated break of postcranial bone and the wound of postcranial portions of both hemispheres of brain. Individual small/fine hemorrhages in the substance of visual mounds. In Fig. 30 - hemorrhages into the parenchyma of the lungs, especially expressed in right lung.



Fig. 30. Hemorrhages into the parenchyma of the lung.

Page 144.

The symptomatology of hemorrhages into pulmonary parenchyma is very restricted it depends first of all on the value of damage/defeat and depth of disposition. Small/fine hemorrhages do not give any changes during percussion and auscultation. On the contrary, during the sufficiently large and superficially arranged/located hemorrhages it is possible to note shortening or even loss of resonance and weakening respiratory/breathing noises. Roentgenologically during massive hemorrhages is noted the homogeneous blackout, which, however, rapidly undergoes reverse/inverse development.

During the first days after the appearance of hemorrhages in the lungs the temperature keeps on subfebrile numerals, then it comes to norm. During the first days also is observed certain increase in the quantity of leukocytes of the peripheral blood and acceleration ROE. In the predominant majority of the cases during very short time (5-7 days) hemorraging disappears without a trace. However, in a number of cases they are accompanied by

hemoaspiration atelectasis. Both the hemorrhages and atelectases are sometimes the reason for the onset of pneumonia. According to clinical data in those wounded the skull of pneumonia they were observed in 25.0-30.0o/o, while according to the data of pathoanatomical autopsies inflammatory processes in the lungs with the wounds of skull were noted still more frequent (to 70.0o/o of cases).

So high frequency of pneumonia in those wounded the skull to a considerable extent depended on a large quantity of the predisposing factors: cooling, change of the vital capacity of the lungs as a result of weakening respiratory/breathing excursions, functional violations of circulatory apparatus, decrease in the immunobiologic properties of organism, hypovitaminosis and finally presence of the chronic diseases of the lungs.

But there is no doubt, that the vital importance of the genesis of inflammatory processes in the lungs belonged to injury and connected with it neurchumeral effects. Pneumonia in the predominant number of cases bore focus character/nature (88.0o/o), they were localized in lower portions and paravertebrally. More frequent than pneumonia they were discovered in lower portions, it is thinner/less frequent in the upper ones; in : 1/4 cases occurred bilateral pneumonia. Pneumonia were developed within early periods and more

than in half the cases during the first 2-3-4 days after wound.

The symptomatology of pneumonia with the wounds of skull was ordinary. Wounded complained about cough with the liberation/excretion of a small quantity of mucus, pain in to side. During objective research were detected the foci of the blunting; were examined dry, and also average/mean and bubbling sonorous moist rales.

Usually pneumonia were escorted/tracked by a small increase in temperature (37.2-37.5°) and by blurred changes in the picture of the peripheral blood: appeared leukocytosis, but it did not achieve the high numerals; leukocytosis was escorted/tracked by the blurred shift/shear of leukocyte formula. ROE was always accelerated. In the majority of the cases pneumonia ran its course favorably and they concluded during 5-10 days.

Suppurative processes in the lungs in those wounded the skull were observed relatively rarely.

Large interest are of observations of changes in the red and white blood with the wounds of skull. Studying the picture of the peripheral blood in those wounded the skull, some authors found expressed erythrocytosis, explaining this by the stimulation of the

center of hemogeny. In other cases of abrupt changes in the picture of the red blood with wcunds, the skulls did not find even in the presence of hemorrages.

Page 145.

This absence of expressed anemia should be explained compensator reinforcing of erythropoiesis as a result of stimulating the center of hemogeny. However, as far as damages of closed skull are concerned, then a number of the authors indicates changes in the white blood, which are characterized by inclination to leukopenia and to relative lymphocytosis. It is possible that these changes were also the results of the violation of the vegetative regulation of the function of bone marrow.

Finally, in the period of war were carried out observations of a change of functioning the gastrcintestinal tract in those contused. The authors noted dyspeptic phenomena - nausea, vomiting, absence or distortion of appetite, increase, and sometimes the suppression of stomachic secretion, heterochylia, which also, apparently is connected with the violations of vegetative regulation.

Entire presented testifies about large frequency and considerable diversity of the damages/defeats of internal

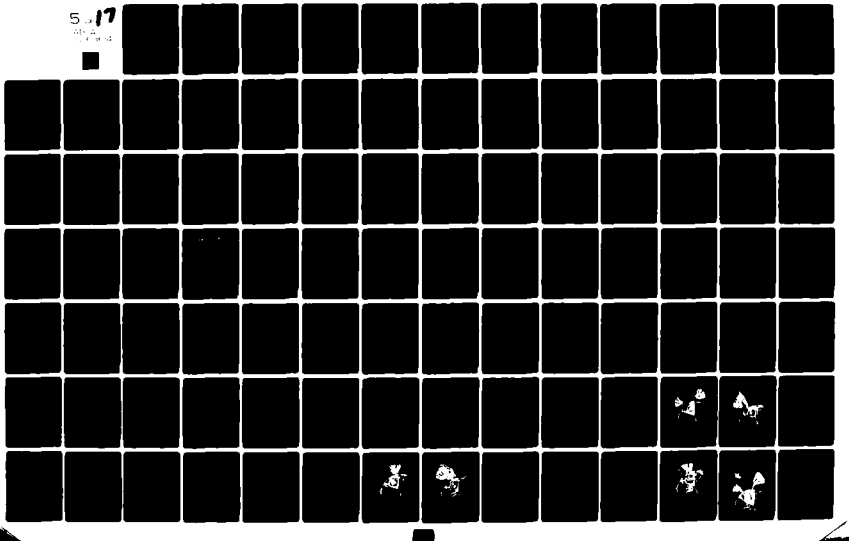
organs/controls in those wounded the skull.

The development of the diverse pathological processes indicated is obligated to many factors - injury, neurohumeral mechanisms, change in the immunobiological properties of organism, violation of respiratory/breathing excursions, cooling, infection, violations of nourishment, etc.

One should emphasize that the manifestation and the course of the diseases, which complicate wounds, to a considerable degree depended, on one hand, from the background, against which was deployed the process, and on the other hand - from the connected wound infection.

Individual observations of the course of wounds and diseases of internal organs/controls in wounded, who suffered alimentary dystrophia, they showed the considerable peculiarity of clinical pictures. This was expressed in unresponsiveness, absence of the series/row of ordinary subjective and objective symptoms (fever, leukocytosis, hypertension, etc.), in the protracted, flaccid course of wound process with insignificant vascular reaction. The connected wound infection caused the development of expressed anemia, myocardial dystrophy, inflammatory processes in the lungs, violations of the function of the liver, kidneys, gastrointestinal tract,

AD-A090 984 FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OH F/G 6/5
THE EXPERIENCE OF SOVIET MEDICINE IN THE GREAT PATRIOTIC WAR 19--ETC(U)
FEB 80 V N SHAMOV, B A SAMOTOKIN
UNCLASSIFIED FTD-ID(RS)T-1925-79 NL




A
098

metabolism, etc.

The study of the genesis of the diseases of internal organs/controls in wounded, and also the development/detection of the special features/peculiarities of their course with alimentary dystrophia and hypovitaminoses allowed already during the Great Patriotic War to search for and to use the effective methods of prophylaxis and treatment.

Taking into account the exceptional role of neurohumeral mechanisms in the onset of the series/row of the diseases of internal organs/controls in those wounded the skull, for prophylaxis of these diseases at some fronts was applied the vagosympathetic blockade. It is completely obvious that the vagosympathetic blockade did not eliminate the conducting and other preventive measures (struggle with blood losses, cooling, conducting respiratory/breathing gymnastics, designation/purpose of cardiovascular substances, frequent change in the position/situation of body, preventive reception/procedure of sulfidine, etc.).

Therapeutic measures, thus, were carried out complexly. It is unquestionable that with any wound, and especially in those exhausted, is required the designation/purpose of therapeutic nourishment with a sufficient quantity of full-valued proteins and

vitamins. The stimulating activity on organism exerted the transfusion of the small and average doses of the blood and the designation/purpose of the preparations of iron. In the presence of vasomotor disorders were assigned the bromides, valerian, calcium, etc., in the presence of inflammatory changes in the lungs - sulfanilamides, cardiovascular substances and so forth, etc.

Page 146.

Special attention turned to earliest possible diagnosis of the associated diseases and earliest possible taking of preventive medical measures.

Development in one wounded the skull or the other pathological processes (anemia, pneumonia, vasomotor phenomena, etc.) always complicated the decision/solution of a question about the possibility in this case of surgical intervention. Experiment/experience convinced that in such cases, if it was not urgent vital readings to process/operation, more expedient was to preliminarily use active therapy but to the occasion of one or the other complicating wound diseases and then already begin the surgical treatment. Otherwise the post-operation period flowed/occurred/lasted considerably heavier, since appeared the more serious complications, which sometimes led to the failure.

Some data on clinical laboratory diagnosis.

The clinical laboratory research of the cerebro-spinal fluid and blood with the wounds of skull has exceptionally important practical value for a diagnosis and a prognosis and is of large theoretical interest. Laboratory investigations can supplement and refine clinical observations and is important component/link in the composite examination/inspection of that wounded the skull, which must be carried out by neurosurgeon, neuropatholcgist and roentgenologist.

Research of cerebrospinal fluid with the uncomplicated wounds of skull. The inclusion into the examination/inspection of wounded in skull and brain of research cerebrospinal fluid has very high value. Lumbar punctures, contributing to the refinement of diagnosis, they make it possible to more accurately place readings to process/operation.

The early research of cerebrospinal fluid helps neuropathologist and neurosurgeon to obtain representation about the condition of an entire fluid system and fluid routes/paths and to refine clinical diagnosis even to process/operation. Research of cerebrospinal fluid

before the primary processing of the wound of skull gives initial material for comparative evaluation of the results of the repeated punctures, which have the high value during the decision/solution of a question about the advancing/attacking or having complication from the side of the wound of brain.

The accumulated during the Great Patriotic War considerable experience on the research of the cerebro-spinal fluid and blood in those wounded into skull and head brain showed the high value of these research and served as basis for the given below short generalizations. The detailed clinical analysis of each punctate of cerebrospinal fluid and the comparison of the results of preceding/previous punctates with those following makes it possible correctly to be oriented in the condition of that wounded the brain. The fluid circulation picture is necessary each time to compare with the clinical course of wound.

Speaking about pathology of cerebrospinal fluid, one should remember about its normal composition: cerebro-spinal fluid is transparent/hyaline and achromatic, it ensues/escapes/flows out under normal pressure (one drop into one second, or 60 drops in a minute), it contains to 3-5 regular/prescribed elements/cells in 1 mm^3. The protein reactions of Pandy, Nonne-Apelt, Weichbrodt are negative. The total quantity of protein composes in norm 0.18‰ (according to

some data, upper boundary of protein it lies/rests at the level 0.2‰).

Page 147.

With the bullet wounds of brain the pressure of cerebrospinal fluid by larger unit is increased. Cerebro-spinal fluid ensues/escapes/flows out by frequent drops, less frequent by *vertical* or curved jet. Greatly rarely in acute/sharp period is observed the reduced pressure; in such cases the cerebro-spinal fluid ensues/escapes/flows out by rare drops, and it is possible to collect not more than 2-3 cm^3.

In the overwhelming majority of the wounds of skull is observed hemorrhagic, i.e., blood-containing, cerebrospinal fluid. Depending on a quantity of blood of that issuing from into sub-arachnoidal space, this cerebrospinal fluid acquires the stain/staining different intensity - from the color of the *liquor-like* blood or cranberry fruit juice to the color of meat slops. Speaking about blood-containing cerebrospinal fluid, it is necessary to keep in mind the possibility of the artificial admixture/impurity of the blood as a result of paracentetic injury. This artificial admixture/impurity of the blood to cerebrospinal fluid is easy to distinguish of the present pathological admixture/impurity: if with lumbar puncture the

outflowing cerebrospinal fluid, at first painted by the blood, gradually turns pale and finally it is made by achromatic, the blood in test tube with fluid rapidly is coagulated, then one should think about the artificial admixture/impurity of the blood.

Authentic hemorrhagic cerebrospinal fluid from the larger or smaller addition of blood is the almost permanent and necessary sign/criterion of the open injury of skull, although it can be observed, also, with the closed injury. At the same time cerebro-spinal fluid can remain transparent/hyaline, achromatic and normal on cytosis and protein and with the penetrating wounds of brain.

Hemorrhagic cerebrospinal fluid is formed as a result of the entrance of the blood from wound focus into sub-arachnoidal space or into ventricular system. Hemorrhagic cerebro-spinal fluid has most intense stain/staining (ruby-colored or dark-red color) during the first 1-2 days after wound. After centrifuging or residue of this fluid/liquid on the day of vessel is formed dark-red sediment, and fluid/liquid itself above the sediment either is decolorized or it acquires slightly yellowish stain/staining.

During the subsequent days in cerebrospinal fluid occurs erythrolysis: whereas freed/released hemoglobin gives to it the same

stain/staining such as occurs after centrifuging. The observing at first intense color (dark-cherry, the color of strong tea, port) gradually turns pale and converts/transfers into greenish-yellow or light-straw. This cerebrospinal fluid it is more right to name/call erythrochromic in contrast to xanthochromic, developing under conditions of fluid and venous stasis. Finally, to middle or toward the end of the second week after injury cerebrospinal fluid becomes completely achromatic and transparent/hyaline.

During the microscopic examination of fresh hemorrhagic cerebrospinal fluid it is detected that the field of the view of microscope is covered with the unchanged erythrocytes. Their number depends on a quantity of issuing from blood. Among erythrocytes are encountered the leukocytes; a number of leukocytes corresponds or exceeds their content in the blood - one leukocyte to 600-700 erythrocytes.

The blood, which was issued into fluid system, irritates cerebral shells - soft and arachnoid, then finds its reflection both in the clinical picture (appearance and build-up of tunicary symptoms) and in the properties of cerebrospinal fluid - build-up of pleocytosis, predominantly neutrophilic (pleocytosis as a result of stimulation), that achieves frequently average and even high numerals.

Page 148.

The total quantity of protein and cerebrospinal fluid with the wounds of skull proves tc be increased - in limits from 0.3 to 4-5-6 ‰ and more. The large of hyper-albuminoses should be explained not only the incidence/impingement of the protein of the plasma of the blood intc cerebrospinal fluid, but also the inflammatory and circulatory violations, caused by wound of brain. Hyper-albuminoses is constant and keeps in cerebrospinal fluid for long, while cytosis already achieves normal numerals. Individual protein reactions (Pandy, Nonne-Apelt) are very frequently positive. The reaction of Weichbrodt is less expressed and it is frequently negative.

Research of cerebrospinal fluid for microflora (bacterioscopically and bacteriologically) gives in the majority of the cases negative results.

Thus, in fluid syndrome with the wounds of skull and brain enter: the elevated pressure of cerebrospinal fluid, the admixture/impurity of erythrocytes, erythrochromia, pleocytosis (initially neutrophilic, converting into lymphocytic, moderated, less

frequent than the large), hyper-albuminoses, positive protein reactions (Pandy, Nonne-Apelt).

During the noncomplication post-operation course of the wound of brain the blood comparatively rapidly disappears from cerebrospinal fluid. Approximately after 10-14 days cerebrospinal fluid becomes transparent/hyaline and achromatic, even if first punctate of cerebrospinal fluid had a color of the ruby-colored lacquer-like blood or cranberry fruit juice. The decrease of pleocytosis occurs more slowly - small pleocytosis can keep several months. Even longer it keeps hyper-albuminoses - from 2 to 4-6 months after wound.

Cerebrospinal fluid with meningitides on the soil of the bullet wounds of skull contains different quantity of leukocytes - from the units to 450000-460000 cells in 1 mm^3. The presence of a considerable quantity of leukocytes is explained by acute/sharp, sometimes purulent inflammation. In one and the same wounded the pleocytosis oscillates very considerably depending on the stage of process. The usually each "wave" of meningitis is escorted/tracked by a considerable increase in the pleocytosis. The relatively favorable course of purulent meningitis was escorted/tracked by the simultaneous incidence/drop in the quantity of protein and pleocytosis in cerebrospinal fluid. Protein-cellular dissociation was considered as prognostically extremely unfavorable symptom.

For a prognosis, besides the absolute value of pleocytosis, has value pleogram. Depending on the course of meningeal process, in pleogram it is possible to distinguish two phases: neutrophilic and lymphocytic.

In neutrophilic phase the cells by large unit are represented by segment-nuclear elements/cells and only in an insignificant quantity are encountered young and stabnuclear.

Neutrophilic phase corresponds to the periods of the aggravation of meningitis. At this time in cerebrospinal fluid segment-nuclear neutrophils by larger unit are destroyed, their ducts/contours hardly are distinguished. It is possible to see phagocytosis.

The periods of the shift/relief of neutrophilia by lymphocytosis depend on the condition of organism, virulence of microflora and character/nature of treatment. In the so-called interwave periods it is possible to note a drop of pleocytosis and quantity of segment-nuclear neutrophils with the simultaneous increase of a quantity of lymphocytes.

The reactions of Pandy, Nonne-Apelt, Weichbrodt, etc. are

positive and expressed to different degree. At a considerable number of wounded the total quantity of protein oscillated in limits 0.3-0.6 ‰. A maximum quantity of protein in cerebrospinal fluid achieved 8.6o/oo. During the build-up/growth of meningeal phenomena a quantity of protein slowly increased, during an improvement in the condition of wounded slowly it dropped.

Page 149.

Changes in the cerebrospinal fluid with encephalitides. With the wounds of skull, complicated by encephalitis, the cerebro-spinal fluid proved to be transparent/hyaline and ensued/escaped/flowed out under the moderate pressure.

Cytosis oscillated from 6 to 64 cells in 1 mm³. In the painted smears of cerebrospinal fluid were encountered the lymphocytes, represented almost exclusively micro-cells. A considerable quantity of such cells was found in the condition of mitosis. In the stage of recovery the cytosis gradually descended. In the cases of the complication of encephalitis of meningitis in the smear of cerebrospinal fluid appeared a considerable quantity of segment-nuclear neutrophils.

Globulin reactions - Nonne-Apelt, Pandy, Weichbrodt - in the

larger unit of the wounded were negative. A quantity of protein oscillated from 0.1 to 0.4o/oo.

Changes in the cerebrospinal fluid with the abscesses of brain after the bullet wounds of skull. The picture of cerebrospinal fluid with the abscesses of brain after the wounds of skull substantially differs from picture with the abscesses of nontraumatic origin, since the first are developed as complications against the background of wound with the inherent in the latter pathology of cerebrospinal fluid.

The diversity of changes in the cerebrospinal fluid with the abscesses of the brain of bullet origin depends, in the first place, from the time when is developed abscess (early or late abscesses), and, in the second place, from the associated or preceded purulent complications of the wcund of brain in the form of meningitis, meningoencephalitis, etc. Thus, for instance, with the abscesses of brain, complicated with meningitis, cerebrospinal fluid changes just as with meningitis. In these cases meningitis cerebrospinal fluid appears as the smoke screen which covers ripening or presence of abscess. With the onset of meningitis 2-3 weeks after wound always one should think, does not hide itself behind meningitis cerebrospinal fluid the abscess of brain. The elimination of meningitis outbreak under the effect of sulfanilamides and

antibiotics leads to the removal/taking of meningitis changes in the cerebrospinal fluid and to the development/detection of the cerebrospinal fluid, characteristic for a cerebral abscess, growing hyper-albuminose with the moderate or insignificant pleocytosis. After the surgical treatment of abscess with favorable outcome the composition of cerebrospinal fluid is improved it is gradually made by normal. During the unfavorable course of cerebral abscess again attacks/advances meningitis outbreak with the appropriate changes in the cerebrospinal fluid. The dissemination of abscess in the direction of ventricular system and its penetration into ventricles involve in suppuration the ependyma of the ventricles; in this case changes in the cerebrospinal fluid continuously grow to death of wounded.

Changes in the blood with meningitides after the bullet wounds of skull. After the wound of skull and brain, if in this case it was not considerable hemorrhage, any changes in the picture of the red blood revealed/detected could not be.

With meningitides usually was observed leukocytosis. In an insignificant quantity of cases, with heavy clinical picture, was noted leucopenia. In the majority of patients leukocytosis was expressed moderately and it did not exceed the level into 12000-13000 leukocytes in 1 mm^3. Higher leukocytosis, to 20000 is above, it was

detected in patients with different complications, especially in the cases of the connection of pneumonia.

Page 150.

With purulent meningitis was noted the insignificant shift/shear of leukocyte formula to the left, neutrophilia, lymphopenia, eosinopenia. In some patients in the cells of the blood were observed the degenerate changes, which were being expressed in the decomposition/decay of lymphocytes and toxic grain size of segmentally nuclear neutrophils. In interwave periods leukocytosis somewhat was decreased. Leukogram in this case it changed toward the build-up/growth of lymphocytes, appearance in the rare fields of the view of eosinophils, certain descent in the quantity of segment-nuclear neutrophils.

The reaction of settling erythrocytes in all wounded was accelerated and it oscillated in the limits of 30-65 mm an hour. In interwave periods the reaction rate somewhat descended in order with the aggravation of process again to be increased. The introduction of sulfidine conducted to the insignificant incidence/drop in leukocytosis. A descent in the latter was noted on the 2nd day after the reception/procedure of sulfidine and continued to recovery or offensive of the new wave of meningitis when leukocytosis again grew.

Was noted a considerable descent in the quantity of segment-nuclear neutrophils, young and relating to stab neutrophile. Simultaneously slowly grew lymphocytosis, which reached sometimes to 45o/o.

Sulfapyridine therapy caused the suppression of myelopoiesis and relative to increased lymphopoiesis, which led to "favorable" leukogram, which could lead into deception of the doctor in attendance. Therefore to evaluation of the condition of patients according to the formula of the blood during treatment by sulfanilamides it is necessary to approach carefully.

Changes in the blood with encephalitides. In initial period is noted the decrease of the quantitative content of hemoglobin and erythrocytes, is observed poly-nuclear leukocytosis, frequently with the shift/shear of formula to the left, relative of lymphopenia. The stage of recovery is characterized by the decrease of a quantity of neutrophils.

The reaction of settling erythrocytes is frequently increased. The remission/abatement of process is escorted/tracked by the sufficiently prolonged delay of the reaction of settling erythrocytes.

In more detail the diagnostic value of the laboratory methods of

research is stated in the description of different complications (see special unit).

X-ray diagnostics of the bullet wounds of skull.

X-ray diagnostics of breaks of the bones of skull.

The roentgenological method of research with the bullet wound of skull was used for the first time in 1895. With purpose of the determination of localization of foreign body. During the subsequent years several authors, including L. L. Levshin in Russia in 1899., published unit observations. However, also into beginning of XX century this method did not have an even wider acceptance in military circumstances due to the low level of X-ray technology and inability correct to analyze the X-ray photographs of skull. The latter fact was frequently the reason for a large quantity of erroneous conclusions.

During the first world war the roentgenological method of research was applied for the diagnosis of the bullet wounds of head on the very restricted scales.

The government of tsarist Russia supplied army only with the minute quantity of X-ray equipment, and the roentgenological method

of research even in hospitals was applied rarely.

Page 151.

Despite not this the Soviet authors at that time completely correctly already estimated the value of the roentgenolcgical method of research with the bullet wounds of skull and they insisted on the need for the x-ray examination all of those wounded into head (A. I. Krymov, M. I. Ladygin, V. N. Shamov, N. N. Burdenko, A. L. Polenov et al.).

At the beginning of the Great Patriotic War the development of radioanatomy of skull was almost completed because of predominantly Soviet researchers. Furthermore, Soviet roentgenologists paid considerable attention tc the X-ray diagnostics of non-gun damages of skull and to the identification of the late complications, appearing in skull and its contents after damages. Besides this, was developed the X-ray diagnostics of different pathological processes of brain by the method of artificial contrasting. At the beginning of the Great Patriotic War already was a durable base for the development of the X-ray diagnostics of the bullet wounds of skull.

During the Second World War in the foreign press it was not published not one deserving attention work, dedicated to the X-ray

diagnostics of the bullet wounds of skull. Especially should be emphasized the complete absence of works about the early X-ray diagnostics of the bullet wounds of skull. This testifies, first of all, about the low level of the setting of medical aid by wounded into skull in foreign armies in advanced stages of evacuation. The foreign authors cannot hide, that the primary perfecting of the wounds of skull and brain in the hospitals of the English (Lestron, Webster and Schneider) and mainly German (Schenbauer) army was very frequently carried out low-grade. Because of this foreign roentgenology were occupied predominantly by the X-ray diagnostics of different infectious complications of the wounds of skull. However, also this question in foreign literature is also illuminated very insufficiently.

In the hospitals of Soviet army necessary x-ray examination was carried out in all those wounded into head and it stored/added up from primary and control roentgenological examination/inspection.

Primary roentgenological examination/inspection preceded the primary perfecting of the wound of skull and it was carried out, as a rule, in specialized KhPPG, and also in the specialized separations/sections of army and front line evacuation hospitals.

Control x-ray examination in the overwhelming majority of the

cases was undertaken in the same installations 4-6 weeks after process/operation. The majority of wounded did not require the supplementary repeated research. Considerably less frequent - during the complicated course of wound - control research was conducted the previously period indicated and preceded the number of repeated, sometimes special research.

Primary research was carried out only via ordinary craniography, this procedure was applied also during control research. During the complicated course of wound widely were utilized the methods of artificial contrasting: encephalo-ventriculography, abscesso- and fistulography.

The purpose of primary x-ray examination consisted in the refinement of the pathcanatomical picture of wound, sufficient for deciding/solving a question about readings to surgical intervention, development of its plan/layout, and also for setting of prognosis and evacuation characteristic of wounded.

Pages 152-153.

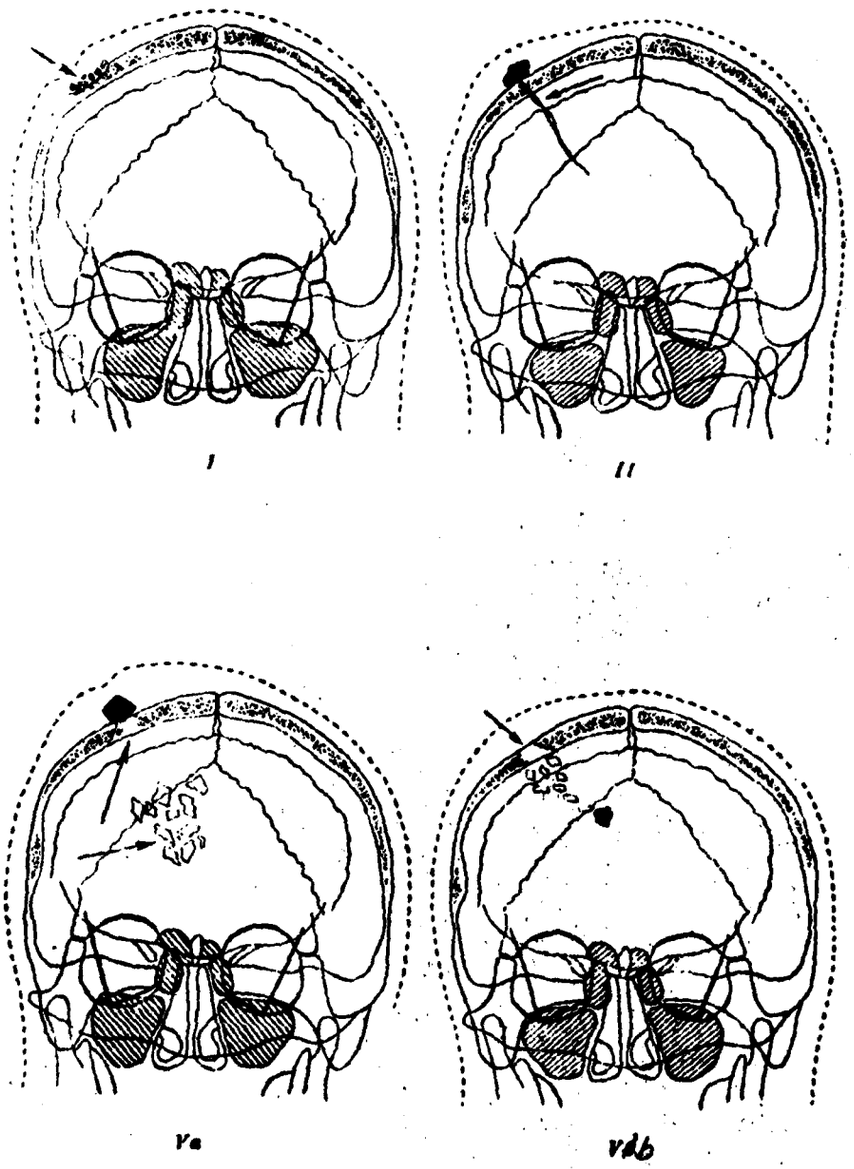
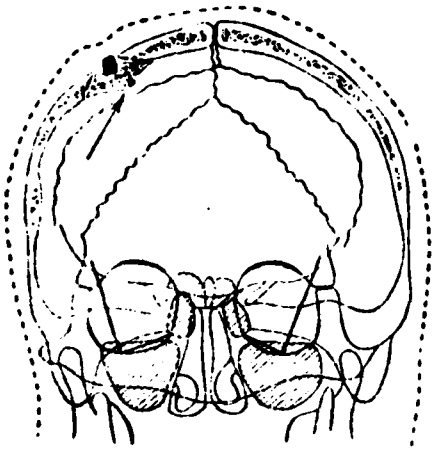
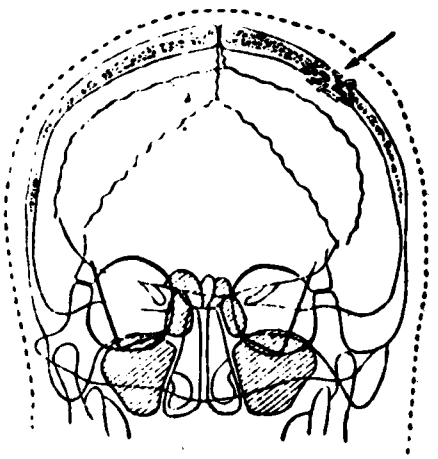


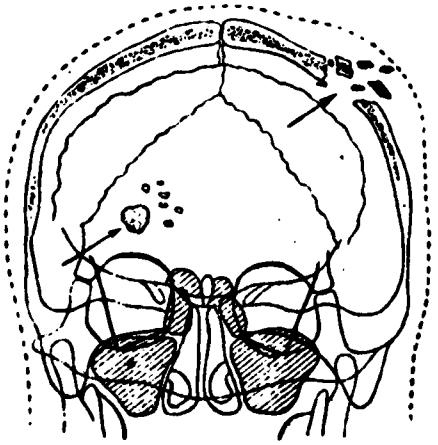
Fig. 31



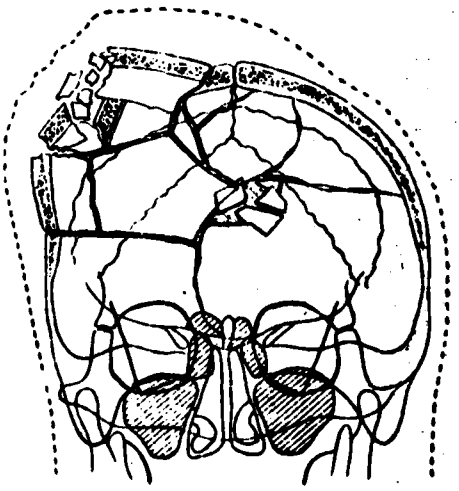
III



IV



V/C



VI

Fig. 31 C cont'd.

Fig. 31. Diagrammatic representation of the types of straight/direct bullet breaks. I - incomplete break; II - linear break; III - depressed break; IV - crushed break; Va, b, c - perforated breaks: a - perforated plumb break; b - perforated blind break; c - perforated through break; VI - comminuted break. In upper series/row are arranged/located the types of breaks, characteristic for the nonpenetrating wounds of skull. In bottom row are located the types of the breaks which are encountered only with those penetrating.

Page 154.

Because of this the data of prisary x-ray examination made it possible to carry out a most rational and rapid classification of wounded after their mass entrances. Of the development/detection of the basic condition/positions, necessary for judgment about the quality of the made process/operation and about presence or absence of conditions for the onset of different complications.

Tentative representation about the pathoanatomical picture of wound according to roentgenological data was comprised on the basis of development/detection of the type of the bullet break of skull.

The type of break is characterized by the specific

interrelations between the special features/peculiarities of the sector of the violation of the integrity of bone, the value of bone fragments, by localization of the wounding shell and by severity of wound. In latter/last concept was packed the representation about the penetrating or nonpenetrating character/nature of wound, about the degree of damage of brain, about the severity of clinical picture, about vital and functional prognosis, and also about the possibility of the subsequent complications and their character/nature. It was established that different types of bullet breaks pass a certain process of healing, to which are hidden the conditions for development of one or the other complications. The clinical X-ray observations and histological research showed that the healing of the wound of skull occurs via the edge/boundary inflammatory process which provides resorption and rejection/separation of all nonvital sectors of bone. This process is terminated by development closing plates, which connects the internal plate of skull from external and is occluded porous substance. Healing flows/occurs/lasts more rapidly with the even and smooth edges of defect in skull. Most rapidly heal the trepanation apertures and the bone defects of the insignificant value, which have subglobose form and smooth ones of edge.

The same process healings undergo over the more or less large/coarse bone fragments, which were separated/liberated from skull with wound, but not lost connections/communications with

periosteum. All small/fine scrap of bone, isolated from the periosteum, are nonvital; unit of them is resolved, another unit being necrotized, supports prolonged inflammation, which at infection it is inclined to convert/transfer into festering. If bone fragments are arranged/located superficially in the region of the defect of skull, suppuration is spread to the wound of bone and soft integuments. If such scrap of bone are located in the area of skull, the wound of its soft integuments can cicatrize very soon, and in the depth of cerebral substance is developed the inflammatory process, which leads to festering or development of massive ones Rubtsov.

The manufactured during the Great Patriotic War clinicoroentgeno-anatomical classification of the bullet wounds of skull is constructed on the principle of development/detection of the type of the bullet break of skull. This classification became the basis of the X-ray diagnostics of the bullet wounds of skull.

According to the classification indicated, are secreted direct and indirect bullet breaks of skull. The straight/direct breaks of skull appear in the place of the direct effect of the shell; indirect - are developed under the effect of the secondary effect of shell on more or less considerable distance from the region of its direct effect.

Page 155.

Are observed 6 types of the straight/direct bullet breaks of the skulls which are arranged/located with respect to the growing severity of wound as follows (Fig. 31): I - the incomplete break; II - linear break; III - depressed break; IV - crushed break; V - perforated break, which is divided into three forms/species: a) plumb, b) with blind and c) through; VI - fragmented break.

Among the indirect bullet breaks of skull are distinguished two types (Fig. 32): 1 - the continued break and 2 - the distant break.

Incomplete break is characterized by the damage of external plate and partially porous substance with the retention/preservation/maintaining of the integrity of internal plate. Bone fragments are insignificant in value and they are little displaced towards the outside from skull.

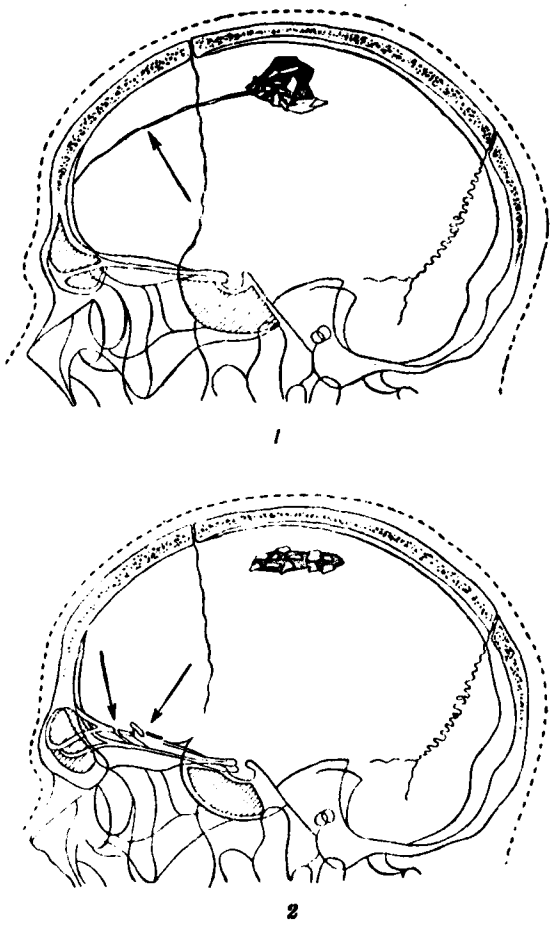


Fig. 32. Diagrammatic representation of the types of the indirect bullet breaks of skull. 1 - continued break (it is shown by arrow/pointer); 2 - distant break (it is shown by pointer/riflemen).

Page 156.

With this type of break the wound is always nonpenetrating. Without

the primary processing of wound the breaks of this type are frequently complicated by purulent fistula and considerably more rarely they lead to osteomyelitis. Incomplete breaks are observed with tangential and blind-end wounds.

Linear break is characterized by the presence of that isolated/insulated, usually short, crack, which crosses/intersects entire thickness of bone. Bone fragments it is not formed. with linear break the wound, as a rule, is nonpenetrating. With these breaks frequently are observed epidural hematomas. Without the process/operation of the primary processing of wound the breaks of this type are inclined to be complicated by osteomyelitis and festering of epidural hematomas. Linear breaks are observed with the ricocheting, blind-end and tangential wounds.

The depressed break is characterized by the disturbance of the integrity of an entire thickness of bone with education of one or, it is more frequently, several sufficiently considerable fragments which cave in into the area of skull at the depth, which does not exceed 0.5-3 cm by the center of the sector of damage. With the depressed break solid cerebral sheathing in the majority of the cases only is pressed by bone fragments and into 18.4o/o of cases it is only damaged by them. However, even with the penetrating wound cerebral substance suffers insignificantly. Without the process/operation of

the primary processing of wound fin the crowbars of this type are sometimes complicated by development of purulent fistula and by meningitis. The depressed breaks are observed with the ricocheting, blind-end and tangential wounds.

The crushed break is characterized by the presence of the sector of the decomposition of an entire thickness of bone, which is granulated to many small/fine fragments, which are disorderly displaced in the limits of several millimeters. In spite of the insignificant value of bone fragments and the insignificance of their shift, solid cerebral sheathing proves to be damaged into 30.8o/o of cases. The wound of cerebral substance during the penetrating damages is insignificant. Without the process/operation of primary processing the crushed breaks are invariably/unchangedly complicated by the development of prolonged festering which can lead to meningitis, epidural abscesses or to osteomyelitis. The crushed breaks occur with blind and tangential wcunds.

Perforated break is characterized by the presence of perforated defect in skull which is formed during the decomposition of sector its and considerable shift of bone fragments. With perforated break the wound is always penetrating and is escorted/tracked by the essential damage of cerebral substance. Depending on the series/row of the special features/peculiarities which are determined by the

mechanism of wound, perforated breaks are divided into three forms/species:

Perforated plumb break is characterized by most deep - to 6-8 cm and more - by the intracranial shift of bone fragments in the absence of foreign body in the area of skull. The basic wounding agent with breaks of this type are the bone fragments, which are always displaced perpendicularly, i.e. vertically to defect in skull. Without the process/operation of primary processing perforated plumb breaks are frequently complicated by abscess of brain and by meningitis. Breaks of this type are noted with the ricocheting and tangential wounds.

Page 157.

Perforated blind break is characterized by the presence of foreign body in the area of skull and by the more or less deep intracranial shift of bone fragments. Without the process/operation of primary processing perforated blind breaks are inclined to be complicated by abscess of brain, by meningitis and, it is thinner/less frequent, by encephalitis. Breaks of this type are only with blind wounds.

Perforated through break is characterized by the presence of two

defects of bones which appear with the perforating wounds of skull in the region of intake and outlet. In the region of inlet are small/fine bone fragments, displaced into the area of the skull; whereas in the region of outlet bone fragments are displaced towards the outside from skull. Without the process/operation of primary processing perforated through breaks are frequently complicated by meningitis, encephalitis and, it is thinner/less frequent, by the abscess of brain. Breaks of this type are observed only with perforating wounds.

The fragmented break is characterized by the extensive zone of damage, which envelops sometimes several adjacent bones, by the presence of predominantly large/coarse bone fragments and by their expressed shift towards the outside from skull. In the presence of fragmented break the wound is always penetrating and is escorted/tracked by the extensive damage of cerebral substance. Breaks of such type are complicated mainly by encephalitis and meningitis. The fragmented breaks are developed with the perforating, tangential and blind wounds of skull.

In the given classification are not taken into consideration isolated/insulated fractures of the internal plate which with the bullet wounds of skull are established/installed by a number of the authors. Such breaks during the Great Patriotic War are

radiographically discovered in 0.3o/o of all wounded with the nonpenetrating wounds of skull. During x-ray examination similar breaks are detected in photographs in the form of the sector of breaking up or depression of internal plate. These breaks were not taken into consideration in the classification, constructed on roentgenological data, in view of the fact that on the basis of x-ray examination them frequently it cannot be differed from the crushed and depressed breaks, since the latter with the insignificant sizes/dimensions of the sector of damage frequently are revealed/detected in tangential photographs only in the region of internal plate and are inaccessible to detection on external. Therefore the isolated/insulated breaks of internal plate during x-ray examination it cannot be recognized; usually they are diagnosed as the depressed or crushed break.

The indirect bullet breaks of skull are uniform.

The continued break is characterized by the presence of crack, which begins from the zone of straight/direct break and cross/intersect one or several adjacent bones.

The distant break is characterized by the presence of crack or, it is thinner/less frequent; the sector of the breaking up of bones which appear to more or less considerable distance from the zone of

straight/direct break.

In the region of the indirect break of skull solid cerebral sheathing, as a rule, is not damaged, but sometimes are observed epi- and subdural hemorrhages and sectors of the contusion of cerebral substance.

The continued breaks are observed into 16.7o/o of cases of all straight/direct breaks of skull. The distant breaks are considerably thinner/less frequent - in all into 0.4o/o of cases of all straight/direct breaks. Furthermore, the distant breaks were discovered into 0.5o/o of those all cases, with which in the region of the direct effect of shell occurred the isolated/insulated damage only of soft integuments of skull. Sometimes of the bullet wounds of skull the appearance of the distant break, probably, is connected with the supplementary non-bullet wound injury which the wounded could obtain with the incidence/drop.

Page 158.

Great value for clinic have straight/direct breaks, since they are encountered most frequently and in the overwhelming majority of the cases is determined vital and functional prognosis. Furthermore, the dissemination of infection, as a rule, occurs into the zone of

straight/direct break and operational intervention also it is conducted in this region. Therefore a diagnosis of the straight/direct break and its type is most important for clinic. However, indirect break also must be in proper time identified and correctly evaluated, since in certain cases the series/row of the special features/peculiarities clinical coursing of the wounds of skull and brain is explained by the presence of the associated changes in the region of indirect break.

During the Great Patriotic War during the primary x-ray examination of those wounded into skull, first of all, they tried to establish/install, was disrupted the integrity of skull and its soft integuments in the region of wound or far from it. In the presence of break was determined its type and by this was supposedly solved a question about the condition of solid cerebral sheathing, about the degree of the damage of cerebral substance and about the character/nature of possible complications.

Was established/installed precise anatomical localization of the region of break, displaced bone fragments and foreign bodies. Furthermore, were determined the special features/peculiarities, deserving the individual attention: the wound of the paranasal sinuses and ear, the possibility of damaging of venous sinuses, branches of tunicary artery, cerebral ventricles, etc. Simultaneously

was established/installed the mechanism of wound. The latter was determined X-ray anatomically with large accuracy on the basis of the analysis of value, form and quantity of sectors of the disturbance of the integrity of bone, value of bone fragments and direction of their shift, presence of foreign bodies and their localization and presence of the associated cracks.

The given above data determine those strong points on the basis of which during control x-ray examination was estimated the quality of the primary processing of the wound of skull and was determined the possibility of develcpment of complications and their predicted character/nature.

After the full-valued primary processing of the wound of skull during control x-ray examination must be discovered any bone fragments or available to distance/separation foreign bodies. Exception are the fragmented breaks with which frequently in wound can be left the large/coarse bone fragments, which maintained viability and arranged/located out of area skulls.

The trepanation defect, which remains after surgical intervention, must possess even, smooth edges which through 5-6 weeks are covered/coated with closing plate. In the presence of the uneven edge of bone with the sectors of crushing it is possible to expect

the considerable delay of the process of the healing of wound and development of osteomyelitis.

The presence of the superficially arranged/located bone fragments indicates that to the healing of the wound of the soft integuments of skull will be required very much time, moreover is possible the formation of purulent fistula. The presence of bone fragments in cerebral substance speaks about the possibility of the developments of the abscess of brain and massive Rubtsov, which sometimes lead to epilepsy. The presence of metallic foreign bodies in cerebral substance also threatens with the development of suppurative processes and massive ones Rubtsov in late period.

Page 159.

More precise information about the condition of cerebral substance and about the character/nature of the developing in it inflammatory and degenerate processes is obtained with the aid of encephalo- and ventriculography.

Incomplete and linear breaks were observed predominantly in army and front line hospitals, the depressed and crushed breaks - also mainly in army and front line hospitals and in the specialized separations/sections of the hospitals of the near rear. Wounded with

perforated breaks were operated in the same hospitals, but then were evacuated and they composed bulk of the patients, who were being located undergoing medical treatment in the specialized rear hospitals. The fragmented breaks were observed predominantly in the foremost stages of evacuation and in a small quantity in the specialized hospitals of the deep rear.

Thus, a quantity of wounded with one or the other breaks of skull, traced by individual roentgenologists and neurosurgeons, was determined by ethane of evacuation on which worked this specialist. An absolute quantity of wounded with different types of the bullet breaks of skull considerably oscillated at different fronts and in the different periods of war depending on the character/nature of combat operations, on a quantity of soldiers, that bore protective helmet and, etc. Most rarely was observed linear break (0.8-1.0o/o of all breaks of skull), since with bullet wounds, in contrast tc closed trauma, the wounding shell exerts, first of all, the dividing/marking off, and not contusing activity.

The given materials illuminate the principles of the formation of roentgenological aid by that wounded the skull in the hospitals of Soviet army during the Great Patriotic War. These materials they show, what vast value Soviet roentgenologists gave to primary x-ray examination. The outcome of the bullet wounds of skull depends on the

correctly shown/rendered primary surgical aid, which in turn, to a considerable extent depends on quality and promptness of primary x-ray examination.

X-RAY DIAGNOSTICS OF THE DAMAGES OF BRAIN.

Craniography with the wounds of skull during the Great Patriotic War was basis, and in the number of army and front line installations only from the roentgenclcgical methods of the research of those wounded into skull in initial period.

The insufficiency of experiment/experience and theoretical development of this question dictated extreme restraint in the use/application of a contrast procedure of research in the initial period of the wound of skull and brain, when the damaged cerebral tissue and its blood and liquor system yet did not arrive to stable position/situation. However, need the decisions/solutions of the series/row of urgent diagnostic questions and frequently the insufficiency of neurologic and laboratory investigations forced to apply the roentgenological contrast diagnostic methods of their even ardent enemies. Pneumography in initial and early period wounds used in the unit cases. More frequently applied methods research with artificial contrasting cn the 2nd and 3rd month after wound.

Page 160.

In the number of installations in this case they widely used pneumography, especially by encephalography and thinner/less frequent than ventriculography. They were applied also abcessography and fistulography. Angiography for the research of those wounded into skull they used in the unit cases and then is exclusive in the late periods of the wounds of skull.

From X-ray diagnostic methods with the wounds of brain the exceptionally important value during the Great Patriotic War acquired the encephalography. This method not only enlarged and it deepened our representations about the pathology of brain with its wounds, but also made possible to study pathological processes in brain and liquor spaces in their dynamics; it enriched our knowledge by the series/row of new facts and representations which were not known to war. Encephalography contributed to the understanding of complicated interrelations in the pathogenesis of the phenomena, arising with the wounds of brain.

Abcessography as diagnostic method it was known even to the Great Patriotic War. During the war abcessography it began to be applied during the research of those wounded into head in connection with the proposition of S. I. Spasokukotskiy and A. N. Vakulev to

treat abscesses by punctures. Contents of abscess is driven out and is replaced by air or liquid contrast media (sergosin, iodolipol, torotrast). This method gave the possibility to determine form and sizes/dimensions of abscess, its anatomical-topographical position/situation, ratio of foreign bodies tc its walls. The repeated introduction of the new portions of air or the use/application of contrast substances, which long retain their properties in the area of the abscess (torotrast), it gave the possibility to control coursing of abscess.

However, besides the danger of the infection of the adjacent sectors of brain with puncture, in the method of abcessography was revealed/detected the series/row of other shortages. First of all it turned out that abcessography it does not reveal/detect abscess, but it only more precisely formulates some of its details. Dealing concerning the emptied single ulcer, abcessography not in condition to consider or to signal about other sometimes developing abcesses.

Fistulography, which with the bullet injury of brain was applied rarely, in the positive cases gives representation about the direction of fistula and the ratio to it of bone and metallic fragments. In the rare cases of fistulography and abcessography they detect direction and penetration of fistula ccurses not only into sub-arachnoidal or subdural space, but also into the ventricles of

brain.

Thus, the roentgenological method of research gave more or less reliable diagnostic information, providing the at the same time full-valued decision/solution of a question about advisability and method of surgical intervention.

The X-ray image of the picture of the damaged brain is characterized by great variety and depends on a number of factors: character/nature and degree of damage, form of pathoanatomical, pathophysiological and biochemical processes in the tissues, different in structure and physical to qualities, and also from the development of infecticus processes in brain.

With an entire complexity of process roentgenological method is restricted by visual representations and gives image only in two colors - black and by bel (in their different tones).

Page 161.

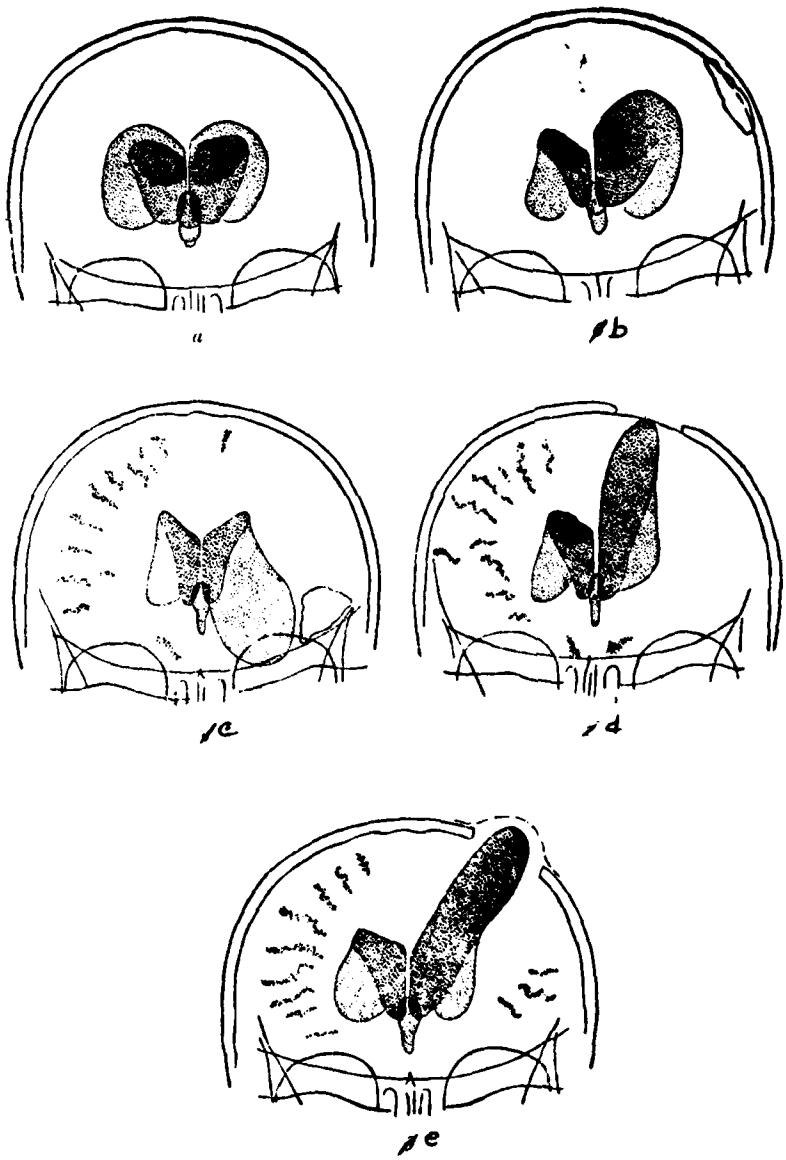


Fig. 33. A. Gidrotsefali's forms opened, internal. a) is symmetrical, b) asymmetric; c) regional; d) porencephaly; e) ventricle in the

protrusion of brain.

Page 162.

Criterion for judgment is the three-dimensional/space relationship/ratio of the shadows, which correspond to brain and liquor spaces. Their restricted by cranial box solid values are values conjugated/combined. It is possible to distinguish two kinds of a change in the volume of brain and liquor spaces: the forms, characterized by the decrease of the volume of brain and, therefore, by a corresponding increase in the liquor spaces (form A), and the forms, connected with an increase of the volume of the mass of brain and, therefore, with the corresponding contraction of liquor spaces (form B).

Forms A reflect/represent wrinkling, atrophic, degenerate, cicatrical changes in the brain and post-inflamatory changes in the stage of cicatrization with adhesive anachroidites or without them. The shift of ventricles and protrusion of their walls occur toward of pathological focus or process. Corresponding to these forms changes in liquor spaces can be joined into the groups, represented in Fig. 33, 34 and 35. In this section are connected arachnoidites, which take place with surplus storage of fluid/liquid (Fig. 36).

Forms B are roentgenologically reflected/represented by an increase in the shadow of brain (Fig. 37). Here are included hematomas, encephalitides, abscesses of brain, granulomas, bloating and edema of brain, arachnoidal and cerebral large-size cysts.

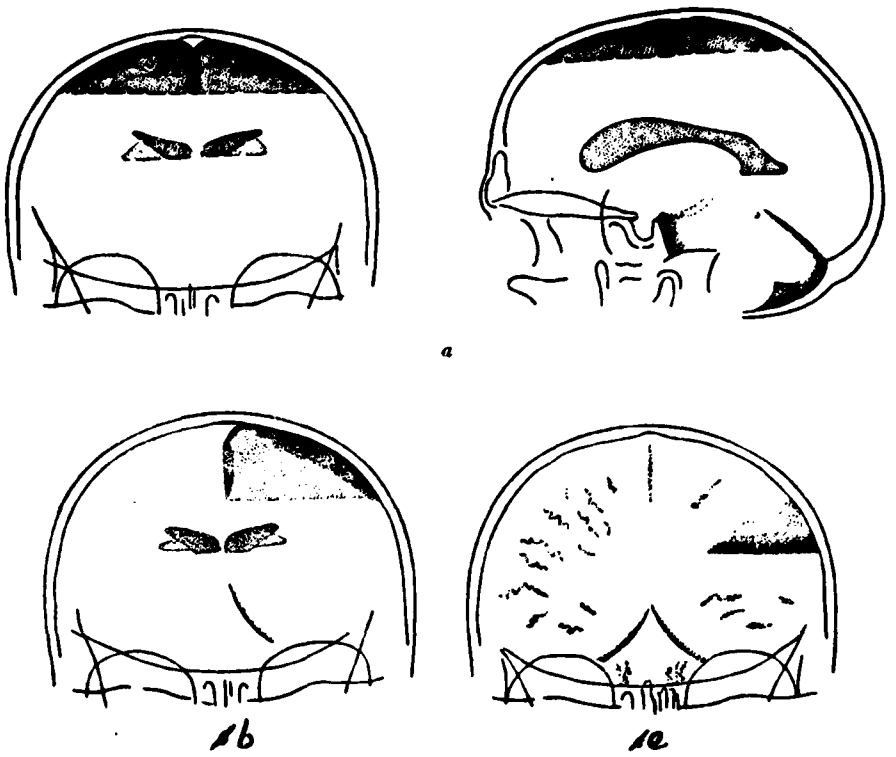


Fig. 34. Forms A. Hydroencephaly that opened, is external. a) is symmetrical; b) asymmetric; c) regional.

Page 163.

The appropriate changes in the liquor spaces indicate their contractions. Shift and depression of the walls of ventricle occur from the side of pathological focus or process.

According to topographical sign/criterion tunicary forms can be

divided into extra-cerebral ones and intra-cerebral ones, which are characterized: a) by contraction or closing/healing of liquor spaces (adhesive and Rubtsov processes) and b) by the expansion of these spaces (cyst-like, exuding processes). Here they can be encountered:

(1) Внемозговые—арахноидиты разлитые { а) слипчивые (1a)
ограниченные { б) кистообразные (1b)

(2) Внутримозговые -эпендимиты { а) облитерирующие (2a)
{ б) кистообразные (1b)

Key: (1). Extra-cerebral - arachnoidites spilled restricted. (1A). adhesive. (1b). cyst-like. (2). Intra-cerebral - ependymitis. (2a). obliterating.

Page 164.

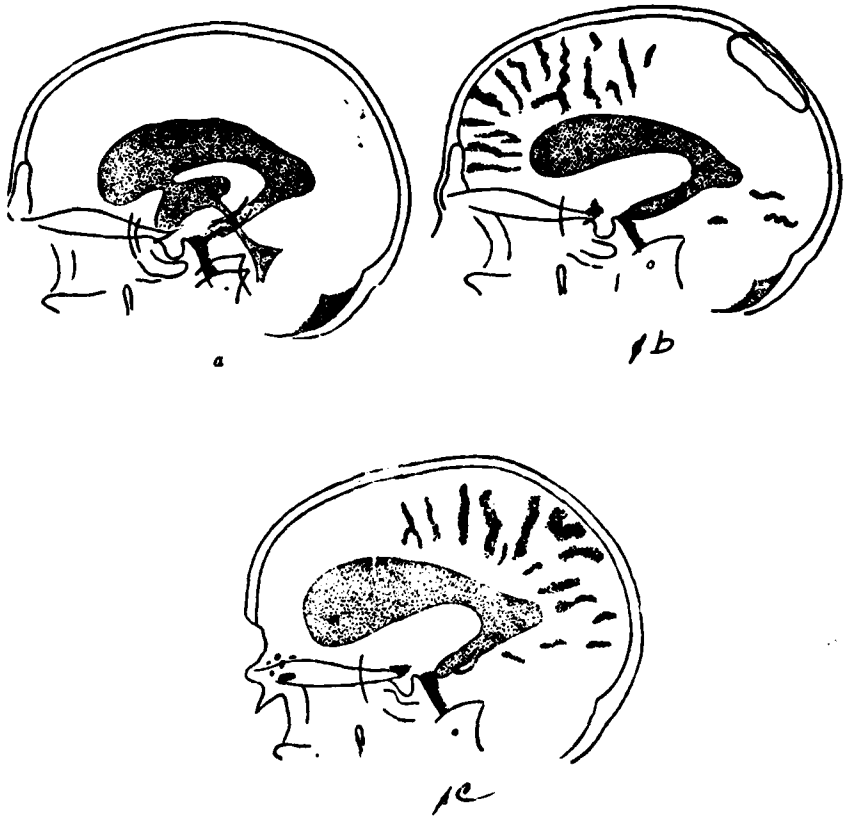


Fig. 36. Forms A of arachnoidites. a) spilled adhesive (internal aresorbtive hydroencephaly); b) the restricted adhesive; c) cyst-like.

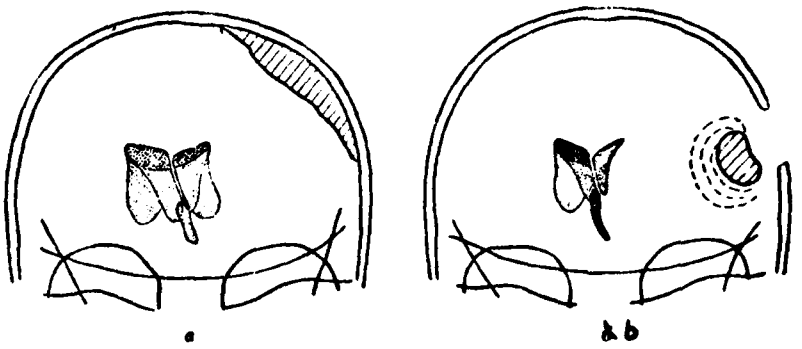


Fig. 37. Forms B. a) hematoma; b) infiltration, granuloma, abscess.

Page 165.

Roentgenologically they are reflected/represented by the complete or partial absence of sub-arachnoidal slots, by the decrease of the shadow of brain and by the expansion of ventricles. In the absence of the spilled adhesive phenomena and presence of exuding arachnoidite it can be escorted/tracked by the development of external regional of hydroencephaly with the education of large cyst-like intermembrane liquor accumulations with the decrease of the shadow of cerebral mass on encephalogram and without expansion or with the low expansion of ventricles.

Ependymitis after the wounds of ventricles during obliterating Rubtsovs's lifetime processes in them are reflected/represented by complete or partial non-extensibility of ventricle on encephalogram.

In the cases of limitation of any crescent of ventricle with the obliterating changes on one of its sectors is formed the cyst-like expansion of the blocked unit of the ventricle.

If is maintained connection/communication of the disconnected unit of the ventricle with its basic part, then this hydroencephalic expansion is revealed/detected by encephalography. It frequently is detected also with the aid of ventriculopuncture.

The series/row of the mentioned pathological forms can, depending on the stage of process, give reverse/inverse roentgenological pictures.

So, abscess in the period of its development, being escorted/tracked perifocal changes or bleating, roentgenologically gives the pictures of an increase in the shadow of brain and contraction or compression of ventricle or its crescent as during tumoral processes. And the same abscess in the stage of cicatrization is reflected/represented by the decrease of the shadow of brain and by the expansion of the adjacent liquor spaces, as a result of the development of asymmetric vicarious internal or external hydroencephaly. The same contradictory/opposite roentgenological pictures, which reflect one and the same process in the different stages of its development, can give encephalitis (picture of an

increase of the mass of brain in active stage and, on the contrary, the decrease of the mass of brain during the permission of process).

Page 166.

Chapter V.

GENERAL PRINCIPLES OF THE TREATMENT OF BULLET WOUNDS OF THE SKULL AND BRAIN.

Evolution of therapeutic aid with the bullet wounds of skull for the time of the Great Patriotic War.

During the Great Patriotic War at grandiose front were deployed combat of this scale and stress/voltage, what yet did not know humanity's history. In this unprecedentedly heavy war for Soviet military medicine it was necessary to construct the system of rendering aid by wounded under exclusively difficult conditions.

For the characteristic of the wounds of skull and brain during the Great Patriotic War it is possible to indicate that, based on materials of the maps/charts/cards of the deepened characteristic, 82.7o/o of wounds of skull were related to the fragmentation wounds,

mainly blind, and only 17.3o/o - to bullet ones.

Basic installations relative to treatment of the bullet wounds of the skull with which Soviet military medicine entered this war, completely corresponded to the contemporary condition of neuro-surgical speciality.

A difference in the Soviet installations from the principles of the treatment of those wounded the skull, manufactured during the Second World War in west, consisted in the fact that the Soviet military field surgery entered the war with the requirement of the treatment of the bullet wounds of skull only by the open method. Closing of wound tightly, for the first time used by Russian surgeon A. V. Britnev in large scales, was approved by many Russians and foreign surgeons. The advantages of this method, having already found wide application in the practice of the traumatology of peacetime, were not subject to doubt. However, Soviet military field surgery could not mechanically transfer the installations of peacetime under military field conditions and forced was negatively to be related the use/application of anechoic sutures with the wounds of skull, because it considered the unusually mass and stressed character/nature of the forthcoming battles with German hordes and the exceptional mobility of armies. To design in this case for the possibility of designing of the proper conditions for the imposition of anechoic suture with the

wounds of skull it was cannot. Taking into account, which perfecting the wounds of skull in this war it is necessary to charge and for young doctors, little familiar with neurosurgical principles, it was necessary to recommend simplest methods.

Page 167.

Could not be relied on the fact that the young doctors will know how to correctly individualize therapeutic-surgical tactics under complicated military field conditions, and therefore it seemed most safe and rational to propose as the leading principle - sewing bullet wounds of skull and brain.

In the course of the war when were already prepared experienced neuro-surgical cadres and was organized the clear system of neuro-surgical aid by wounded, was again raised a question about closing of the wounds of skull. The latter began be applied to widely first only with the wound of the soft tissues of skull, and then, when the corresponding conditions of combat and medical circumstances are present,, and with wounds with damage to bone - nonpenetrating and penetrating.

The second difference in the basic installations of Soviet military field surgery during the Great Patriotic War consisted in

the fact that the leadership/manual of Soviet military medicine entered the war, after creating the special system of rendering aid by that wounded the skull, in contrast the insufficiently defined concretely instructions in this direction of the military field surgeons of the western countries. This system rested on the creation of the individual companies medical reinforcing ORMU [separate medical reinforcement company]), in which were included the neuro-surgical groups, equipped with the appropriate instrumentation and equipment. Such groups of reinforcing, which are located at the disposal of the medical commanders of armies and fronts, being attached to the period of combat to surgical mobile/motile field hospitals (KhPPG), gave to them the profile/specialty of the specialized neurosurgical hospitals and provided the qualified neurosurgical aid to wounded the skull. If one considers that in each group of ORMU were included, besides neurosurgeon, even and the neuropathologist, roentgenologist, ophthalmolcgist and otiatrist, then in such KhPPG was created specialists' highly skilled group, which could render that wounded the skull proper medical aid.

Formed in this way specialized KhPPG was foremost center for care in the army area cf wounded with the damage of brain.

Transferring the specialized aid by that wounded the skull into specialized KhPPG of army area, the leadership/manual of military

medicine proceeded, on one hand, their special features/peculiarities of a comparatively slower development of infectious process in the substance of brain, and on the other hand - of the requirements of contemporary neurosurgery to perform perfecting the wound of brain after the most complete possible neurologic and x-ray examination of wounded and with his necessary subsequent prolonged hospitalization.

All these conditions are not completely feasible in foremost stage (in MSB and hospitals of the first line), where there is neither X-ray apparatus nor specialists. This position/situation made it necessary to publish directive that the wounded with the damages of brain would not undergo primary perfecting in area DMP, but possibly more rapidly they were evacuated into the neuro-surgical separations/sections of specialized KhPPG of army area. Exclusion from this rule/handspike was allowed/assumed only during the threatening life hemorrhage and the compression of brain. The directive indicated formed the basis of of the treatment of the bullet wounds of the brain some deferred primary perfecting thus their, transferring such under the conditions specialized hospital where to the wounded was provided the qualified aid of neurosurgeon, neuropathologist and other specialists, and also prolonged post-operation hospitalization.

In specialized KhPPG of army area had to be produced detailed study and classification of wounded with the damages of skull. Wounded, according to the character/nature of wound and due to general condition requiring immediate hospitalization or surgical intervention, remained here for the appropriate treatment. But the wounded, who due to their condition could transfer further evacuation, were headed without surgical intervention in the special separations/sections of the evacuation hospitals of the hospital basis of army or front. But if during neuropathological and x-ray examination, and also with surgical intervention finally it was established that the wound of skull is not escorted/tracked by the damage of solid cerebral shell, then such wounded sometimes could be directed from the specialized KhPPG into the appropriate army or front line hospital general-surgical profile/specialty.

From specialized KhPPG those wounded the skull had to be evacuated subsequently also "according to designation/purpose" into the specialized neurosurgical evacuation hospitals of front, and thereupon the rear of the country.

Thus, according to the plan of the main army medical administration of the Red Army during the Great Patriotic War were

provided the ordered system of the specialized neuro-surgical aid by that wounded the skull and the head brain, clearly formulated from the first day of war and resting on the specific authorized-organizational structure.

The affair of rendering aid by that wounded the skull in the Great Patriotic War passed several stages and continuously was improved both due to the theoretical generalizations and due to an improvement in the practical aid by wounded in proportion to gaining of experience.

In first the period of war occurred the mobilization of replenishments into the Red Army and the personnel procurement of the cadres of medical service by civil/civilian doctors, drafted from reserve. These doctors by wide wave were pourred into all therapeutic installations of the medical service of the Red Army. Among these doctors, together with old specialists, a considerable number composed the young people, who recently graduated from medical institutes. Young people did not have an experiment/experience. However, old specialists although possessed large practical period, in them already solidly were formed their own views on different questions, frequently they were the convinced followers of the specific schools and directions and we could not immediately assimilate the principles of single military medical doctrine. Both

those and, etc., equally burned to the wish to aid wounded soldiers, it was necessary in the course of war to retrain and to finish teaching. In the beginning of war was required doctors' considerable quantity for filling of authorized posts in all therapeutic installations of grandiose front, especially as specialists in this narrow branch of medicine as neurosurgery, was required much both in ORMU and into the specialized hospitals.

Furthermore, staffing therapeutic installations was impeded by an entire circumstances, which was created due to the perfidious attack in the USSR of immense ones, to the teeth of enemy's armed hordes, with a deep strategic withdrawal/departure of the troops/forces of the Red Army, with the evacuation of population, factories and plants, and also by the extreme g-force of the railway lines of communication/report.

Page 169.

This is why the correct organization of aid wounded generally and in particular by that wounded the skull in this first period of war ran into considerable difficulties.

In this circumstances at first of the Great Patriotic War, in spite of "instructions in accordance with military field surgery",

were required considerable efforts from the side of main army medical administration, in order to completely realize the outlined system of rendering to neuro-surgical aid by that wounded the skull. This was caused, on one hand, by the fact that in some military medical commanders and leaders of the surgical service of armies and fronts were still fresh in memory the installations of the positional warfare with White Finns, during which attempted to organize the surgical perfecting of wounds the skulls and brain in the foremost stages of evacuation. At the same time, the bulk of the called into army doctors, who did not have sufficient work experience under military field conditions, attempted to perform the primary perfecting of the wounds of skull within earliest periods, under conditions of MSB and KhPPG of the first line in order to prevent the development of infection in shells and substance of brain.

At numerous army and front line conferences in the beginning of war individual surgeons deposited need as early as possible, i.e., in MSB, to widely operate those wounded the skull. However, the sanitary and tactical circumstances of the Great Patrictic War, which deprived the possibility long to hospitalize after the process/operation of those wounded into skull in the therapeutic installations of army area and to ensure the detailed clinical examination/inspection of wounded by neuropathologist and roentgenologist, immediately made it necessary to refuse from similar tactics.

In the extremely stressed circumstances of the first year of war main army medical administration took all measures everywhere to realize of the idea of Soviet military medical doctrine and constantly in proportion to gaining of the experience to improve its different positions/situations.

Considerable difficulties were overcome in the process of the adjustment of the timely of the export of those wounded in skull from the therapeutic installations of army and army area, the evacuation of them it is strict in designation/purpose, deployments and equipment with the appropriate cadres of the specialists of the groups of ORMU and hospitals for those wounded the head, clear shaping of rear hospitals and filling with their appropriate groups of wounded, etc.

Only the harmonious work of the Soviet doctors, who burned by the wish to render full-valued assistance by wounded, made it possible in short periods to attain the organization of the ordered system of the specialized aid.

However, let us point out below to the individual defects the primary of perfecting technique of the wounds of skull and brain,

which required urgent elimination during the first days of war.

Some general/common/total surgeons of army area, little familiar with neurosurgery, attempted to sometimes perform perfecting the wounds of skull by wide flap section/cut or extensive carving of the wound of soft tissues with the education of the so-called "five-kopeck coins", which subsequently led to osteomyelitis of skull. Perfecting the wounds of skull was sometimes first of too surface, then of too radical, with the extensive rough traumatization of cerebral substance.

Page 170.

Not still surgeons knew how to stop hemorrhage from the wound of brain and inserted in it tampons, always without knowing how to regulate the processes of intracranial pressure increase and, etc.

These individual defects in the organization of neuro-surgical aid and in the technology of perfecting the wounds of skull in the first months of war led in the unit of the cases to the fact that the results of the treatment of the bullet wounds of skull and brain left to desire the best. Wounded the head brain, evacuated soon after primary perfecting, although they happily achieved the subsequent stages of evacuation and even rear hospitals, subsequently in unit of

them were developed encephalitides and abscesses of brain around the left in the depth of wound canal fragments. The wounded the soft integuments heads sometimes crossed from one stage of evacuation to another and they frequently achieved the deep rear with the festered, for long not healing wounds and the fistulas in depth of which frequently was determined the sequestrating bone plate or even metallic fragment.

Thus, in the first months of the Great Patriotic War again was confirmed the correctness of the principle, advanced by N. I. Pirogov, which indicated that "not medicine, and administration plays main role in a matter of aid by wounded and by patient not the theater of war".

The main army medical control of the Red Army, which was persistently striving the clear organization of the specialized neuro-surgical aid by that wounded the skull, carried out the series/row of special measures. Questions of the treatment of the bullet wounds of brain thoroughly were discussed at numerous army and front line conferences and plenums of academic council. During main army medical administration was created special inspectorate for neurosurgery, and subsequently leadership/manual of it was charged to one of the deputies chief surgeon of the Red Army. Are again given clear instructions about the cessation of perfecting those wounded

into skull in MSB and KhPPG of the first line without vital to that readings and is confirmed the requirement to urgently evacuate them compulsorily according to designation/purpose into specialized KhPPG. Considerable attention was turned to the selection of cadres into the neuro-surgical groups of ORMU, moreover neurosurgeons' deficiency/lack was compensated by the at first fact that those wounded the skull operated the general/common/total surgeons, but it is compulsory with experimental neuropathologist's consultation.

Some neuropathologists, after being mastered with the surgical technique of perfecting the wounds of skull, themselves stopped for operating table. Furthermore, from the second year of war, first in Moscow and Leningrad, and thereupon in other large centers, were organized the short term courses to which young military surgeons in the course of several months successfully mastered the basic principles of military neurosurgery and neuropathology.

All these measures made it possible to rapidly remove the observed in the first period wars deficiencies/lacks in the affair of the treatment of the bullet wounds of skull. Instead of the numerous heterogeneous groups of the civil doctors of the different specialities, which were striving to individually carry out the ideas of the most diverse schools and directions, in the military medical service of the Red Army in short periods was created the

powerful/thick collective of medical workers, joined under the single doctrine of military medicine, harmoniously it is selfless working above conducting of the specific system of rendering aid by wounded.

Page 171.

The military medical commanders and the surgecns of fronts and armies, after being convinced of the irrationality of the operational perfecting of the bullet wounds of skull in army region, attained that the surgeons of MSB ceased to operate thcse wounded the skull, with exception of the special cases.

The aforesaid is wonderfully illustrated by decrease with each year of the war of a quantity of wounded the skull with damage bones, operated in MSB. Thus, fcr instance, during the first year of war in MSB were operated by 31.8o/o of those wounded the skull with the damage of bones, in the second year - 8.6o/o, in the third year - 1.2o/o and in the fourth year - 2.1o/o.

Those wounded into skull, that entered MSB, they began to more organizationally guide with special transport into specialized KhPPG. The system of the work of the neurc-surgical groups of ORMU gradually acquired ever larger and large definition. Sorting separation/section under neuropathologist's leadership/manual began to distribute

wounded by several groups. Wounded, subjects to urgent perfecting, after the X-ray analysis of skull in two projections were headed into operating room, in which was conducted perfecting the wounds of skull frequently on several tables. In post-operatien period these wounded remained for the specific period in the same hospital under the direct observation of neuropathologist and operated neurosurgeon. Henceforth the system of the post-operation content of wounded with the penetrating wounds of skull in bed during not less than 3 weeks solidly entered into the practice of all neurc-surgical separations/sections. It is important to emphasize that accumulated in the course of war the specially medical and organizational experiment/experience made it possible to deploy the necessary neuro-surgical aid by wounded under any conditions of military circumstances. After acquiring combat experiment/experience, the neuro-surgical groups of ORMU learned to wonderfully adjust their work, also, in tents, both in mud huts and in any urgently fitted out quarters/premises. This work was conducted continuously and into summer heat, and under pouring rain, and into winter frost and snowstorms, and with the raids of hostile aircraft.

In the second half war by the specialized neuro-surgical aid have already been provided not only the groups of the most heavily wounded with the penetrating wounds of skull, but also the specific categories of easily wounded with the damages of the soft tissues

which were inspected in the specialized hospitals. Correct neuro-surgical identification of this category of wounded, prophylaxis of complications in them and necessary timely surgical intervention made it possible rapidly to cure wounded the soft tissues skulls in the limits of army or front line area. An improvement in the neuro-surgical aid by that wcunded the skull from the second half the Great Patriotic War became to a considerable degree to grow/rise also due to the acquisition of experiment/experience, and due to the best maneuvering mobile field hospitals and neuro-surgical groups of OBMU. Army and front line medical commanders learned before combat to create sufficiently powerful/thick reserves cf specialized hospitals and corresponding groups of ORMU, maximally drawing it nearer before the offensive a line of combat so that during the advance of the troops/forces forward they could follow the troops/forces and provide rendering to the timely qualified aid all by that wounded the skull.

Further evacuation from the army area of those most heavily wounded the skull, after the outflcw of the period of hospitalization on the spot, was conducted by frequently ambulance aircraft.

Page 172.

With the same definition fixed was in the second half war the

work of the neuro-surgical separations/sections of the specialized evacuation hospitals of front line and service area. On many fronts and districts for more operational supervision of the quality of therapeutic aid by neuro-surgical wounded was created neurosurgeon's special post - the assistant to the chief surgeon of front or district.

The practical implementation of all measures indicated during the Great Patriotic War ensured creation in the Soviet army of the ordered system of neurosurgical aid by that wounded the skull.

Within the time of war was acquired immense experiment/experience, and are also prepared experienced specialists' cadres who provided therapeutic aid with that wounded the skull with respect to the requirements of neurosurgical speciality. In connection with this during the Great Patriotic War progressively was improved the quality of diagnosis and rendering to therapeutic aid with the wounds of the skull: the neurologic and roentgenological examination/inspection of the condition of wounded became more careful, the periods of the primary perfecting of wound they were reduced, perfecting was conducted more radically, was improved post-operation departure/attendance, etc.

This improvement in the quality of therapeutic aid with the

wounds of skull pronounced, naturally, both on the near ones and on the distant results of the treatments which during each subsequent year of the Great Patriotic War began progressively to be improved. In the confirmation of the aforesaid it is possible to give the series/row of illustrations.

On this one specialized KhPPG, periods the deliveries/procurements there wounded the skull and, consequently, also periods of the corresponding qualified aid changed in recent years of war as follows (Table 19, in percentages).

According to the report data of one front line surgeon (I. A. Zvorykin), an improvement in the organization of the specialized neuro-surgical aid was expressed in a considerable descent in the lethality with the wounds of skull with damage to bone (Table 20).

The correctly organized neuro-surgical aid gave for last 3 years of the Great Patriotic War a descent in the lethality with the wounds of skull almost two times.

D. G. Schaeffer, who is based on the extensive, well recorded and analyzed material of one rear district, which envelops 3000 penetrating wounds of skull, indicates that a quantity of late infectious complications with the wounds of brain descended by years per annum.

Table 19.

(3) Срок поступления раненых / (1) Год	1943	1944	1945 (4 месяца) (2)
(4) В 1-й день после ранения	18,0	43,5	53,3
(5) Во 2-й » » »	40,5	37,1	27,3
(4) В 3-й » » »	20,3	12,4	11,4
» 4-й » » »	8,6	3,8	4,0
» 5-й » » »	12,6	3,2	4,0

Key: (1). Year. (2). month. (3). Period of entrance of wounded. (4). During 1st day after wound. (5). In.

Page 173.

Thus, for instance, during the first year of war the abscesses of brain are noted into 7.2c/o of cases of all penetrating wounds of skull, in the second year - into 3.8o/o, in the third year - into 4.7o/o and in the fourth year - into 3.5o/o of cases. Kh. I. Garkavi, having in detail studied 2617 cases of the wounds of skull, which passed through the rear neuro-surgical center, indicates that a number entered into rear neuro-surgical hospital of those wounded the skull, not obtained primary perfecting the preceding/previous stages, descended from year to year: if during the first year of war a number of such wounded composed 32.0o/o, then in last year it was lowered to 2.4o/o (Fig. 38).

The quality of finish of the wounds of skull with each year of war also progressively was improved, which is clearly represented in Fig. 39.

With respect to the larger envelopment of those wounded into skull by primary perfecting and to an improvement in its quality progressively was decreased a number of late infectious complications (Fig. 40).

The more timely and more radical surgical perfecting of the wounds of skull considerably decreased a number of the fatal results in service area (Fig. 41).

Table 20. Lethal outcomes with the wounds of skull in the stages of evacuation (in percentages).

(2) Этап эвакуации \ (1) Год	1943	1944	1945 (4 месяца) (3)
МСБ	22,4	19,3	13,2
ГБА	33,7	16,9	16,8
ГБФ	6,1	5,3	3,5

Key: (1). Year. (2). Stage of evacuation. (3). month.

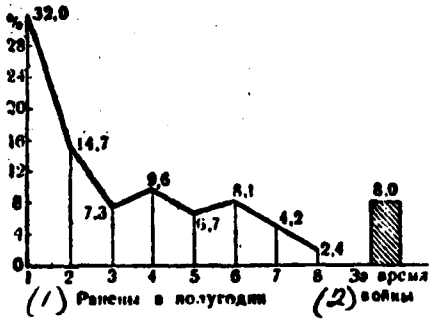


Fig. 38. Absence of perfecting wounds of skull and brain (on half-years of war).

Key: (1). They are wounded in half-year. (2). For time of war.

Page 174.

The given data wonderfully illustrate the progressive evolution

of therapeutic aid by that wounded the skull, which occurred in different periods of the Great Patriotic War in connection with the clearer conducting of the systes of the specialized neuro-surgical aid with the wounds of skull and brain.

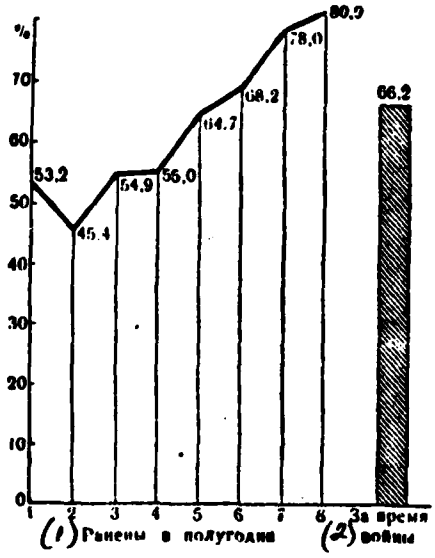


Fig. 39. Distance/separation of bone fragments during primary perfecting (on the half-years of war).

Key: (1). They are wounded in half-year. (2). For time of war.

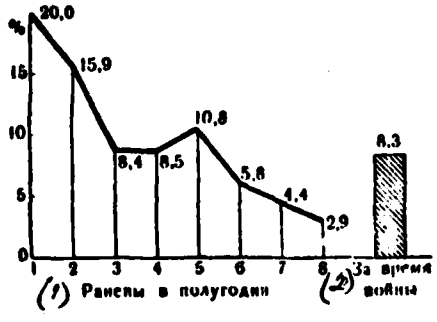


Fig. 40.

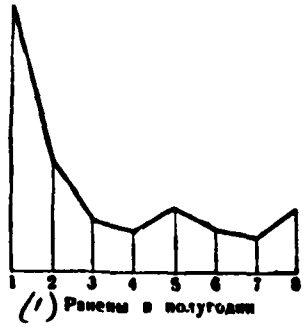


Fig. 41.

Fig. 40. Abscesses of brain in all stages of treatment (on half-years

of war).

Key: (1). They are wounded in half-years. (2). For time of war.

Fig. 41. Curve of lethality in latter/last stage of treatment (on half-years of war).

Key: (1). They are wounded in half-year.

General/common/total principles of perfecting the wounds of skull.

The experiment/experience of the Great Patriotic War showed that all wounded the skull are subject to surgical treatment, with exception of those having the very surface wounds only of skin of head, without an injury of aponeurosis, and also extremely heavy inoperable wounded.

Page 175.

To a number of latter after being related wounded the skull with the sharply pronounced hanger-on symptoms, by the disorders of respiration (of type of Cheyne-Stokes and Kussmaul), by the heavy degrees of shock or blood loss, to complications from the side of the lungs (longitudinal pneumonia), and also by the large destruction of

skull and brain, incompatible with life.

Primary surgical perfecting of the wounds of skull gives the best results, if it is conducted within earliest periods after wound. However, the complicated operational-tactical circumstances of the Great Patriotic War and the grandiose extent of the front frequently prevented the early delivery/procurement of wounded into skull into specialized KhPPG or specialized evacuation hospitals armies. Furthermore, or the expressed phenomena of shock the primary perfecting of the wounds of skull within early periods always was not shown. Taking into account all this, and also certain stability of brain to infection, it was necessary in the course of war to allow the primary perfecting of the wounds of skull and brain within later periods. Perfecting the wounds of skull, produced into the first three days from the moment/torque of wound, was called early primary perfecting, and the process/operation, undertaken in time from 4 to 6 days after wound, by many surgeons was defined as the deferred primary perfecting. Surgical interventions on the unfinished wounds of the skulls, produced after 6-7 and more than days after wound, they were named late perfecting.

The purpose of primary surgical intervention on skull consisted in the radical emptying of the contained wound canal in brain, distance/separation of all bone and accessible metallic fragments,

along with the carving of the wound of soft tissues and perfecting of bone.

Exception were wounded with the sharply infected wounds, if it was necessary to operate them within later periods - 7-10-12 days after wound. In such cases perfecting of wound was limited by the carving only of soft tissues and bones, without intervention on deep departments of brain. The basic goal of this perfecting of wound - creation of a good outflow. Subsequently, which the delimitation of infectious process in cerebral wound, in such cases was necessary to resort to reworking of wound already within later periods, after 1-2 months after wound.

The experiment/experience of the Great Patriotic War made it possible to manufacture in the final analysis the typical technique of the primary perfecting of the wound of skull and brain. Before the process/operation to wounded shave off the hair and is conducted the cautious washing of head by warm water with soap or dilute solution of ammonium chloride. The shave of hair is conducted all over surface of head to avoid the survey of the small/fine wounds of skull, which have the frequently penetrating character/nature. Before the process/operation the wounded obtains luminal, chloralhydrate or injection of the solution/opening of morphine.

Experiment/experience showed that the process/operation of the primary perfecting of the wound of skull usually can produce one neurosurgeon with assistance of the specially trained nurse. During process/operation it is necessary to follow the general condition of wounded and to have at call framing for the blood transfusion.

Instruments for a process/operation on skull are sufficiently fully represented in large surgical framing.

Page 176.

Most necessary they are: different form/species cutting pliers, oval spoon, mosquito clamps, thin and steep/abrupt circular needles of low sizes/dimensions, straight/direct tweezers with long branches or nasal bent tweezers, special cerebral shears, which can be substituted bent by ocular ones by shears, and also manual trepan with set of cutters. It is necessary to have a sufficient quantity of warm physiological solution, weak antiseptic solutions/openings (Rivanol, etc.) and peroxide of hydrogen. For the washing of wound usually is applied rubber cylinder. Perfecting operating field is conducted by ordinary methods - gasoline or ammonium chloride, and also iodine.

Anesthesia local 0.25o/o or by 0.5o/o solution of novocaine.

Hexenal or another form of narcosis was applied in the unit cases, with the strong degrees of excitation of wounded.

When selecting of section/cut it was considered the form of wound, its disposition, radial guiding of vessels and nerves, and also cosmetic considerations. Section/cut usually was selected bordering, curved. The through wounds, which had the short skin navigation bridge, were cut all over by single section/cut. Flap sections/cuts during war, as a result of the considerable bacterial contamination of the wounds of skull, barely were applied.

By the wound only of soft tissues the carving of wound was conducted in layers, with purpose of the retention/preservation/maintaining periosteum, if the latter was not damaged and it was not indications of damage to bone. The excessive exposure of bone, as showed the experiment/experience of the first year of war, always is created complications itself of osteomyelitis. When the established/installed defect of bone is present, the carving of the wound of soft tissues was conducted immediately at entire depth of up to bone (Fig. 42). During a similar section/cut the hemorrhage from the vessels of soft tissues stopped at first by pressing skin by fingers/pins against bone, and then vessels were bandaged. The cut all over tissues were usually driven out immediately together with periosteum. The latter still somewhat was

scaled to periphery for more convenient disarrangement of bone.

Bone wound was processed usually by the resection method. Osteoplastic method under military field conditions did not find use.

The incomplete breaks of the bones of skull, in the form of surface scratches, hollows, etc., were processed by usually acute/sharp spoons with the alignment/levelling of the applied defect of bone, with giving of navicular form to it. In this case within early periods had to be conducted the anechoic occlusion of the wound of soft tissues and processed similarly of incomplete break.

During abundant impregnation the blood of diploethic layer or with the scaling of internal plate it was necessary to resort to complete trepanation, for which sometimes along with defect was laid with the aid of cutter the aperture. The isolated/insulated cracks of the arch/summary of skull without hiatus and visible contamination (hair, mud/contamination, small pieces of head-gear) were not trepanned, if it was not the data about the presence of intracranial complication. With the depressed breaks without considerable displacement was laid cut aperture in the adjacent sector of undamaged/uninjured bone, from which was conducted the trepanation. This trepanation in the periphery of defect was blackened with smoke subsequently by the removal of the single depressed conglomerate of

bones en block with its cautious peeling from the surface of solid cerebral shell. In all cases, with exception noted above, and also the breaks, which were being escorted/tracked by the wound of average/mean tunicary artery or venous sinuses when trepanation it was necessary to also produce from periphery to the center of defect, was accepted the principle of biting through of the defect of bone from center for periphery - from the infected sectors of bone to undamaged/uninjured ones (Fig. 43).

The crushed breaks were cleaned with the aid of the Fol'kman spoon at first of the small/fine bone fragments of external plate, and then with the aid of tweezers from scrap of the internal plate of skull.

Page 176a.



Fig. 42. Stages of primary perfecting of wound of skull. Carving of the wound of soft tissues. (Artist T. V. Belyayev.).

Page 176b.

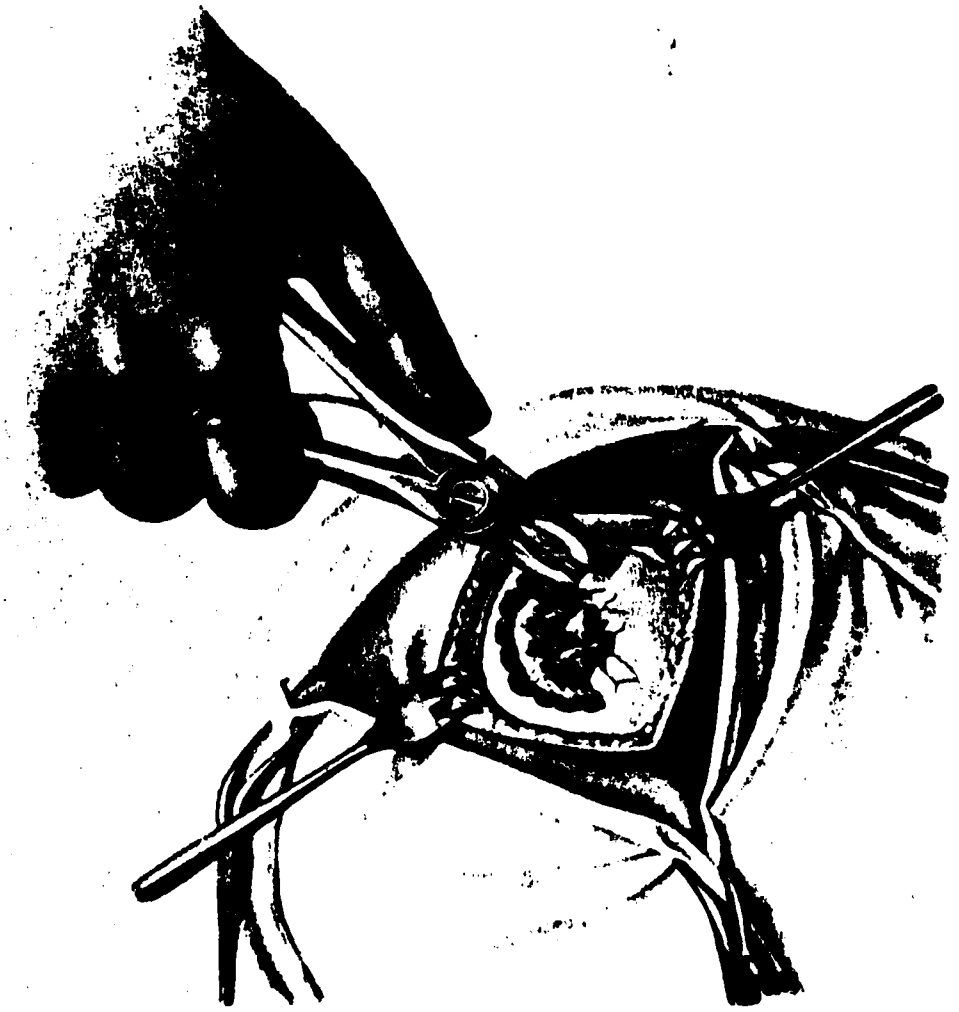


Fig. 43. Distrepanation of bone. (Artist T. V. Belyayev.).

Page 177.

The perforated and fragmentation breaks also at first were cleaned of free bone fragments and foreign bodies. Subsequently the defect of bone was consistently expanded by cutting pliers before the appearance of an undamaged/uninjured solid cerebral shell.

During the treatment by cutting pliers attention was paid to cautious introduction of lower branches between bone and solid cerebral shell to avoid the damages of the vessels of shell, pachyon granulations or cerebral cortex, and also danger of capture together with the bone of the edges of undamaged/uninjured solid cerebral shell.

High value was given to the accurate perfecting of the edges of the trepanation defect, imparting to it the subglobose form, which was achieved with the aid of Johnson cutting pliers.

With the trepanation of bone one ought not to have considered perfecting the cracks, exitting from defect, especially if they gaped. In these cases was conducted semi-oval carving of the beginning of the waste/exiting crack on 0.5-1 cm on the course by the latter.

With segmental type perforated through breaks, which had the small bone navigation bridge between intake and outlet with the short chord of wound canal, was driven out entire bone navigation bridge for warning/preventing the development of osteomyelitis. However, with the larger distance between intake and outlet the bone navigation bridge was retained, even if it was divided by connective crack. Subsequently this navigation bridge was occluded by the tissues of the integuments of head.

Perfecting through wounds, as a rule, began with inlet.

The small/fine perforated defects of bone with multiple wounds, if they were arranged/located closely each other, were connected into the overall trepanation defect.

Fragmentation breaks with the multiple cracks, which divide the large sectors of the arch/summary of skull into large/coarse bone fragments, considerably impeded trepanation. The distances/separations of all large/coarse bone fragments, which exit deeply under soft tissues and not lost connection/communication with periosteum, was not conducted, even if they were mobile/motile. In the similar cases they were limited to the refreshment of the edges of these large/coarse bone fragments, turned to the side of wound. With the accomplishment of this objective mobile/motile bone

fragments to avoid their disengagement from periosteum with biting through were preliminarily fixed/recorded by assistant bone by forceps.

Treatment of epidural space was reduced in essence to the distance/separation of bone fragments, foreign bodies and hematoma. The large sizes/dimensions of hematoma made it necessary to begin its cautious distance/separation with periphery in order, gradually approaching a center, to reveal/detect the source of hemorrhage. Frequently among blood clots were located the bone fragments, which occluded the lumen of the damaged vessel.

With the wound of average/mean tunicary artery or its branches, and also venous sinuses it was necessary to expand the trepanation window to the sizes/dimensions, making it possible freely to manipulate in wound. Only after this was driven out the center section of hematoma or the bone fragments, which occluded the lumen of vessel. The appeared hemorrhage rapidly was stopped by pressing vessel by fingers/pins.

Breaking out of basic barrel or large/coarse branches of average/mean tunicary artery was conducted by steep/abrupt circular needle compulsorily from both sides of stricken area, since it is necessary to stop hemorrhage, also, from of escorted/tracked this

artery two veins. Considerable difficulties were encountered with the basal wounds of temporal region, during damage a meningea media in the place of its entrance into the skull through foramen spinosum. In the similar cases it was necessary to previously form the trepanation window possibly below in order to obtain access to vessel from below and outside.

Page 178.

If it was possible, vessel was cloven around and was bandaged; in the contrary cases was conducted tamponade foramen spinosum by solid wax or small piece of bone. For this they usually used dental forceps with the bent ends of branches. The dressings of tunicary vessels began with the bringing end.

Tamponade of the average/mean tunicary artery of gauze, and also abandonment in the wound of different terminals gave poor results.

Hemorrhage from pachyon granulations or from venous sinus during the damage of its only upper wall was stopped with the aid of the small piece of muscle or galea aponeurotica.

The imposition of vascular suture on sinus was possible only with the narrow small defects of the edge of its or upper wall. With

the gaping breaks of two or three walls of venous sinus it was necessary to bandage it from both ends by strong silk ligatures, conducted around sinus with the aid of large steep/abrupt needle. If after the dressing of sinus hemorrhage was not stopped, there were ligated or were faced/trimmed the veins, inflowing into area of the damaged sinus.

In cases when the wound of skull was not complicated by the expressed hemorrhage from the vessels of solid cerebral shell, treatment of epidural space was comparatively light. After the distance/separation of bone fragments, including from under the edges of the trepanation window, the wound was thoroughly washed in weak antiseptic solution.

In the integrity of solid cerebral shell and the absence of data for submembrane hematoma solid cerebral shell was not revealed.

The unjustified autopsy of undamaged/uninjured solid cerebral shell made the nonpenetrating wound by the penetrating and thereby it deprived brain and submembrane spaces of natural defense from secondary infection. Only the growing phenomena of compression syndrome and the presence of subdural hematoma served as reading to the autopsy of undamaged/uninjured solid cerebral shell. After the emptying of hematoma the linear section/cut of solid cerebral shell

within early periods and with pure/clean wound sewed itself tightly, but if wound was infected, it remained opened.

Considerably more complicatedly was perfecting deeper units of the wound, capturing the tissues of brain. From the defect of solid cerebral shell carefully were driven out its filling bone fragments (Fig. 44). During the low sizes/dimensions of the defect of solid cerebral shell and at the same time deep disposition of bone and metallic fragments of the edge of the defect of solid cerebral shell carefully they were notched in radial direction for expanding the access into wound canal. After freeing "plug" of the narrow tunicary department of the wound canal (plug consisted of bone fragments, blood clots and detrite), they began the emptying of the most expanded, ampullaceous unit of the wound canal in cortex and subcortical layer of brain. Most rational tactics during war acknowledged the sparing methods emptying of wound canal with the aid of an artificial intracranial pressure increase, what was achieved at tussiculation or straining of wounded, and in the cases of his unconscious condition - by the compression of jugular veins.

With a similar procedure the contents of wound canal was secreted to the surface of wound and it was driven out. Combining this method with the washing of deep units of the wound from rubber cylinder, frequently it was possible to completely clear shallow

wound canal (Fig. 45). The washing of canal from cylinder required care in order by liquid jet not to produce a sharp the intracranial pressure increase.

The deeply arranged/located bone fragments with a similar procedure to surface were not moved.

Page 178a.

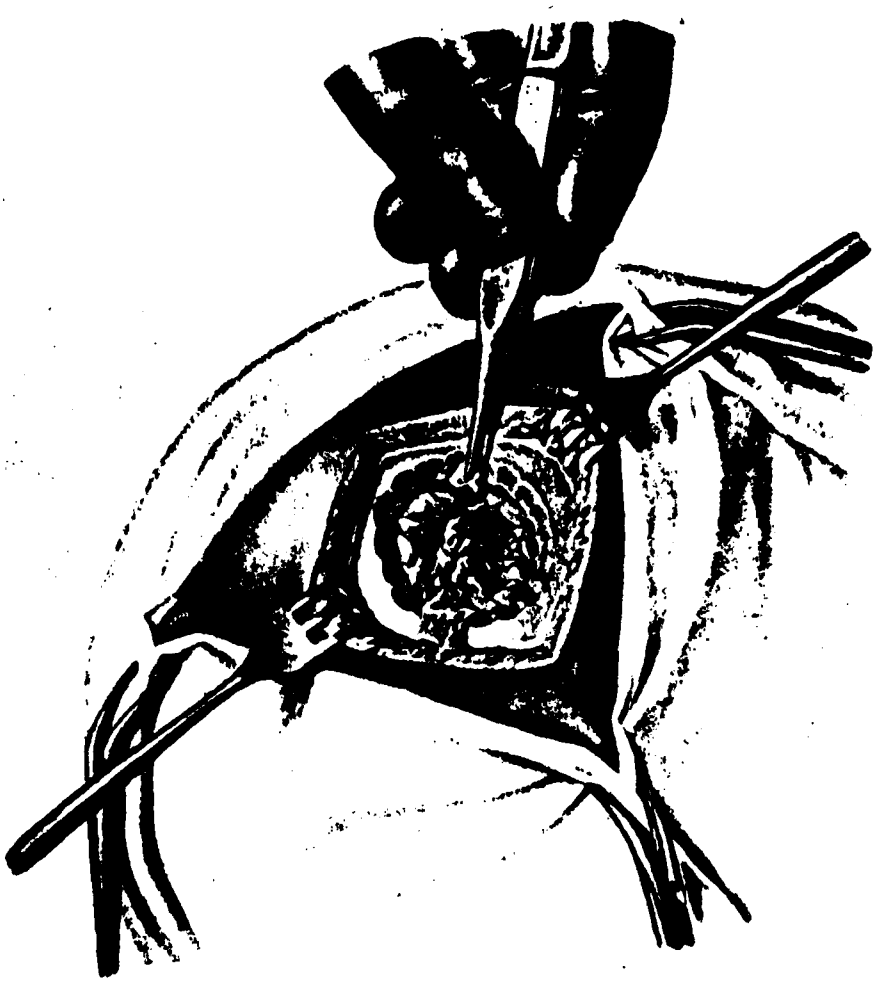


Fig. 44. Distance/separation of bone fragments. (Artist of T. V. Belyayev).

Page 178b.



Fig. 45. Washing of wound canal with distance/separation of small/fine bone fragments, blood clots and cerebral detrite. (Artist of T. V. Belyayev).

Page 179.

For their detection with sufficient sizes/dimensions of wound canal and pure/clean wound within early periods was allowed/assumed the very cautious examinatic n/inspection of wound canal by little finger. The introduced into wound little finger of surgeon made it possible to determine localization of the deeply arranged/located bone or metallic fragments. In this case the finger/pin carefully and passive followed along wound canal, perceiving its walls and foreign bodies. No attempts at the distance/separation of bone fragments or foreign bodies by finger/pin ("picking out") was allowed/assumed.

In the case of detection by the end of the little finger of foreign body into wound canal was introduced the tweezers with long branches by which was captured the fragment or foreign body and after the distance/separation cf finger/pin carefully it was extracted. Similar manipulations were repeated sometimes several times, to complete emptying contained wound canal. Sometimes bone or metallic fragments were arranged/located in wound canal fan-shaped, creating several courses in cerebral substance. The comparison of the data of X-ray photograph with the perceptions of finger/pin made it possible to reveal/detect all wound canals and to empty them. The high

sensitivity of finger/pin made it possible to easily determine even small/fine bone fragments ("bone sand") on the walls of wound canal. In this case turned the attention also to the distance/separation of the displaced under the surface of solid cerebral shell small/fine bone fragments.

As the index of quality of the radical primary perfecting of the wound of brain served the distance/separation of all bone fragments and available metallic foreign bodies.

During war as a good working scheme during the determination of readings to the distance/separation of foreign bodies served the separation of perforated blind breaks into four basic types. With the simple type of perforated blind break the foreign body was subject to distance/separation, since it was arranged/located at the depth of 3-4 cm in the limits of the damaged portion. With radial type the foreign body, which is arranged/located in falx cerebri, was subject to distance/separation only with the sufficiently wide and gaping wound canal. The narrow wound canal and especially the wound of ventricle, which is frequently encountered with this type of break, are almost always made the distance/separation of foreign body impossible. With the segmental type of the perforated blind break when wound canal is passed into the adjacent portion of brain, the distance/separation of foreign body was possibly only with the

surface and short course of wound canal. With the diametric type when foreign body is passed according to the diameter through entire thickness of brain, the possibility of separating the metallic fragment from inlet was eliminated. The segmental and diametric types of perforated blind breaks under the condition of a good condition of wounded allowed/assumed the distance/separation of the superficially arranged/located foreign body through the laid contra-aperture in bone, in the place for the projection of foreign body. More frequent similar attempts were undertaken 1-1 1/2 months after wound.

Generally attempts at the distance/separation of the foreign bodies, arranged/located in the depth of brain, led frequently to excessive traumatization, to risky hemorrhages and even damages of ventricles, to what sometimes partly contributed absence according to one or the other reasons for roentgenological instructions. Therefore the demand of some neurosurgeons of the service area of the widest possible distance of foreign bodies from brain was insufficiently substantiated, since it did not consider working conditions in army and army area.

Furthermore, the searches/scannings of foreign bodies in the infected wound of brain were pregnant with different complications.

Page 180.

Missing.

Page 180a.

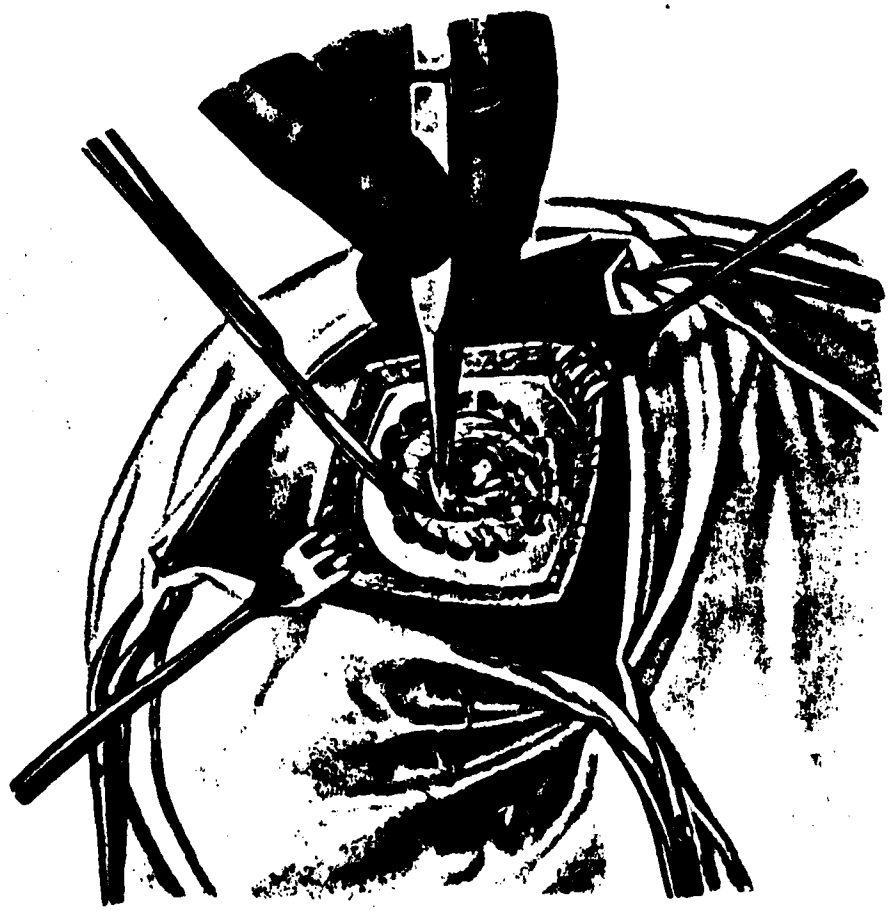


Fig. 46. Carving of edges of solid cerebral shell. (Artist T. V. Belyayev).

Page 180b.

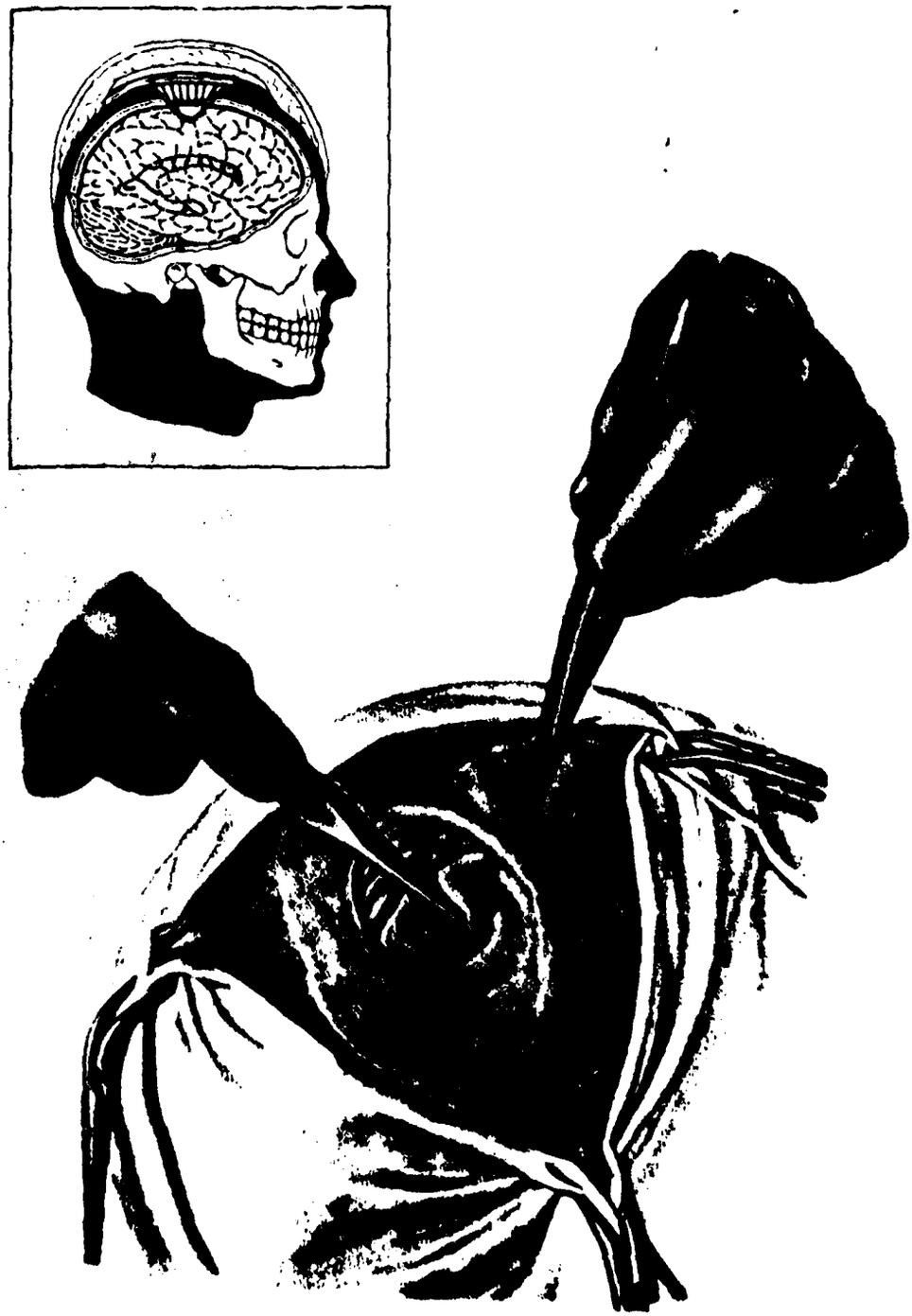
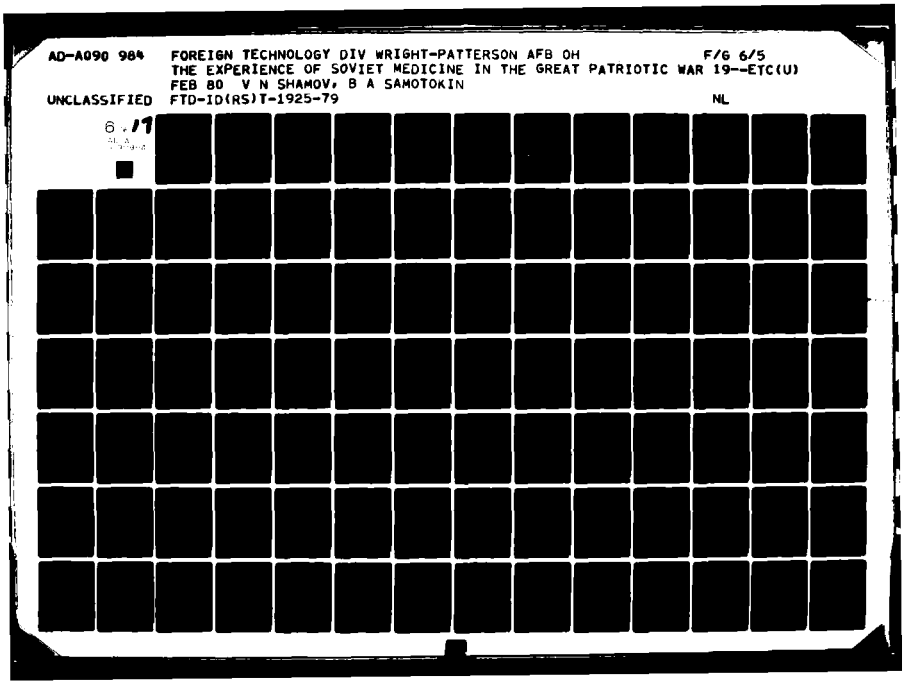


Fig. 47. Application of a dressing of the type Mikulich-Demmer-Goykhman. (Artist T. V. Belyayev).


AD-A090 984
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OH
F/G 6/5
THE EXPERIENCE OF SOVIET MEDICINE IN THE GREAT PATRIOTIC WAR 19--ETC(U)
FEB 80 V N SHAMOV, B A SAMOTOKIN
UNCLASSIFIED
FTD-ID(RS)T-1925-79
NL
6 .11


A
098

Page 181.

The wounds of posterior cranial pit in view of their severity required primary measures. Hemorrhage from transverse venous sinus stopped most frequently by the small piece of muscle or aponeurosis, and also by facing and dressing of sinus. Latter/last measures were less risky, than the dressing of posterior departments of longitudinal sinus. The danger of the development of post-operation and traumatic edema of brain forced to sufficiently wide trepanation of bone with the autopsy of the posterior sewing of large foramen, and sometimes also the arches of atlas. . All manipulations in the depth of cerebellum or Vermis must be extremely cautious. The outflow of cerebrospinal fluid from large postcranial tank ceased frequently independently under the effect of developing traumatic edema of brain, sometimes nevertheless was required the anechoic occlusion of wound.

The described above general/common/total principles of processing the wounds of skull, naturally, in each specific case were modified. The basic condition, which affects the method of process/operation in the sense of its radicality, was the sharp

infection of the wound of brain within late periods after wound. In similar cases it was necessary to be limited to processing only the wounds of soft tissues and bone in order to create conditions for a good outflow from cerebral wound.

Toward the end of the war widest use received the following tactics: the pure/clean wounds of the soft tissues of skull within early periods sewed themselves tightly, moreover between sutures on 1-2 days remained graduate from glove rubber. The inflamed wounds conducted openly and after appropriate preparation were covered with secondary seams. The nonpenetrating wounds of skull, if they were processed to 1-2 days after wound and if conditions made it possible for wounded to remain on the spot, they flowed/occurred/lasted sufficiently smoothly with the sewtightly wound. However, in connection with the fact that the nonpenetrating wounds of the bones of skull usually it was necessary to process within later periods, frequently in GBA and GBF, appeared need the post-operation wound of news opened and only on the bearings/angles of it to lay sutures for the cover of the exposed bone. Wide distribution received in the similar cases the long-term bandages of Nikulich-Denner-Goykhman which during uncomplicated coursing remained on the wounds 12-14 days (Fig. 47).

The sharply infected wounds conducted under loose bandages,

impregnated

A with antiseptics or antibiotics. A good effect exerted bandages with hypertonic solutions. The use/application of emulsions with streptocide or sulfidine also received wide distribution at some fronts. Irradiation by quartz lamps contributed to the fastest cleansing and the granulation of wounds.

Penetrating wounds in essence conducted opened under long-term bandages, by limbers were applied different sulfanilamide emulsions. At the end of the war in the cases of the radical processing of wound into early periods and possibilities of prolonged observation of that operated on the spot received known dissemination the method of sewing of the soft tissues of skull tightly even with the penetrating wounds. Method this gave on the whole good results.

The plastic occlusion of the defects of brain during primary processing, and also the occlusion of the defect of solid cerebral sheathing under military-field conditions during the Great Patriotic War were hardly conducted.

Page 182.

General/common/total principles of the conduct of wounded with the damage of skull.

The basic point, which is determining the correct treatment of those wounded in skull is attentive observation of them with a strict observance of bed mode/conditions.

The duration of the bed mode/conditions of those wounded the skull during war was different and it depended on character/nature and severity of wound; however, the conditions of general/common/total mode/conditions were unique Those wounded the skull, especially the post-operation period, require silence and rest. In tents must be the sufficiently high temperature of air, since some wounded with the darkened consciousness drop from themselves blanket and they can catch cold themselves. The severity of the condition of these wounded in the skull forced especially attentively to control the cleanliness of bed, the state of preservation of bandage, the regularity of feeding, after the position/situation of the body of wounded in bed, by care of skin, overall cleanliness, etc. So that the wounded would not fall with cot, it it was frequently necessary to fence in special grids or stretchers. Heavily wounded required the individual care. It was necessary to bear in mind, that those wounded in the skull and in the head brain almost never complain, they lie/rest passive, and only attentive observation and care of them can ensure their recovery. To avoid the development of stagnant phenomena in the lungs it was necessary to change the position/situation of wounded in bed. Observation of the regular

function of intestine and of urination was one of the important moments/torques with care of wounded.

With expressed edema of brain and hypertension syndrome the high value has the elevated position/situation of head, and sometimes also the semisitting position/situation of wounded. On the contrary, with shock or cerebral hypotension to head is given low position/situation. Special attention turned to care immediately after process/operation, since were possible different unexpected complications in the form of hemorrhage, epileptic seizures, edema of brain, changes of the consciousness, vomiting, etc. In all cases of the wounds of brain attention was paid to that, so that the wounded would lie/rest on healthy/sound side.

The systematic research of the temperature of body and pulse during entire post-operation period was necessary. The experiment/experience of war showed that of high importance is continuity during the transmission of tour of duty by the service personnel. In the presence of this succession more easily recover the changes in the condition of wounded, and also is provided the faultless execution of therapeutic designations/purposes. The short morning conferences of nurses with all doctors' participation made it possible upon the shift/relief of tours of duty to introduce into the policy of affairs the interceding shift/relief, to plan/glide work,

in to also increase personnel's qualificiation.

Treatment of the post-operation wound of skull. During the Great Patriotic War was accepted the principle of the tamponage-free treatment of the wounds of skull and brain. The dusting of wound in the end of the process/operation by the powder of sulfanilamide preparations or the use/application of emulsions of them made it possible to change the bandage through several days, which contributed smooth coursing wounds.

Immediately after process/operation was established/installed observation of the bandage; if it got wet, was conducted bandaging. Attention was paid to the fact that developed soon after process/operation edema of the soft tissues of head could produce sharp pains under dressing. In the similar cases it was necessary to re-bandage patient and to more weakly lay bandages. So that the bandage would not be displaced, it compulsorily should have been fixed/recorded under chin. The form/species of the bandage, laid during process/operation, depended on the condition of wound, period of process/operation from the moment/torque of wound, character/nature of processing and possibility of prolonged observation of wounded after process/operation.

Page 183.

The anechoic occlusion of wound forced to careful observation of coursing of wound process. Usually on the second, and sometimes on the first day after process/operation it was necessary to make a dressing and to inspect wound. In the absence of significant discharge and inflammatory reaction of tissues rubber esissary was driven out and provisory suture tied itself. Subsequently, if process proceeded quietly, i.e., there are no symptoms of infectious complications from the side of brain and its sheathings, descended temperature, was decreased edema of the soft tissues of head, was improved the health of wounded, bandage was not relieved 7-8 days, i.e., to the moment/torque of removing/taking the sutures. Otherwise with festering it was necessary to more frequently inspect wound, to remove/take partially cr completely sutures and expand wound.

In the suppressing number of wounded during process/operation the wounds were not tightly --- sewn. During the radical processing of wounds and in the cases, if the infection of wound was blurred, many surgeons applied a long-term bandage of the type of Nikulich-Denner-Goykhman. The latter with nonpenetrating wounds was not relieved to 2 weeks, but with the penetrating wounds - to 3 weeks. As reading to the distance/separation of many-day bandage earlier than period served abundant purulent discharge from under

bandage, development of the protrusion of brain, and also infectious complications from the side of brain and its sheathings. During smooth coursing of process after the removal/taking of long-term bandage was opened the granulating surface of the solid cerebral sheathing, for complete healing of which still were required 1-1 1/2 months. This procedure made it possible to protect the wound of brain from secondary infection, facilitated the work of medical dressing room and gave the possibility to economize surgical dressing. Usually bandage during smooth coursing was removed/taken within 2-3 days before the evacuation of wounded.

The sharply infected wounds of brain conducted under loosely superimposed bandages. Dressings were done after 2-3 days, depending on coursing of process. Frequently in similar wounds appeared the protrusion of brain, during which was required careful care of wounded. Hemorrhagic-purulent and ichorous-purulen protrusions conducted under bandages with hypertonic solutions, the sectors of protrusion of brain were irradiated by quartz and thoroughly were guarded from random injuries, for which on wound was laid a wadded-gauze circular cylinder ("cracker"). The protrusions of brain, covered with necrotic films or purulent raids, conducted under the moist-desiccating bandages with weak antiseptic solutions. The granulating "benign" protrusions flowed/occurred/lasted well under bandage from the thick layer of the gauze, moistened by 5o/o

sulfanilamide emulsion on fish grease or castor oil. The frequency of dressings was determined by coursing of process and by character/nature of protrusion. During the "benign" protrusions of wounded they bandaged more rarely.

With outflow of cerebrospinal fluid from wounds were applied the urgent measures, which depended on the character/nature of liquorrhea. Subarachnoid liquorrhea conducted under long-term bandages with their periodic rewinding. In the relation to wounded with ventricular liquorrheawith pure/clean wound frequently was placed a question about the imposition of the deferred anechoic sutures. Ventricular liquorrhea fistulas from the protrusions of brain in the end of the war was proposed to conduct under the cellophane leaflet which made it possible to irradiate the sector protrusion of brain by the quartz and thereby to accelerate the development of granulations.

General theraputic measures.

Page 184.

In post-operation period frequently was observed expressed traumatic edema of the brain which indicated the headaches, frequently blackout or loss of consciousness, general/common/total unresponsiveness of

wounded, the delay of pulse, change in the respiratory rate, extinction of reflexes, etc. With such phenomena of the increased intracranial pressure was required the use/application of dehydrating therapy. Rapid and sufficiently stable therapeutic effect in the similar cases gave intravenous introduction 20 cm³ 10-15o/o of solution of sodium chloride or introduction 60-100 cm³ 40o/o of solution of glucose. Smaller dissemination obtained introduction to 25o/o of solution of sulfate magnesia intramuscularly or through the rectum (use/application of sulfate magnesia it is incompatible with sulfanilamides).

Progressive local edema of brain, frequently caused by the connection of infectious complications and which was being characterized, besides other symptoms, by the increase of the protrusion of brain, it was possible to sometimes stop by addition to hypertonic solutions 5-10 cm³ 40o/o of solution of urotropin.

The measures indicated were combined with lumbar, (less frequent with suboccipital) punctures. Usually was discharged not more than 20-30 cm³ of cerebrospinal fluid/liquid, in order not to produce a compensator increase in liquor formation. Frequently local edema of brain captured regions III and of IV ventricle and was characterized by increased somnolency and very high "cerebral" hypertherma. In these cases favorable effect gave use/application

inside 4o/o of solution of pyramidon (on the tablespoon after 3-4 hours prior to the beginning of a descent in the temperature of body). In the heavy cases were applied oxygen, lobeline, camphor, caffeine, etc. With expressed edema of brain favorable effect gave the limited drinking, the designation/purpose of purgative and diuretics, and also the elevated position/situation of head. Escorted/tracked sometimes it swelled brain excited state of wounded or sharp headaches served as reading to the designation/purpose of chloralhydrate, veronal cr luminal.

For the purpose of prophylaxis of the development of infectious complications from the side of brain and its sheathings the wounded systematically obtained sulfanilamides (4.0-6.0 in a 24 hour period, depending on coursing of process). Is especially pedantically sulfanil amide therapy it was carried out after processing of the sharply infected wounds of brain. The use/application of sulfanilamides frequently reinforced vomiting. A good effect in this case is exerted designation/purpose 2o/o of sclution of sodium bicarbonate

Permanent supervision of the condition of the blood, urine and cerebrospinal fluid made it possible to in time trap the beginning of infectious complications and to take necessary measures.

The quality of surgical intervention was determined from the control X-ray photographs of skull. The remaining in cerebral wound

bone or metallic fragments forced doctor to be particularly alert. To the timely identification of the initial forms of infectious complications to a certain extent contributed the routine inspections of oculist and otiatrist.

In post-operation period it was necessary to thoroughly control dynamics the neurologic data. The build-up/growth of neurologic symptomatology or the appearance of epileptic fits in combination with an increase in the protrusion of brain and the increase in general cerebral symptoms served as the irrefutable proof of local or general/common/total infectious processes in brain.

For the treatment of the infectious complications of brain and its sheathings were applied sulfanil amide therapy, lumbar punctures, therapeutic sera, antibiotics, and sometimes also surgical interventions.

Page 185.

Usually the early infectious complications appeared on second or third week after wound; however, in certain cases these complications were developed already tc second- fifth day.

The treatment of the meningoencephalitis was assigned sulfidine

inside at large doses (on 6.0-7.0) daily during 5-6 days), and also systematic lumbar punctures with introduction to sub-arachnoidal space 15.0-30.0 0.8o/o of solution of streptocide in physiological solution. In the second half war found use the methods of the intravenous introduction of sulfidine to 2-3 and 5o/o solutions, and also the proposed by N. N. Burdenko method of intra-carotid introduction of sulfanilamide-finally, to last year of war good results gave treatment by penicillin (intramuscular, sometimes endolumbar and intra-carctid introduction). In parallel was carried out dehydration therapy.

With the abscesses of brain most frequently it was necessary to reveal focus and to drain area for the outflow cf pus or within later periods, if was already formed capsule, was conducted the total carving of abscess with capsule. After interventions apropos of abscesses was required careful observation of wounded, in view of the danger of the onset of different associated ccmplications - meningitis, encephalitis, protrusions of brain or local edema of brain. The grown/risen protrusion of the brain frequently made it necessary to produce decompression trepanatien for expanding the bone and tunicary annulus, in which the protrusicn could pinch.

The onset of cerebral and tunicary infectious complications in those wounded into skull considerably lengthened their stay on cot

and forced to the most attentive observation of the condition of internal organs/controls. Especially frequently infectious complications from the side of brain accompanied pneumonia; therefore warning/prevention, timely identification and its correct treatment had great effect on the outcome of wound.

On the abatement of acute/sharp phenomena after process/operation and improvement in the general condition by that wounded the skull they assigned therapeutic exercise (carefully!) and massage, especially in the region of the paralyzed extremities. High value for the litter wounded had respiratory/breathing gymnastics.

Nourishment and drink the mode/conditions of those wounded in the skull, beginning with the first days after wound, they depended on the severity of damage. When symptoms an increase in intracranial pressure and edema of brain are present, it was necessary to maximally limit the intake of fluid/liquid. With strong headaches, vomitings or with different complications the wounded obtained the necessary for them high-energy nourishment by frequent, but low portions. Many of them themselves could not accept foods, and it was necessary to feed them. In the very heavy cases, in unconscious condition or during the violations of report/event the ingestions, food introduced through the probe or through rectum.

With therapeutic target during war were widely applied the periodic blood transfusions on 100.0-200.0 after 3-4 days, by the especially exhausted patient, with blood losses or with infectious complications.

To the puncture of the ventricles of brain apropos of the occlusion by the blood clots of the liquor routes/paths during war is made rarely. So rarely it was necessary undertake for a special process/operation of the type Oddi with insertion or sharp edema of the barrel of brain, although about the possibility of such complications it was necessary always to remember.

The periods of hospitalization during uncomplicated coursing depended on character/nature and severity of the wounds of skull.

Page 186.

The wounded the soft tissues skulls from the average were located in hospital one month. Bed mode/conditions during smooth coursing was limited to 7-10 days, since always it was necessary to consider the possibility of the occurred brain concussion at the moment of wound. The best of general cerebral and local symptoms it made it necessary to lengthen bed mode/conditions before the stabilization of pathological processes in brain and beginnings of their

reverse/inverse development.

With the nonpenetrating wounds of the bones of skull bed mode/conditions continued not less than 2 weeks after process/operation, and only during the smooth course of post-operation period wounded were evacuated to the following stage. Wounded with the penetrating wounds of skull required the hospitalization on the spot not less than 3 weeks. In the case of the development of complications the period of hospitalization grew/rose.

Evacuation was contrasted when the violations of the consciousness of wounded, the protrusion of brain, and also different complications is present, both from the side of brain and its sheathings and from the side of the lungs. Before the designation/purpose for evacuation was conducted the careful comprehensive examination/inspection of wounded and was done evaluation of his condition. Point of destination during the evacuation of wounded was determined by the severity of the wound of skull. The wounded for soft tissue skulls were headed in KhPPG of general-surgical profile/specialty, wounded with the damage of bones - into the specialized evacuation hospitals of army or front line area.

The best form/species of transport for those wounded into skull

proved to be aircraft transport. With the use of this form/species of transport considerable attention was necessary to turn to the cautious delivery/procurement of those wounded into skull from the place of landing to hospital. However, during war bulk of those wounded the skull was evacuated on motor vehicles. Attention was paid to that, so that that wounded into skull in route/path would be located compulsorily in horizontal/lying position and so that the vehicles would be equipped by the devices/appliances, damping agitation.

During evacuation by railroad the wounded with the damage of the bones of skull in essence were placed into the well-organized krieger cars.

The experiment/experience of war showed that the transport immobilization of head by the splints of Cramer or by gypsum itself did not justify. By lightly wounded this immobilization it interfered in route/path. For heavily wounded, who were being found in the unconscious or stunned condition, the immobilization of head proved to be simply harmful, especially in the case of the onset of vomiting. Best of all, the necessary rest to head provided the cushion, laid under head, or not tightly well-packed sacs/bags/follicles with sand. The most important condition of the correct evacuation of these wounded the skull was attentive

observation of them in route/path.

The period of getting up from bed during further treatment in the stages of evacuation was determined by the character/nature of wound and by the severity of condition. During uncomplicated course of the nonpenetrating wounds of the bones of skull the wounded without harm could get out of bed in a month, with the penetrating wounds - in 2 months.

On the average the period of the hospitalization of wounded in the skull wit damage bones during the uncomplicated course was equal to 2-2 1/2 months, and wounded with the penetrating wounds of brain - 3-3 1/2 months.

Page 188.

SPECIAL UNIT.

Page 189. Chapter 1.

CLOSED INJURY OF SKULL.

Introduction

The closed injury of skull and brain includes the large group of the damages, diverse in origin, clinical picture and severity. During the Great Patriotic War of the patients of this category treated the neuropathologists, psychiatrists, surgeons, otiatrists and therapeutists.

"Spheres of individual specialists' effect" always cannot be agreed to; therefore liberation/excretion among that closed the trams of casualty, which are subject conduct surgeons' group, somewhat conditionally. However, the analysis of the materials of the great patriotic war makes it possible to distinguish the individual forms/species of the closed injury of skull.

Thus, comparatively small group (1.8%) those suffering from the closed injury of skull required predominantly the observation of surgeon and, possibly, in surgical treatment.

Usually under the closed injury are understood such damages of the cranial bones and brain, with which is not disrupted the integrity of external integuments.

Table 21. Data according to the distribution of different forms/species of the closed injury of skull.

(1) Характер закрытой травмы	(2) Частота в процентах
(3) Тяжелая закрытая травма черепа и головного мозга (переломы костей свода, основания, внутричерепные кровотечения, тяжелые контузии и коммоции)	1,8
(4) Закрытая травма черепа (легкой и средней тяжести) с преобладанием нарушений вегетативной нервной системы, невротических симптомов, судорожных расстройств и поражений слухо-речевого аппарата (сурдомутизм)	80,9
(5) Ранения глаз, лица, конечностей, туловища с нерезко выраженными явлениями закрытой травмы черепа (коммоция и контузия)	8,2
(6) Закрытые травмы черепа сопровождавшиеся главным образом нарушениями со стороны ушного аппарата (баротравма уха)	9,1

Key: (1). Character/nature of the closed injury. (2). Frequency in percentages. (3). Serious closed injury of skull and brain (breaks of bones of arch/summary, basis, intracranial hemorrhages, heavy contusions and concussion). (4). Closed injury of skull (light and average/mean severity) with predominance of violations of vegetative nervous system, neurotic symptoms, spastic disturbances and damages/defeats of auditory-vocal apparatus (surdimutism). (5). Wounds of eye, face, extremities, body with mildly expressed phenomena of closed injury of skull (concussion and contusion). (6). Closed injuries of skull escorted/tracked mainly to violations from side of aural apparatus (barotrauma of ear).

This determination correctly emphasizes the vast role of the violation of the integrity of the integuments of skull in the origin of the subsequent infectious complications of nervous system. However, also intracranial hematomas, which were being formed after the closed injuries, also can rot, to say nothing of breaks and cracks of the bones of the basis of the skulls which by tradition upt to this time relate to the closed damages, although they frequently prove to be open and therefore limber are complicated by meningitis.

Some pathoanatomical and pathological physiological data.

Basic condition/positions about the closed injury of skull were established/installed even in XIX and in the beginning XX century.

N. I. Pirogov one of the first beginnings to experimentally study a question about the closed injury of skull. Being based on the results of his experiments and mainly on the rich personal clinical experiment/experience, acquired during the defense of Sevastopol and Caucasion war, N. I. Pirogov formulated the series/row of the positions/situations, which maintained their value up to now. From his observations N. I. Pirogov made a conclusion about frequent nonconformity to the clinical ones of these and expected pathomorphological changes with the closed injury of skull. Principal value N. I. Pirogov gave to direct observation of the patient. He

advanced the principle of dynamics during the treatment of the clinical signs/criteria of the closed injury of skull. None, separately undertaken symptom, not even all symptoms, together undertaken, give the possibility to differ the jolt of brain from his compression. Neither delay or acceleration of pulse nor one or another type of respiration by themselves aid diagnosis, if we do not consider further development of these symptoms. "I insist, wrote N. I. Pirogov, with the bed of patient not so much on the investigation of distinctive features of each of them (jolt, compression or contusion of brain), as on that: were progressive the phenomena of the damage/defeat of brain or not. This, in my opinion, results in the the activity of doctor. However fits (symptoms) were considerable, if we succeeds in noticing, that they are more regressive than more progressive, then it is possible to hope that they in the course of time will pass also without energetic allowances...". "Generally with the bed of patient it is necessary to bear in mind so much individual signs/criteria, however they seemed characteristic, as their connection/communication with others and by the obvious reason for disease/sickness/illness/malady".

In spite of the numerous attempts to establish/install the typical picture of each form/species of the closed injury on the basis of the one-time accounting of those or other symptoms (pulse, respiration, etc.) which were undertaken subsequently, these

positions/situations of N. I. Pirogov remain in force, until now,.

N. I. Pirogov focused attention on the fact that with concussion of brain frequently there are the flood tide of the blood, acute edema of brain and his sheathings and tendency "of brain toward expansion." It assumed the presence of those confirmed of later the interconnections between intracranial ones by pressure and vascular violations after the injury of skull. N. I. Pirogov formulated hypothesis about the origin of edema and bloating of brain which he treated as the reaction of brain as a whole in response to the the local damage. "Compressing, therefore, after anematizing, and at the same time shaking one unit of the brain, we we contribute to inclination to the inflation turgescence of its whole mass, increasing in it the stasis of the blood and the humidity of the tissues: pressure of the swelling pulp by the walls of skull from this increases".

Page 191.

During the future, the study of a question there was explained decisive importance of edema and bloating of brain in the pathogenesis of the closed injury of skull, although many sides of this question, until now, remain unclear.

Most difficult and disputable/debatable is a question about the classification of the closed injuries of skull. Long ago it was known that the various forms of the damages of skull are differentiated not only depending on presence or absence of the damage of bones, but also on the damage to brain tissue. Beginning with Petit (1773), the closed injury of skull is subdivided into jolt (concussion), contusion (contusion) and compression (compression) of brain. Petit assumed that the jolt is caused only by the molecular damage of brain tissues, which at known intensity can lead even to the fatal result, although visible pathoanatomical changes in the brain tissue in this case it is impossible to reveal/detect.

With contusion, on the contrary, these changes are detected always. The compression of brain, in the opinion of Petit, is caused by the depressed break of bone or by the accumulation of the blood in the area of skull.

Already N. I. Pirogov considered that "these three morbid conditions are not completely so different and hardly they can so sharply differ from each other, as usual they accept".

During 80-90 years which passed from that time when N. I. Pirogov conducted his investigation, did not cease the attempts to reexamine this conventional classification of the closed injuries of

skull from the point of view of new data. However, the old classification, which bribes by its apparent simplicity, exists, until now . In all stages of further development of the exercise about the closed injury of skull in previous nosologic frames/scopes was included the new content, which corresponded to the contemporary condition of science.

Initially concussion it was treated as reflector paralysis of the vessels of brain, caused by injury. Hence was done conclusion about certain similarity between shock and concussion. This view is supported by some contemporary authors. However, with shock, in contrast concussion, consciousness is not lost; therefore it is difficult to recognize as identical ones both conditions.

In latter/last fourth of past century researchers' attention was directed toward the hanger-on unit of brain as to the region, which is the basic source of the concussion violations.

The results of further numerous research made it necessary to recognize that in the origin of the concussion syndrome the leading role play barrel and mesdiencephalitic departments of brain. Experimental data are confirmed by the observations of the neurosurgeons who during process/operation on skull frequently observed the most typical symptom of concussion - instantaneous loss

of consciousness during manipulations on the medulla oblongata and in the region of bottom . . III ventricle (N. N. Burdenko et al.).

The vascular factor, to which belongs the dominant role in the development of concussion syndrome, after N. I. Pirogov was subjected to careful analysis. Main role in the origin of the symptoms of the closed injury of skull was assigned to the venous stagnation of the vessels of brain and sinuses/antrums of solid cerebral sheathing. The venous pressure increase with the closed injuries of skull - with concussion and contusion - and is at present given high value S. I. Spasokukotskiy and A. I. Zlatoverov).

Page 192.

After war 1914-1918 exercise about vascular factor with the closed injury of skull moved considerably forward. It was possible to explain that the typical for the closed injury vascular violations of brain in the form of localized hemorrhages, and also large drainage hemorrhages in cerebral tissue appear not immediately, but in known sequence, during certain time interval. These hemorrhages are noted not only in the direct proximity to the place of injury, but also on known distance of it, which is explained by the violation of the innervation of the individual elements/cells of vascular net/system.

Then it was shown that the hemorrhages can appear not only per diapedesin, but also as a result of the direct violation of the integrity of vessels. Studying the origin of localized hemorrhages, in particular, in the barrel of brain, anatomical pathologists revealed/detected that these violations can be observed also in agonic conditions in the cases, not connected with the injury of skull.

The exercise about the "molecular" disturbances of the cells of

brain, to which the old authors frequently referred during the explanation for concussicn gradually began to be enriched in the concrete/specific/actual pathological physiolcgical content. The theories of diaschisis cf Monakov (1905) and traumatic asynapsis of of Genshen (1927) were in this respect space forward.

Many contemporary clinicians treat concussion as the temporary/time violation of synaptic connecticns/communications.

In the experiments, produced on the basis of contemporary physiological procedure, it was possible to decipher previous representations about "molecular" changes with concussion and to show that brain concussion it is necessary to examine as the straight line, caused by the generalized injury of neurons paralysis of nerve functions, not depending on vascular damages/defeats. The latter appear for a second time, mainly during shock/counterblow of brain against the contradictory/opposite walls of skull. Subliminal stimulations cause system response of IX-X nerve and subsequent short-term disturbances of respiration and vasomotor functions.

Cushing (1902) considered that with concussion is disrupted the automatic regulation of the arterial and connected with it intracranial pressure by the vasomotor center of the medulla oblongata. The primary stimulation of this center it assigned to

anemia, appearing with injury. The acute/sharp phenomena of concussion, in particular, the loss of consciousness, initial disturbance of the respiration and of heart activity, up to present time are connected with the reflector violations indicated. It is there be no doubt that similar treatment of concussion is placed in the concept of the inhibition of nerve centers (I. M. Sechenov, I. P. Pavlov) and parabiosis (N. Ye. Vvedenskiy). With the air contusion, identified by some authors with concussion, high value is attributed to the powerful/thick flow of the afferent impulses/momenta/pulses, which arose from strike wave and which call brake process in central departments irritated afferent systems.

It is possible to say that also now, as in N. I. Pirogov's times, to distinguish concussion of contusion is not always possible. Some authors identify either pour these two concepts into concussion-contusion syndrome or they propose to refuse from the term of concussion, others insist on a difference in these concepts.

Page 193.

Some consider that the fatal result or even any pathoanatomical damage of brain tissue contradicts the diagnosis of concussion diagnosis of concussion others recognize themselves that also with concussion are possible rough changes of cerebral tissue, especially

small and large/coarser symmetrical hemhorrage. Some distinguish concussion and contusion as two different mechanisms of the closed injury, others assign tc each of these forms the presence of specific symptomatology and even different picture of arteriography of the vessels of brain. The presence concussion with specific violations (mainly from the side of vegetative nervous system) after minor injury cannot be denied. However, it is not completely lawful, but to extreme measure from a practical point of view, to designate as concussion severe injuries with the prolonged loss of consciousness, but those more with the fatal result.

Less not complicated proves to be concept "contusion". In the broad sense each damage cf brain with its pathoanatomical changes is contusion. Actually speaking, and bullet wounds, and intracranial hemorrhage, and crushing of the substance of brain, and its softening with the closed injury of skull are placed in this concept. However, under "contusion" in the narrow sense of the word understand only those damages which appear with the contusions of brain against the internal walls of the arch/summary of skull, about the inequality of the basis of skull or partition/septum of the solid cerebral sheathing (cerebellar drift, crescent-shaped extension). Even in the past some authors indicated the possibility of rapid and light extrusion inside the specific sector of the arch/summary of skull without break with the subsequent contusion of the tissue of brain.

They assume that with strike/shock on skull the barrel of brain will be traumatized by the liquor wave, which is fixed from the lateral ventricles through aqueduct of Sylvius into area of IV ventricle of brain. There is no need for emphasizing, how is complicated in this case differentiation of concussion and contusion, and in what measure it is possible to proceed from the single complete picture of the closed injury of skull. At present, during the development of the clinical, electrophysiological and especially rcentgenological methods of research, diagnosis "contusion" is frequently replaced by the more outlined particular definitions, depending on character/nature and localization of damage. From contusion are isolated the massive internal hemorrhages, the violations liquor system - hydrocephaly, serous meningitis, etc. The diagnosis of contusion and concussion frequently is retained as supplementary, which indicates the mechanism of damage.

What form is concerned third of the classical subunit of the closed injury of skull- the compression of brain, then also on this question N. I. Pirogov formulated remarkable ones, full of deep sense, position/situation. He established the neurogenic theory of compression syndrome. "In many instances, wrote he in "beginnings", that [redacted] we call the compression of brain perhaps to eat nothing else but one stimulation alone of some of his units. We know, for example, that there is points/posts in the brain (appropriate,

probably, to the beginnings of the roots of one or the other nerves), stimulation and damage of which entails different phenomena and even sudden death".

"By removing the pressing body, we restore consciousness, etc. perhaps not because we annihilate pressure on brain, but therefore only, that we cease the activity of stimulatien".

Comparing contemporary concepts about the origin of compression syndrome with the closed injuries of skull with N. I. Pirogov's views, it is necessary to come to to the conclusion/derivation that the positions/situations of N. I. Pirogov not only did not become obsolete, but underwent confirmation and further development.

Page 194.

At present compression syndrome is treated as the complicated pathophysiological process in which it is only extremely schematically possible to secrete the primary and secondary factors, which cause its onset and disappearance. A number of primary ones includes the reactions of the hanger-on centers which in response to injury give venous hemostasis, including - in the venous sinuses/antrums of solid cerebral sheathing and choroid webes/plexi. A number of primary factors includes also the decrease of the volume

of cranial area with the depressed break or an increase in the volume of its contents with intracranial hematoma.

The secondary factors include the violations hemo- and liquor dynamics. Venous stagnation is caused by the hypersecretion of cerebrospinal fluid by choroid webs/plexi. In certain cases with injury it occurs, ,on contrary, the cessation of secretion, the collapse of the ventricles of brain, contraction or even occlusion of the lumen of fluid communication routes/paths (aperture of Monroe, Majandi and Lushka) and acute/sharp of hydrocephaly. An increase in the mass of brain is supported by the difficulty of the outflow of the cerebrospinal fluid through the venous sinuses/antrums of solid cerebral sheathing.

At the same time the decrease of inflow to the brain of the arterial blood, stasis, changes in the permeability of vascular walls lead to anoxia, to point and large/coarser hemorrhages in cerebral tissue.

Compression syndrome is the circuit of the mutually each other factors. As the final result the consequence frequently obtains reason value, is formed "vicious circle" (M. I. Astvatsaturov) the connected with each other vascular, fluid and reflector violations. Decisive importance in the maintenance of compression syndrome

belongs, as this correctly foresaw N. I. Pirogov, to the reactions of hanger-on centers. Of ccurse more considerable according to sizes/dimensions intracranial hematomas or pressed breaks of cranial bone, other conditions being equal, rather lead to compression syndrome.

Even in the middle of the eightieth years of past century were done the attempts to come to light/detect/expose the relationships/ratios between a quantity of issuing from blood and clinical manifestations during the compression of brain. It was shown that the presence in area of the skull 75 cm^3 of the issuing from blood is the limit which follows the syndrome of compression. According to other communications/reports, the compression of brain is developed with outflow into the area of skull of narrower than 50 cm^3 of the blood; with 120 cm^3 unavoidably attacks/advances death. It was indicated that in the area of skull there are by 10o/o of spare space, which gives the possibility of cerebral tissue to be expanded without the expressed clinical manifestations.

However, further observations ascertained that and with the small foci of hemorrhage in certain cases can rapidly develops the compression syndrome, while massive hematomas and depressed breaks, which exceed limits indicated above, sometimes they do not give compression syndrome.

High value is assigned to time factor. The rapid accumulation of the blood (arterial hemorrhage) rather leads to heavy compression syndrome. In this case is not subject to doubt the role of the individual characteristics of nervous system, increased reactivity of the vegetative centers of barrel and intermediate brain in individual people.

Compression syndrome is caused not only by the direct primary stimulation of hanger-on and mesodiencephalic centers. Reflector produce pathological reactions it can the stimulation of any sector of the cerebral corter and even solid cerebral sheathing.

Page 195.

It is sometimes sufficient distance/separation even of small blood clot, and in certain cases - decompressicn even without the autopsy of solid cerebral sheathing in crder to destroy the created reflector patholoical situation and to produce the reverse/inverse development of the syndrome of compression. In certain cases the transition of compression syndrome into the condition of unstable equilibrium occurs according to the type of retardation (I. P. Pavlov) or parabiosis (N. Ye. Vvedenskiy) from the side of the "reflexogenic

zones of brain" (N. N. Burdenko). Additional irritant (infection, supplementary injury during transportation, the arterial pressure increase, emotion, small physical stress/voltage, etc.) can produce to life the slowed mechanisms and cause the rapid development of compression syndrome with the subsequent decompensation (acute edema, bloating of brain, paralysis of hanger-on reflector mechanisms). With insignificant injuries the syndrome of compression at first of disease already undergoes reverse/inverse development, occurs the more or less complete compensation vascular, fluid and reflector violations. Thus, contemporary concepts about the origin of compression syndrome confirm the formulated by N. I. Pirogov neurogenic theory of the compression of brain.

The fundamental clinical characteristic of the closed injury of skull in initial period is the loss of consciousness.

Consciousness as the highest function, inherent in man, the which gives to it possibility to estimate of stimulation from outside and to actively respond them by vocal and complicated motor reactions, there is a function of cortex and subcortical departments of brain. Barrel and interstitial brain are not the "center" of consciousness. Their role can be likened to "starting gear", which calls into being "intracerebral reflexes" (N. N. Burdenko) and leads to short-term or prolonged unconscious condition. At the basis of the

loss of consciousness, by whatever reason it with injury was caused, lies/rests the process of the functional suppression distant from the place of the injury of cellular crusting and subcortical departments. The pathophysiological basis of this suppression compose the processes of inhibition, parabiosis, temporary/time or more stable break interneuron connections/communications.

Experiment/experience shows that the slowly and long developing processes in brain, including in barrel and intermediate brain, for so long and no longer do not cause the loss of consciousness. Only suddenly emergent, according to the type of reflex, stimulation causes the loss of consciousness, since in this case do not manage to develop internal compensator mechanisms. To loss the consciousnesses lead the rapidly advancing/attacking changes in the development of the morbid process: the penetration of the blood in the ventricles of brain, arterial hemorrhage from the vessels of sheathings and brain, sharply developing edema and bloating of cerebral tissue.

The developing subsequently vascular disturbances, edema and bloating of brain support unconscious condition. Sometimes with minor injuries in the condition of the hanger-on centers whose stimulation causes loss of consciousness, gross deflections from norm subsequently can not be, nevertheless unconscious condition remains.

With any loss of consciousness is noted one or the other degree of the suppression of cortex, subcortical departments and barrel of brain (sometimes in combination with excitation). A difference in the types of the loss of consciousness is explained by the dissimilar degree of the damage/defeat of the departments of nervous system indicated.

Page 196.

Therefore only schematically it is possible to secrete the types of the loss of consciousness with the preferred suppression of cortex with the state of preservation of subcortical departments and barrel and the types of the loss of consciousness with the preferred damage/defeat of the barrel of brain.

The given scheme, which connects the complicated phenomena of the loss of consciousness with the participation of different "floors" of nervous system, gives the possibility to differentiate the types of unconscious condition. Frequently, however, with the severe injuries of skull picture is extremely confused and complicated. This gave N. N. Burdenko the foundation for naming/calling such conditions "chaotic". In the similar cases during short period after injury the doctor observes the rapid shift/relief of different types of the viclation of consciousness and other

clinical manifestations.

The numerous pathomorphological research of brain with the closed injury of skull they did not introduce anything new into the exercise about three classical varieties/subspecies of this injury. L. I. Smirnov correctly indicates that the morphological picture does not give the possibility to differentiate concussion contusion and compression of brain, since in each case with the closed injury of skull is their combination. It proposes under the terms of "concussion" and "contusion" to understand only different mechanisms of the closed injury of skull, but not different pathological processes, which are their only consequence. These pathological processes can be general/common/total and for a contusion, and for concussion.

With the closed injury of skull it is possible to distinguish primary and secondary pathoanatomical violations. The primary violations include: the cracks and the breaks of the bones of arch/summary and bases of skull, contusion foci, softenings of cerebral tissue, primary necroses and hemorrhages - epidural, subdural, intra-cerebral. The secondary pathoanatomical violations include the changes, connected with the disorder of water metabolism/exchange in brain, edema and bloating of brain, and also with late hemorrhages, substitution of the defect of the brain of

scar tissue, secondary degeneration of conductor systems and infectious complications of brain (meningitis, festering of contusion focus, abscess of brain). In initial conditions are noted the cysts of brain, intergrowth of sheathings, different forms/species of dropsy.

With minor injuries of the type of concussion the discussion deals with the transitory changes cerebrospinal fluid and hemodynamics. P. Ye. Snesarev, considering vascular-fluid violations with concussion as functional, is focused attention on the fact that with them change the colloidal properties of the cellular elements/cells of brain. The violations of the structure of the colloids of the cells of brain can be reversible and irreversible. Their transition into the irreversible condition clinically corresponds to the transition of functional changes in organic ones.

On the basis of that stated above it is possible to arrive at to the conclusion/derivation that the present closed injury of skull, independent of its type, more frequently it began to be considered as single nosologic form. With severe injuries, as a rule, there can be different combinations. Concept "compression of brain" does not reveal the essence of process. Speech can go about the depressed break of the bones of skull, about intracranial hemorrhages, about edema and bloating of train. In identical measure this is related

both to "concussion" and to "contusion". Contusion call rough crushing of cerebral tissue, which leads to death, and the light damages of nervous system with insignificant functional violations of the type of surdimutism, stuttering, etc.

Page 197.

The designation of heterogeneous on clinical and pathomorphological picture damages by one term "contusion" unavoidably leads to confusion in concepts. It is there be no doubt that the terms of "concussion", "contusion" and "compression of brain" in practice can be applied only in capacity of tentative preliminary diagnosis or in the form of additional characteristic to the basic diagnosis, more which or less accurately designates the nature of process. In any case they are related to heaviest by clinical picture to the group of the closed injuries of skull.

Classification of the closed injuries of skull and statistical data.

* During the distribution of the analyzed material is taken in attention the classification of the closed injuries of skull, which was being in practice applied at the fronts of the Great Patriotic War (Table 22).

There is no need for speaking as to what extent this division of the closed injuries of skull was conditional and inadequate and as frequently the individual forms were interwoven with each other.

Experiment/experience showed that in initial period and period of early reactions and complications to demarcate concussion, contusion and compression of the brain is possible only tentatively, moreover, always it is possible to diagnose even breaks of the bones of the basis of skull, especially if they are not escorted/tracked by typical symptomatology. To the care of victims from heavy condition it was necessary to be limited to the diagnoses of concussion and contusion, that it did not give the guidelines in the relation to the offering of valuable aid, including surgical intervention.

Different treatment of the concepts of "concussion " and "contusion" brought they related first to one, then tc another group. Sometimes the concepts of concussicn and contusion as the different mechanisms of the onset of damage were mixed with the concepts of concussion and contusion as by the clinical varieties/subspecies of the closed injury of skull. Freguently were encountered the combined diagnoses: the "brain concussion and the break of the basis of skull", the "contusion of brain, the depressed break of skull and sub-arachnoidal hemorrhage", etc.

Very important in acute/sharp period was differentiation not only of concussion from contusion, how many forms of the closed injury of skull from the compression of brain as the more or less outlined symptom complex of intracranial pressure increase.

Table 22. Frequency of the closed injuries of skull (in percentages).

Закрытая травма головного мозга без повреждения костей черепа (1)	63,3
а) сотрясение (коммоция) головного мозга (2)	14,9
б) ушиб (контузия) головного мозга (3)	40,3
в) сдавление (компрессия) головного мозга—внутричерепные кровотечения (4)	8,1
Закрытая травма головного мозга с повреждением костей черепа (5)	35,7
а) перелом свода (6)	8,5
б) перелом основания (7)	28,2

Key: (1). Closed injury of brain without the damage of the bones of skull. (2). jolt (concussion) of brain. (3). contusion (contusion) of brain. (4). compression (compression) of head brain- intracranial hemorrhages. (5). Closed injury of brain with damage of bones of skull. (6). break of arch/summary. (7). break of basis.

Page 198.

The symptoms of intracranial pressure increase escort/track to a certain degree the large part of the cases of the severe closed injury of skull. However, far not in all cases the compression of brain is the main, decisive component/link in the common picture of the closed injury of skull. From a practical point of view it is especially important to secrete the symptom complex of compression, although it escorts/tracks the most diverse means of the damage of skull and does not possess the signs/criteria of nosologic form.

Of all means of intracranial hemorrhages to the concept of the compression of brain to the greatest extent correspond the acute/sharp subdural and epidural hemorrhages which in the analyzed material comprise with respect 60.6 and 10.5o/o with respect to all hemorrhages with the closed injury of skull. Experiment/experience showed that always accurately was carried out the division between the diffuse and multiple hemorrhages, impregnating the contusion foci of softening, by the lamellar dissemination of the blood over sheathings and surface of brain, on one hand, and by the massive accumulation of the blcod in sub- and super-membrane space and in brain tissue - on the other hand. To this one should add that the combinations of different types of hemorrhages in one and the same wounded in general/common/total were encountered as a rule; on this were secreted more or less frequent types, intracranial hemorrhages.

Epidural hemorrhages which occur during the violation of the integrity of the large branches of average/mean tunicary artery and venous sinuses/antrums of solid cerebral sheathing, were determined very rarely. Evidently, victims with similar damages frequently perished on the field of battle or in any case to their delivery/procurement into medical installations. To epidural hemorrhages usually was related any outflow of the blood to space

over membrane , including appeared from the damaged vessels diploe or the small veins of solid cerebral sheathing.

Much more frequently were determined the subdural hemorrhages, to which added all cases of the detection of the blood under solid cerebral sheathing. Usually discussion dealt with subdural hemorrhages in combination with subarachnoidal and epicerebra. To accurately come to light/detect/expose the source of hemorrhages it was impossible. Most frequently the source of these hemorrhages were, apparently, the vessels of soft cerebral sheathing, and also the veins, inflowing into the longitudinal sinus/antrum of solid cerebral sheathing. In the studied material it is not noted of the cases of hemorrhages from internal carotid artery and jugular vein. One should assume that the wounded with such hemorrhages rapidly perished and therefore they did not reach even the quite foremost stages of evacuation.

Thus, the separation of the closed injuries of skull into concussion, contusion, on one hand, and compression of brain - with another, satisfied only the initial alignment of the doctors in attendance, guiding their thoughts and activities on the river bed of conservative or surgical treatment.

The subsequent X-ray and clinical examinations, and also

observations during prccess/operations frequently made it possible to reject these diagnoses and to replace by their more outlined nosological designations. Instead of concussion, contusion and compression of brain in the period of early reactions and complications proved to be the softening and the decomposition of the specific sectors of brain, epidural, subdural and intra-cerebral hemorrhages, edema and bloating of brain, and subsequently period-hydrocephaly, arachnoiditis, cyst of brain and sheathings, atrophies of cerebral tissue, etc.

Page 199.

The diagnosis of concussion, contusion and compression of brain, thus, proved to be for the heavy forms/species of injury only by preliminary, "working". It was retained also subsequently only for the cases, completely clinically deciphered.

Closed fractures of the bones of arch/summary compose 8.5o/o. The analysis of the studied material confirms the existed previously representations about the fact that severity the conditions and the special feature/peculiarity of the clinical picture of victims with the closed breaks of the bones of skull are determined not so much by the damage of bones, as by degree of the damage of cerebral substance. Therefore the clinical picture of the breaks of

arch/summary does not differ frcm cther forms of the closed injury of skull. In this group it is possible to secrete the cases, which correspond to contusion with the reverse/inverse development of pathological hemorrhages, and also the cases of heavy contusion with the intercranial hemorrhages, which were concluding with different outcomes.

However, the breaks of the bones of arch/summary have their specific character, which justifies their liberation/excretion into individual group.

The aforesaid in an even larger measure is related to the breaks of the basis of skull.

The breaks of the bones of the basis of skull are noted in the analyzed material into 28.2o/o. Breaks most frequently underwent average/mean cranial presence, almost twc tises more rarely were encountered the breaks of front/leading cranial pit and it is rare - posterior cranial pit. Comparatively frequently were noted the breaks of temporal bone. One should, however, consider that the presence of the break of pyramid was accurately established/installed with X-ray analysis or - in the case of detailed outcome - during pathoanatomical research only into 44.7o/o.

General/common/total conclusion/derivation in the relation to classification lies in the fact that the closed injury of skull is the single nosologic group; this position/situation does not eliminate, however, the need for the liberation/excretion of such forms as intracranial hemorrhages, breaks of the bones of arch/summary and basis of skull.

Facts of injury.

The study of the materials of war showed that in the significant part of all cases of the facts under which occurs the closed damage the skulls and brain, remain unknowns even to foremost medical installations, where victims are delivered from the field of combat. Very soldiers usually of the facts of injury do not remember as a result of the instantaneous loss of consciousness and subsequent amnesia.

The reasons (tentatively), which produced the closed damage of skull and brain (in percentages with respect to a number of closed damages of skull), according to S. V. Gol'man's data, are shown in Table 23.

Table 23. Reasons for the onset of the closed injury of skull.

Разрывы снарядов	(1)	71,0
Повреждения тупым орудием	(2)	14,2
Прочие причины	(3)	14,8

Key: (1). Explosions of shells. (2). Damages by blunt gun. (3). Other reasons.

Page 200.

The most frequently closed injury of skull and brain, as is shown the analysis of material, will be deposited with the breaks of different shells, and also by blunt gun. Are here connected head impacts during the rejection of entire body at the moment of shell burst, the contusions by the lumps of the earth/ground, by beams/gullies, logs, by units of buildings/structures, dugouts, etc.

In this case into some cases appear the typical contusions of the surface of head with the damage of the integrity of soft tissues, and sometimes also the bones of skull. In other cases of the direct damage of the soft tissues of skull it does not occur.

The presence of scratches, bruises on one side of body, on extremity, its sometimes closed break, attest to the fact that the

victim fell not to head, but on body, to hand, etc. The similar cases it would be possible tc treat from the point cf view of the mechanism of injury as brain concussion, although they are sometimes characterized by the very heavy pathoanatomical violations of brain.

To the same group of the damages, connected with the breaks of artillery shells, aircraft bombs and mines, are related the closed injuries of brain, which arose with some wounds of external integuments or bones of skull and face skeleton. Hardly ever in this case the damage of the bones of skull and brain tissue is caused by the directly wounding gun.

The origin of basic focus frequently another. With the light wounds of skull, by the escorted/tracked concussion , the head impact can occur for a second time, as a result of the loss of consciousness, sharp descent in the tone of musculature and incidence/drop in the wounded.

Frequently the consequences of this secondary injury prove to be heavier than the consequence of the wound itself, with which in the similar cases the damage of brain cannot be connected directly. Is characteristic for this group nonconformity to localization of wound and closed damage of skull. Thus, for instance, in one case in that wounded the upper jaw discovered is hematoma of the soft tissues of

postcranial region and depressed break of postcranial bone, moreover cracks were spread to right parietal bone.

There are, however, sufficient examples when intracranial damages as in the region of wound, so (in view of shock/counterblow) and in the distant from it sectors were caused by the direct wound of the soft tissues of skull or face skeletcn.

During the damages of other units of the body, which are escorted/tracked by the incidence/drop in the wounded, also were noted the cases of the closed injury of skull. The determination of the considerable percentage of such cases tells about the fact that this mechanism of injury is typical and is encountered frequently.

A question about the frequency of the closed injury of skull, caused by directly air wave with shell burst, has important value. Of course in the overwhelming majority of the cases it is impossible tc solve, in what measure the closed damage of skull is caused by head impact during the rejection of entire body by blast by wave or by strike/shock on head by any solid object/subject. Most frequently blast simultaneously acts on body and head of victim, contusion will be deposited simultaneously with the rejection of body and the strike/shock by head about solid objects/subjects. Upon consideration of characteristic for barotraumas clinical picture (contusions of

chest, breaks or hemorrhages into pulmonary tissue, hemorrhage from nose, mouth and ears) it is possible to sometimes secrete more or less pure forms of air contusion or barotrauma.

Page 201.

A quantity of victims with the closed injury of skull, caused only by this mechanism, in the analyzed material is not great. The heaviest forms/species of barotraumas lead to instantaneous death on the field of battle as a result of the "disintegration of entire body" (G. V. Gershuni). The overwhelming majority of those transferred barotrauma was treated in general-surgical hospitals from the closed damages of chest and ventral area, and also in otiatrists, neuropathologists and psychiatrists (barotrauma of ear, auditory-vocal, vegetative violations with the subsequent neurotic complications). These cases in the analyzed material are not connected.

The origin of the symptoms of the damage/defeat of brain with barotrauma when head impact against solid objects/subjects with the larger portion of probability is eliminated, is different: discussion deals either with the secondary violations of brain as a result of primary injury by the air wave of pulmonary tissue or about the direct effect of the "wave of strain" (I. S. Beritov) to counterpart of the skull and his contents.

The experiment/experience of war showed that the considerable percentage of the cases of the closed injury of skull appears with the accidents of motor transport. A similar injury, which is encountered and in peacetime, on the whole differs in no way from the injury of wartime, if we do not consider the difficulties, connected with the evacuation of victims up to considerable distances, by virtue of which are lengthened the periods from the moment/torque of injury to rendering to surgical aid.

The closed injuries of skull with the incidence/drop in the aircraft from large height/altitude cannot be taken into consideration, since in the similar cases usually are damaged not only skull and head brain, but also internal organs/controls, spine, pelvis and extremities.

Even when is previously known the character/nature of injury (break of artillery shell, aircraft bomb, accident of aircraft, motor transport, etc.), most frequently does not succeed in recognizing the direct mechanism of the closed damage of skull. During the rejection of body by the blast of the first can suffer either the head or the half body, or that, etc. in different sequence. With the incidence/drop on body, legs, hands occurs the jolt of brain and only

more lately can be connected additional head impacts.

High value has also position/situation of head at the moment of the application of the strike/shock, on what in his experiments paid attention I. S. Beritov. Acccrding to his data in the fixed/recorded position/situation of head the strike/shock on the specific sector of skull rarely leads to hemorrhages in the distant regions of brain according to the type of shock/ccunterblow. It is there be no doubt that the results of injury proved to be different, depending on the position/situation of victim at the moment of obtaining the injury, was located it in horizcrtal/lying position/situation with the fixed/recorded head, it stood, it sat or it moved. These information, as a rule, from wounded with the heavy damages of skull it is impossible to obtain. Hcwever, ccmparing different signs/criteria, it is possible to secrete the most frequent types of the mechanism of the origin of the closed injury of the skull:

1. The presence of the phenomena of the restricted head impact - hematoma, scratch, depressed break of bone and the absence of the damages of other units cf the bcdy - gives the possibility to assume the blunt injury of corresponding to surface of skull.

2. Presence of wound of upper and especially lower extremity of wound of face, chest or ventral area and so forth in combination with local damage of tissues of skull makes it possible to assume primary loss of creation after wcund. With the incidence/drop in the body the wounded could obtain head impact, and sometimes also the break of the bones of arch/summary and basis.

3. Presence of signs/criteria of damage to pulmonary tissue, hemorrhage from ears, nose and mouth, break or hemorrhage into eardrum gives right/law to assume barotrauma with shelling or air bombardment. Is especially typical this mechanism with the breaks of the antipersonnel and field-engineer mines, which lead to the multiple fragmentation wounds of face, bcdy, extremities.

4. Presence of break of bones of pelvis cr lower extremities in combination with break cf bones of basis of skull makes it possible to allow possibility of initial incidence/drop ir victim on struts and subsequent break of bones of basis according to type of "fitting/sowing of axe on axe-handle", which is especially typical for closed injuries of skull with accidents of aircraft and incidence/drop from height/altitude.

The determination of the mechanism of the closed injury of skull on the basis of indirect signs/criteria gives in certain cases the

possibility to determine the character/nature of damage and localization of basic focus, which has great practical value.

Clinic.

The clinical picture of the various forms of the severe closed injury of skull in acute/sharp period has much in common. From a surgical point of view, however, it is important to secrete the syndrome of compression, which characterizes intracranial hemorrhages, and also some breaks of arch/summary and basis of skull.

These forms will be examined after the presentation of the general/common/total characteristic of the individual symptoms of the severe closed injury of skull and neurologic diagnosis in acute/sharp period.

General/common/total clinical characteristic.

To general/common/total ones are given, that characterizes the clinical picture of the closed injury the skulls in acute/sharp period, are related the violation of consciousness and hanger-on functions, tunicary symptoms, pelvic disorders, changes in the cerebro-spinal fluid and temperature of body.

Violation of consciousness. Loss of consciousness - most frequent and most characteristic symptom of the closed injury of skull. One should consider that of wounded themselves always it would have been possible to attach importance, since wounded as a result of amnesia either denied or excessively exaggerated duration the losses of consciousness. Sometimes victims communicated about the fact that the loss of consciousness lasted several days or even weeks, moreover the period of unconscious condition they frequently identified with the period of amnesia. Sometimes even doctors mixed aphasia with unconscious condition.

10.1o/o of victims from the closed injury of skull retained consciousness.

Even with the considerable breaks of arch/summary and basis of skull wounded do not sometimes lose consciousness. As an example can serve the following case.

Sick K. it fell with the height/altitude of several ten meters. With the incidence/drop was obtained the contusion into frontal and postcranial region. Consciousness it did not lose. About two hours lay/rested on open air, experiencing only vertigo and headache. The incidence/drop was noted right after hemorrhage from right ear. There was no vomiting.

Page 203.

After entrance into the hospital, the patient in detail described about that happening, ccmplained about headache. With X-ray analysis it was established/installed: the "large-splintered break of the scale of the temporal and adjacent unit of the sincipital bone to the right, with multiple cracks, diverging tcwards the lobal and sincipital bones; the break of the basis of right pyramid of temporal bone, capturing the sockets of the mastoid extension; in the temperoparietal region to the right - the bone depression of semioval form, with irregular internal duct/contour, oblique crack to the middle of right pyramid". In further patient complained only about vertigo and decrease in the rumcr to right ear. During entire period of the stay in the hospital (2 months 10 days) of no organic symptoms of the damage/defeat of nervous system in it was noted.

Certainly, similar cases were encountered comparatively rarely. Sometimes the breaks of the bases which flowed/occurred/lasted at first without the lcss of consciousness and gave occasion to assume only commotion or contusion, subsequently were developed more complicatedly.

Patient B received head impact by a rock during air bombardment. Consciousness he did not lose, there was vomiting and hemorrhage from the right ear; after 6 days after the injury of patient it felt itself well. In neuropatalogy were some bases to assume even hysterical layerings, since patient "it is pattern, with grimaces on face and superfluous details he told about its contusion". However, on the seventh day after injury in patient with a certainty is established/installed purulent meningitis, from which b. it perished after three days. In section - break of pyramid of right temporal region.

There is no doubt that during intra-skull hemorrhages the consciousness is retained sometimes not only at moment/torque they are etched, but also subsequently.

The patient with accident aircraft completed jump. During unsuccessful touchdown were obtained the contusions of body, moreover during fall in him were knocked out several teeth. Consciousness it did not lose, during entire day it felt itself satisfactorily. Only to the following morning in it developed paralysis of face musculature and extremities to the right. Simultaneously appeared sharp headaches. Subsequently paralysis of face musculature and right

extremities remained stable. The picture of disease/sickness/illness/malady was treated as intra-skull hemorrhage.

Characteristic for those wounded in skull with intracranial hematomas "bright gap/interval" is noted in all into 17.1o/o of all cases of intracranial hemorrhages, moreover here enter also those victims who after injury lost consciousness tc short period, and then after the "bright gap/interval" again inflowed into unconscious condition. Thus, this, sc characteristic a for intracranial hemorrhages symptom virtually was observed rarely. Has it goes without saying value and the fact that in those arrived in unconscious condition frequently completely it cannot be obtained in regard to this of any information. During the evaluation of the "bright gap/interval" always was not considered the possibility of the repeated loss of consciousness after prolcnged transportation along unimproved roads, cr during the acute/sharp development of purulent meningitis.

The analysis of the studied material shows that the condition of victims is characterized not so much by the duration of the period of the loss of consciousness, as by qualitative changes in the consciousness.

The general/common/total concept "unconscious condition" tells either about the severity of clinical picture or about the character/nature of pathoanatomical violations. Unconscious condition is not the uniform symptom; its manifestations with commotion, heavy contusions and breaks of the bones of basis are not identical. Hardly ever satisfied practical practical needs the division of unconscious condition into somnolence, sopor and coma, since this subunit considered only the general/common/total reactivity of patient in response to external stimulations and did not characterize the condition of the "vital" functions of the trunk and mesodiencephalic sections of brain.

Here there is no need for setting forth numerous and diverse versions of the qualitative violation of consciousness, which were being observed in the period of war with the closed injury to skull. Of course under field conditions they did not apply and we could not apply complicated psychopathological examination/inspection, which in clinical circumstances sometimes gave the possibility to some authors differentiate not only character/nature, but also localization of the damage/defeat of brain in acute/sharp period. It suffices to be restricted to bringing the most basic conclusions/derivations, which was important for surgeons during setting of diagnosis, determining

the severity of condition and readings to surgical intervention. For the doctors of field medical installations first of all remained firm the general consideration, formulated already by N. I. Nirogov, that only study of the condition of patient in dynamics gives the possibility to ascribe value thereby or other violations of consciousness.

Experiment/experience showed that no form of the violation of consciousness itself reveals the essence of the clinical picture (exclusion - comatose and agonic conditions which, of course, rarely caused the doubts of prognosis even during the single observation of patient). Somnolency, general/common/total retardation, inaudible speech, absence of reaction for painful stimulations total loss or reinforcing of the tone of musculature, and also motor and vocal restlessness/anxiety, excitation, resistance during attempts at the examination/inspection, delirious condition, convulsive fits and so forth were observed with the various forms of the closed injury of skull, including with contusion with relatively favorable subsequently outcome.

However, even the light violations of consciousness, somnolency, retardation, appeared after period prosperity, impelled to alerted evaluation of the appearance of these symptoms, since this type of changes in the condition of wounded frequently reflected the

intracranial pressure increase. Excitation, motor restlessness/anxiety in victims with the closed injury of skull were encountered frequently. On these phenomena by themselves told either about the severity of process or about its character/nature. However, the onset of these symptoms in the patients who to that were located in good condition, testified sometimes about the catastrophical rapidly developing hemorrhage, edema or bloating of brain.

Frequently the appearance of persistent somnolence and soporic condition after the initial period of excitatien coincided since the beginning of the terminal phase of compression syndrome, which concluded with coma and death of patient.

It should be noted that in one and the same patients were observed the considerable oscillations of different degrees loss of consciousness for a period of several hours, sometimes days and weeks.

Page 205.

Output/yield from unconscious condition is the extremely complicated process, which flows/occurs/lasts differently, depending on severity, character/nature and localization of damage/defeat, manifestation of hypertension phenomena and vascular disorders, and

also age of victim. Other conditions being equal, this process more severely and prolonged proceeded in the victims of more senior ages. It is difficult to present any scheme of output/yield from unconscious condition. In the mild cases after only several hours to patient returned clear consciousness. In others this process was involved/tightened by several days and even weeks for elongation/extent of which were detected different violations of the mental activity: the absence of alignment in place and time, confusion of consciousness, delirum, sharp retardation, apathy, somnolency; in certain cases, on the contrary, were noted the increased exaltation, euphoria. Amnesia of different degree of manifestation, as a rule, was in all patients, who were being found in unconscious condition. Only rarely occurred convulsive attacks, still less frequent epileptic state. Epileptic attacks were developed within later periods.

Truncal disturbances. The study of materials showed that in the evaluation of the severity of condition principal value have the violations of the hanger-on functions which escort/track different qualitative changes in the consciousness. The ignoring of this position/situation brought, as a rule, to erroneous conclusions about readings and contraindications to surgical intervention.

Hanger-on disorders of one or the other character/nature -

ordinary satellite of the closed injury to the skull. Their range is extremely vast, the demarcation of the reversible and irreversible forms is difficult. Only the expressed degrees of the violation of respiration, blood circulation, ingestion made it possible to make, more or less correct conclusion about the condition of victims, about prognosis, about readings or contraindications to surgical treatment.

Even with the partially maintained consciousness, in the presence of living reactions for painful stimulations, with invariable/unchanged muscular tone and reflexes the frequency increase of respiration more than 35 per minute or arrhythmia of Chainey-Stokes's its type proved to be prognostically absolutely unfavorable symptoms. In entire studied material it was located not one case of the closed injury to the skull, which was being escorted/tracked by the quickened respiration to 35 per minute, which would not end by lethal cutcome. In all cases of the bubbling wheezing and noisy respiration also unavoidably was noted the fatal result.

During the evaluation of the violations of respiration were done sometimes the errors in the determination of the character/nature of damage/defeat. It was missed out of sight, that the somatic diseases in agonic period flow/occur/last with the similar to injury disorders of respiration.

So, into hospital in unconscious condition it was delivered to patient with diagnosis "contusion". Consciousness the patient lost on the way. Already after ertrance is noted the sharp, quickened, dry respiration. Patient during the same day passed away. Diagnosis: the "contusion of brain, hemorrhage into the ventricles of brain". In section, however, proved to be moderate edema of brain without any other pathological disturbances and confluent double pneumonia. It is there be no doubt that the source of respiratcry/breathing disorders and the reason for unconscious condition was the pulmonary process.

As already mentioned, blood spilling into pulmonary tissue with the subsequent pneumonia often accompanied the heavy closed damages of brain (air contusion).

Page 206.

Is not less difficult was difficult to evaluate disturbances of the cardiovascular system in casualty from clcsed injury to the skull. Experiment/experience showed that the frequency increase of pulse to 110-120 strikes/shocks per minute, but for those more than 90 strikes/shocks per minute far not in all cases told about the heavy damage of brain even when the loss of consciousness is

present,. The frequency increase of pulse, a thready pulse frequently were noted in comatose and agonic condition. Observations showed that the frequency of pulse and blood pressure are changed in one and the same victim sometimes for the duration of the small interval of time. It is there be no doubt that to a change in the pulse and blood pressure out of connection/communication with the remaining symptoms of the damage/defeat of brain could not be given prognostic; and more diagnostic value. Specifically, bradycardia as the transient phenomenon frequently was recorded in those traumatized with happy subsequently outcome. With commotion and contusion in different time of early period bradycardia is noted into 32.4o/o of cases. The studied materials show that to bradycardia as the symptom of increasing intracranial pressure increase it is possible to attach importance only during the parallel violation of consciousness - retardation, somnolency, excessive restlessness/anxiety, during the development of Jackson epileptic fits, during appearance or sharp reinforcing of headaches, vomiting, with certain increase in the blood pressure and stressed pulse. In the first period of commotion and contusion frequently was noted bradycardia in combination with certain drop in the blood pressure and weak, easily compressed pulse. Sometimes bradycardia was retained during several days after injury. In the heavy cases of ccmmotion already from the very beginning it was possible to observe tachycardia. The frequency increase of pulse of more than 110 strikes/shocks per minute in combination with

lowering of blood pressure gave grounds to assume traumatic shock. With the combined injuries to the skull and other organs/controls the presence of shock was caused no doubts. The relationship/ratio between commotion and traumatic shock remained on the whole the unresolved question.

High value in the evaluation of severity the conditions of patients began to give to the reflex of ingestion. The disappearance of this reflex was estimated as the doubtless sign/criterion of the irreversible comatose or agonic condition even in satisfactory pulse, presence of reactions for painful stimulations. However, during the delayed report/event of ingestion, lengthening of its first phase, happy outcome subsequently was not eliminated.

Vomiting and nausea frequently were encountered with the closed injury of skull in the acute/sharp and subsequent period, especially with the breaks of the base of the skull with the damage of auditory nerve, with concussions of the labyrinth. Without special research there was only possible rough differentiation of vomiting as the local sign/criterion of the damage/defeat of vestibular system from the vomiting of the symptom of the increasing compression of brain. Frequently were observed the combinations of that, etc. As the doubtless sign/criterion of compression syndrome it would have been possible to attach importance only when other signs/criteria of the

growing compression of brain are present,. The disappearance of persistent vomiting in the deteriorating condition was necessary to estimate as the consequence of the suppression of the barrel of brain as march/passage to agonic condition.

Page 207.

During war they very widely resorted to research in sick pupil reactions, determination of the diameter of pupils. Experiment/experience showed that bilateral changes in the pupil reactions could not serve as the independent diagnostic sign/criterion; moreover, one-sided expansion of pupil (classical sign/criterion of epidural hematoma) rarely it helped the diagnosis of intracranial hemorrhage, since it was observed frequently both during subdural hemorrhage and with contusion. It was impossible to come to light/detect/expose not one case when the selection of process/operation on that or other side of the skull would be based exclusively on this sign/criterion. Frequently the pupil proved to be narrower on the side of hematoma. It would have been possible to note "play" of the pupil when for the duration of short time it became first narrow, then wide on the side of damage/defeat.

The double expansion of pupils, and also their contraction with afterexpansion and weakening of reaction to light/world were observed

limber as transient phencmenon in the first phase of commotic and contusion with happy subsequently outcome. Sharp contraction and expansion of pupils with the loss of reaction to light/world frequently were observed in comatose and agonic condition.

The aforesaid entirely is related to reflexes from cornea. The disappearance of these reflexes in the course of disease/sickness/illness/malady, as a rule, testified about the offensive of agonic period. However, limber were the cases when during the violations of ingestion and respiratory/breathing function, with acceleration, filamentary pulse cf corneal reflexes were retained.

Thus, the presence cf corneal reflexes did not eliminate agonic condition, the disappearance of these reflexes in the overwhelming majority of the cases made it possible to speak about its approximation/approach. Exception are signs of epilepsy with which the disappearance of corneal reflexes frequently proved to be transient. Meningeal discrders are noted into 32.9o/o of entire number of the cases of damages in questicn. Experiment/experience showed that the tunicary symptoms frequently were observed in patients with favorable subsequent course of disease/sickness/illness/malady and were conditioned by edema of cerebral shells or aseptic meningitis after sub-arachnoidal

hemorrhage.

With fulminant forms of meningitis, which take place with the loss of the tone of musculature, meningeal symptoms sometimes were absent. The rapid disappearance of meningeal symptoms was estimated as the sign/criterion leading to agonic condition. Great difficulties that appeared with the evaluation of meningeal symptoms, if they appeared in the course of disease/sickness/illness/malady. Only the research of the cerebrospinal fluid/liquid made it possible to differentiate purulent meningitis from the aseptic meningital process (edema of shells, sub-arachnoidal hemorrhage).

Damage of the function of pelvic organs/controls - frequent symptom of the closed injury of skull. They were observed in acute/sharp period both with commotio and contusion with the happy subsequently course of disease/sickness/illness/malady and in the heavy ones, which ended lethally, the cases of closures of the injury to the skull.

Changes in the eyeground with the closed injuries to the skull in acute/sharp period were observed comparatively rarely. Sometimes hemorrhage into the retina of eye one of a few objective symptoms of the transferred closed injury of skull. Beginning from 2-3rd day after injury, sometimes was noted hyperemia, also, subsequently the

stagnant nipples of visual nerves. Frequently with the heavy cases of the closed injury of the skull of violations from the side of eyeground it was not observed even with the expressed compression syndrome.

Page 208.

Changes in the cerebro-spinal fluid. Liquor pressure usually proved to be increased already and initial period. Sometimes this increase was the only objective symptom cf the transferred closed injury of skull. More rarely was noted the normal or even reduced pressure. In the heavy cases liquor pressure often proved to be low due to the blockage of communication routes/paths, which impeded the entrance of fluid/liquid into the sub-arachnoidal space of spinal cord.

Presence of the blood in cerebro-spinal fluid - ordinary phenomenon with the severe closed injuries to the skull. With combination with tunicary symptoms this sign/criterion frequently made it possible to place the clinical diagnosis of sub-arachnoidal hemorrhage or hemorrhage in dependence on the duration of the entrance of the fresh blood into sub-arachnoidal space. Sub-arachnoidal hemorrhage was noted into 21.0o/o of all cases of intracranial hemorrhages in the analyzed damages. As a rule, the

blood in cerebro-spinal fluid was determined during extensive subdural and even epidural hemorrhages.

High diagnostic value had also negative data. Specifically, during epidural and intra-cerebral hemorrhages (but not intra-ventricular) cerebrospinal fluid sometimes proved to be transparent/hyaline, without the admixture/impurity of the blood.

Changes in the temperature of body frequently were recorded with the severe closed injuries to the skull, even in patients whose clinical picture made it possible to exclude meningitis. On the sharp descent in the temperature of body, characteristic for the first hours after injury, are unit instructions, since the victims were delivered usually therapeutic installations within later periods. An increase in the temperature was connected frequently with different factors: with the development of meningitis, pneumonia, with reaction for the resorption of the blood, general/commcn/total effect of injury and its consequences on the highest vegetative centers so forth. The rapid development of edema and bloating of brain was frequently escorted/tracked by a considerable increase in the temperature of body, which kept up to lethal outcome.

Special features/peculiarities of the neurologic diagnosis of the closed injury of skull in an initial period.

Closed injury of skull - composite problem. In the analyzed material into 34.3o/o of cases are noted the wounds and the closed damages of extremities and different regions cf body. Sometimes it was detected that the heavy "contusion" is in reality more the consequence of cavitary damages and hemorrhages, breaks of extremities, pelvis, spine, etc., than the clcsed injury of skull and brain. Frequently were observed secondary complications from the side of internal organs/controls, especially pneumonia, which laid its impression on clinical picture. Neurologic diagnosis therefore could be only one of the elements/cells in the general/common/total identification of the closed injury of skull. Even if in patient it was not noted the signs/criteria of the damage/defeat of other organs/controls, it had a value only with simultaneous surgical, otiatrical, roentgenological and ophthalmological examinations of the victim (usually in the specialized hospitals cf the army where there were the specialists indicated; in MSB elementary neurologic diagnosis could be realized only by a general/ccmmon/total surgeon and a therapeutist). Especially significant were the data of surgical, roentgenological and otiatrical examination/inspection with the breaks of arch/summary and basis; they proved to be limber leaders also for neuropathologists with the diagnosis of localization and character/nature of the damage of the nervous system.

Page 209.

The experiment/experience of war convinces that differentiation of the general/common/total and local symptoms of the damage/defeat of brain in wounded, who were being found in unconscious condition, was extremely difficult and not always can be done in the circumstances of field medical installations. As is known, the accomplishment of this mission is difficultly even in the clinical circumstances of peacetime. As the most frequently leading fact in setting of localization of focus served the violations of soft tissues or bones of the skull, which made it possible to assume the damage/defeat of the brain of the corresponding region. A similar assumption of limber was justified. Considerably more complicated there was diagnosis during the multiple violations of the integrity of the external integuments of the skull or in the cases of the absence of such violations. The methods of contrast X-ray analysis in initial period were not applied and they should not have been applied. Therefore acquired known value some diagnostic receptions/procedures which contributed to the development/detection of local symptomatology in victims which were found in unconscious condition.

The research of cerebellar, extrapyramidal, olfactory, visual and auditory functions, with exception of the condition of eyeground and eardrum, in those, who were being found in unconscious condition, proved to be it goes without saying impossible. However, frequently it was possible to come to light/detect/expose paralysis of extremities, damage/defeat of III, IV, V and VII pairs of cranial nerves, which made it possible sometimes without X-ray analysis to assume the presence of the break of the base of the skull and which is more importantly, to establish/install localization of the damage/defeat of brain with intracranial hemorrhages. In the case of the detection of paralysis it was possible with repeated examinations/inspections to determine its build-up/growth or decrease.

Experiment/experience showed that in victims, who were being found in unconscious condition, after the closed injuries of skull motor reactions in response to painful stimulations sometimes come to light/detected/exposed could not be. Similar conditions somewhat resembled adynamia with anesthesia/narcosis. Sometimes adynamia was one-sided, which led to thought about the presence of paralysis. The characteristic feature of adynamia is their inconstancy. In short time "paralysis" it is relieved by the sharp stress/voltage of the musculature of extremity, which exerts considerable resistance during an attempt at the flexure and straightening. In certain cases the

adynamia or the sharp stress/voltage of the tone of the musculature in a short period converted/transferred to cpposite side. During the decision/solution of a question about the presence of hemiparesis and localization of process in one or the other half brain similar adynamia could guide doctor's thought of dummy route/path. The experiment/experience of war showed that during the determination of the side of damage/defeat it is possible to attach importance only to stable motor disorders.

With the closed injury of skull frequently were noted changes in the tendinous reflexes. The evaluation of these changes proved to be extremely difficult even for specialists. In the heaviest cases already from the very beginning tendinous reflexes sharply descended, and sometimes and they disappeared with both sides. As a rule, bilateral their disappearance was observed in "agonic" condition. In certain cases complete areflection was noted also with relatively happy in further course of disease. Much more frequent in initial period was established/installed the difference in tendinous reflexes, moreover on the side of paralysis they were lower, which coincided also with a descent in the tone of the musculature of extremity on this side.

Less frequently in initial period were revealed/detected higher reflexes on the side of paresis, which coincided with reinforcing of the tone of musculature. More frequent this was noted with intracranial hematomas. However, was difficult to attribute to this sign/criterion absolute differential-diagnostic value. As showed experiment/experience, irregularity of reflexes, presence or absence of pathological pyramidal signs always they did not help setting paralysis and side of the damage/defeat of brain with its closed injury. Pyramidal signs were frequently in larger measure repulsing diffuse edema of brain, than its acute local damage/defeat. In the presence of pyramidal signs on the one hand it is not always possible it was possible to solve, do correspond they to the paralyzed or healthy/sound side, since in rough central paralyses pyramidal signs frequently in initial period were not revealed/detected; in the similar cases the pathological symptoms of Babinskiy, Gordon, etc. they were observed on side, less casualty. Larger diagnostic value in setting of one-sided central paralysis and localization of the damage/defeat of brain had the skin ventral reflexes which were, as a rule, lower on the side, contradictory/opposite to focus. However, by limber was noted the absence of skin ventral reflexes from both sides. Identification helped also research with the aid of palpations of the tone of the ventral wall; the latter frequently proved to be that lowered on the side of paralysis.

Valuable data gave also research of bottom reflexes. Frequently was noted descent or their disappearance on the side of paralysis, while on healthy/sound they were retained even in the very heavy conditions of patients.

For the development/detection of the side of paralysis and, that means stricken area was applied the series/row of diagnostic procedures. The stimulation of cornea led sometimes to the movements of the unparalyzed hand towards the irritated place. Less frequent the same effect was obtained during the stimulation of external auditory passage and mucosa of nose. With sharp pressure to the region of the inguinal ligament frequently occurred the flexure of the unparalyzed lower extremity. Only with develcped spastic paralysis of extremity with increased tendinous reflexes jerked back without not the healthy, but the paralyzed leg according to the type of "protective reflex". The tests/samples of Kering and Brudzinskiy proved to be frequently negative on the side of paralysis. During testing of the rigidity of the occipital muscles on the side of paralysis it was possible to come to light/detect/expose the paresis of face muscles in the presence of painful mimic reaction. The observations showed that the paralyzed lower extremity frequently is rotated towards the outside, foot somewhat sags: if it are placed at angle, it is not held in this position/situation, but it falls towards the outside and rapidly passive it is unbent. The unparalyzed

upper extremity sometimes is held in the attached by it vertical position and falls more slowly than that paralyzed. In certain cases in order to produce response reactions, this reception/procedure it was necessary to repeat on several/somewhat times. Frequently in very heavy patients it was possible to come to light/detect/expose the elements/cells of conscicusness, which made it possible for them to fulfill elementary commands/instructions. Thus, for instance, some of the large ones continued to keep or, on the contrary, omitted hand with doctor's words "keep hand" or "drop/omit". Helped this the repetition of commands/instructions or containment by the doctor of the extremity of patient for a certain period of time.

Page 211.

For stimulating of extremity or different departments the bodies used not only the injections of the surface of skin by pin, but also the intense nips of skin and pressing on periosteum. During similar stimulations more frequently it was possible to come to light/detect/expose paralysis and side of the damage/defeat of brain. The observations showed that even with a deep loss of consciousness some victims not only move extremity, but also they indicate the region of stimulation - they bring their hand closer to the irritated region they are sufficient doctor's hand or with its force they repulse.

The high value with the diagnosis of the side of damage/defeat have the tonic reflexes, obtained with pressure to different surfaces of head. With slow pressure to the region of canine pit is obtained the tonic contraction/abbreviation of face musculature on the side of focus. In certain cases was possible to note during this stimulation and the approximation/approach of the unparalyzed hand of large to the irritated place. More energetic were reactions with pressure to the eyeball, to temporal muscle, region of mastoid extension, to the supraorbital region, to neck-postcranial musculature on the side of focus. In the presence of meningitis tonic reflexes were obtained usually from two sides and lost therefore key diagnostic value.

For the development/detection of the patholcgy of craniocerebral nerves are also manufactured were manufactured useful receptions/procedures. In the presence of anisocoria, especially in the case of suspicion to the intracranial hemorrhage, arises the question about the correspondence to the side of the damage/defeat of that expanded or, on the contrary, the stenotic pupil. Experiment/experience confirmed old observations that on the side of the damage of brain it can be observed both the contraction (stimulation of oculomotor nerve)and the expansion (paresis of oculomotor nerve) of pupil. During the determination of the side of

damage/defeat by the guideline was the reaction of pupils to light - always more flacid on the side of damage/defeat. Sometimes in individuals found in unconscious condition, it was possible to observe the violations also of other muscles, innervated by III-IV pairs of cranial nerves. Observations showed that during the passive elevation of both upper eyelid on the side of the paresis of oculomotor was first the century it is omitted more rapidly; during the rotations of head on the side of the paresis of oculomotor it is first the eyeball it does not approach or more weakly it approaches a middle (paresis of internal straight/direct muscle); the stimulation of cornea on sick side does not lead to the friendly elevation of the eyeball upwards (paresis of upper straight/direct muscle). During the bending of head forward (as during testing of the rigidity of postcranial muscles) on the side of the paresis of oculomotor it is first (III pair) by upper eyelid it does not heave. In the absence of paresis of III pair is noted sometimes elevation both century [phenomenon of "puppet eyes" (G. D. Aronovich)]. Sometimes attempt to draw off lower jaw caused the raising upper eyelid. Frequently with the bending of head forward was obtained contradictory/opposite reaction - reinforcing of blinking eye, which gave the possibility to determine even weakly expressed peripheral paralysis of the facial nerve.

The paresis of the discharge nerve frequently was detected by

the simple examination/inspection the standings of the eyeballs, which was conducted for determining the converging squint. However, the evaluation of findings one should approach carefully. In the heavy cases of the closed injury of skull frequently was noted the "wandering" of the eyeballs, that it could not speak about paralysis of III-IV pair of nerves. For the duration of a comparatively small time interval the picture frequently was changed: appeared the diverging or converging squint, the spasm of look to one side, etc. Similar wandering is the sign/criterion of a deep violation of hanger-on connections/communications between by the innervating ocular ones nuclei of skul nerves and cerebral cortex. More frequent it was observed in the heavy cases, with edema of the barrel of brain.

Page 212.

For the detection of pathology of VII pair of cranial nerves by useful ones proved to be also other receptions/procedures. During simultaneous bilateral stimulation of both the sternocleidomastoid muscles mimic reaction to pain frequently detected the concealed/latent paresis of face musculature. The same effect was obtained with pressure to different sectors of face, epigastral field, during the determination of the symptom of Koenig and with other receptions/procedures, causing pain.

Observations of the patients who were found in heavy unconscious condition, showed that in response to painful stimulations some of them not only answer indicative mimicry, but they can moan, repulse with hand the stimulating object or make the instinctive attempts to move away from it. In more mild cases they attempt to be covered with head blanket, proncunce the individual words, phrases.

Capability for similar reactions testifies about the retention/preservation/maintaining of the functions of the subcortical departments of brain, in particular, visual mound.

This unconscious emotional reaction and corresponding to it "indicative" movements it was possible tc use for judgment about the severity of process only in combination with cther data. The absence of emotional reaction fcr painful stimulations served as basis to the worse prognosis. Larger value emotional reaction for painful stimulations had during the determination of the side of damage/defeat. If reactien to pain appeared only during the stimulation of one side of body, it was possible with the larger portion of probability to assume the disorders of the sensitivity of the corresponding half bcdy. Thus, emotional reaction for painful stimulations had known topical diagnostic value. Sometimes, in view of the absence of emotional-painful reaction for intense stimulations, including to the palpation of ventral area, it was impossible to come to light/detect/expose the associating the closed injury skulls of the damage of the organs/controls of ventral area, etc.

Syndrome of the compression of brain.

As noted above, the compression of brain is clinical concept. By it is meant the totality of the sharply developing symptoms, mainly with intracranial hemorrhages, and also with the depressed

breaks of bones the skulls, edema, bloating and abscess of brain. Setting the syndrome of compression - only first diagnostic space: the second, less not essential is the identification of the nature of process.

In the syndrome of compression usually secrete: a) the first phase, which includes the period of the initial loss of consciousness after injury, and the subsequent "bright gap/interval", b) the second phase with the characteristic for it general/common/total symptoms of the stimulation of barrel and focus signs/criteria - Jackson type epileptic fits, gradual build-up/growth of paresis on the side, contradictory/opposite to focus, with localization of process in sincipital region and c) third phase, which is characterized by suppression by function and by march/passage into comatose condition.

As showed observations, in practice frequently are encountered considerable evasions from this scheme. The "bright gap/interval" of one or the other duration was noted both with epidural and subdural hematomas, sometimes to it without bases was related the period, preceding the development of meningitis and edema of brain with contusion.

Page 213.

Considerably more frequent than no indications of "bright gap/interval" there was (this should be considered typical for the injury of wartime). Furthermore, both epidural and acute subdural hematomas (and also intra-cerebral) frequently they were detected during ordinary surgical perfecting after light damages or nonpenetrating wounds in the wounded who were found in relatively good condition and they suggested no suspicions to the compression of brain and intracranial hemorrhages. Experiment/experience showed that always even massive intracranial hemorrhage or depressed break of the bones of skull leads to the expressed intracranial pressure increase. It is there be no doubt that in a number of cases the internal compensation vascular and liquor disturbances impedes the accumulation of the blood and does not give the symptoms of the compression of brain. Only additional irritant (frequently the infection) disrupts the condition of unstable equilibrium. In proof let us lead the following case.

K. obtained the surface scratch of the soft tissues of right temporoparietal region. It lost consciousness by several hours, subsequently it felt itself satisfactorily, but it complained about the headaches which were connected with contusion. In KhPPG was produced splitting up of wound. With twofold X-ray analysis in the bones of the skull of changes were not discovered. On the 13th day after wound by patient it became flaccid, it ceased to associate with those surrounding, appeared sharp somnolency, bradycardia (52-60 strikes/shocks per minute). Next day of patient it is hollow into the soporic condition; was noted contraction and nonuniformity of the pupils; to the right the diameter of pupil proved to be only more and its reaction to light/world is weaker. Temperature of 37.1-37.4°. Reflexes from both sides flaccid; during the passive elevation of hands upwards left hand is fallen somewhat more rapid than the

rightist. From the same side was noted the variable symptom of Babinskiy. Cerebrospinal puncture: small increase in liquor pressure, fluid/liquid transparent/hyaline, xanthochromic. In view of suspicion to intracranial hemorrhage is made the process/operation. In the region of wound is discovered the linear crack of bone. After the education of window in bone from epidural space under pressure it was secreted 3-4 cm^3 of dense pus with ichorous odor. The trepanation aperture is expanded. Solid cerebral shell proved to be inflammatorily changed, it did not fluctuate. With its puncture freely were secreted about 30 cm^3 of dark blood-containing fluid/liquid. Already during the process/operation of patient it began to fulfill elementary commands/instructions, freely to answer questions, pulse was made more frequent to 80 strikes/shocks per minute. Subsequently - smooth course.

It is there be no doubt that subdural hematoma of this case was revealed/detected clinically only under the effect of infectious

process in the epidural space.

The unresolved question remained differentiation of the forms of the compression of brain, caused by local intracranial hemorrhage, on one hand, and by the diffuse contusion foci with multiple hemorrhages - on the other hand. Both in the first and in the second case the progression of clinical phenomena frequently proved to be the consequence of one and the same reasons - edema and bloating of brain.

To come to light/detect/expose the syndrome of the compression of brain proved to be virtually possible only in cases when "bright gap/interval" continued more than 1-2 days after injury. The identification of epidural and acute subdural hematoma was in the overwhelming majority of the cases difficultly. On epidural hematoma with the larger portion of probability it was possible to speak only when with the syndrome of the compression of brain simultaneously was established/installed the break of temporal bone. The difference in the value of pupils, as it is said above, it was noted both with epidural and with subdural hematoma. Acute subdural hematomas more frequent were bilateral, epidural - one-sided.

Page 214.

The estimation of the value of the individual symptoms which in the period of war were ccnnected with the growing the intracranial pressure increase, mainly with epidural and subdural hematoma (second phase of the syndrome of compression), was given below in the form of the schematic table, borrowed of the instructional instructions of army medical control of one of the fronts. Not one given in this table signs/criteria, as showed experiment/experience, could not be isolated/insulated attached independent value. However, the combination of these signs/criteria helped the development/detection of the second phase of the syndrome of the compression of brain.

Comatose and agonic condition - is final, the third, phase of the syndrome of compression. With very severe injuries these conditions appear without inherent in the syndrome of compression intermediate marches/passages. The demarcation of the reversible and irreversible forms had great practical value. Ccmatose and agonic condition was actually the indicator of the irreversibility of process and she served as contraindication to surgical interventions.

Comatose condition and its final stage - agonic condition - with the closed injuries of skull become apparent by complicated symptom complex with a large quantity of variants. Characteristic feature of these conditions - irreversible violations of respiration and ingestion.

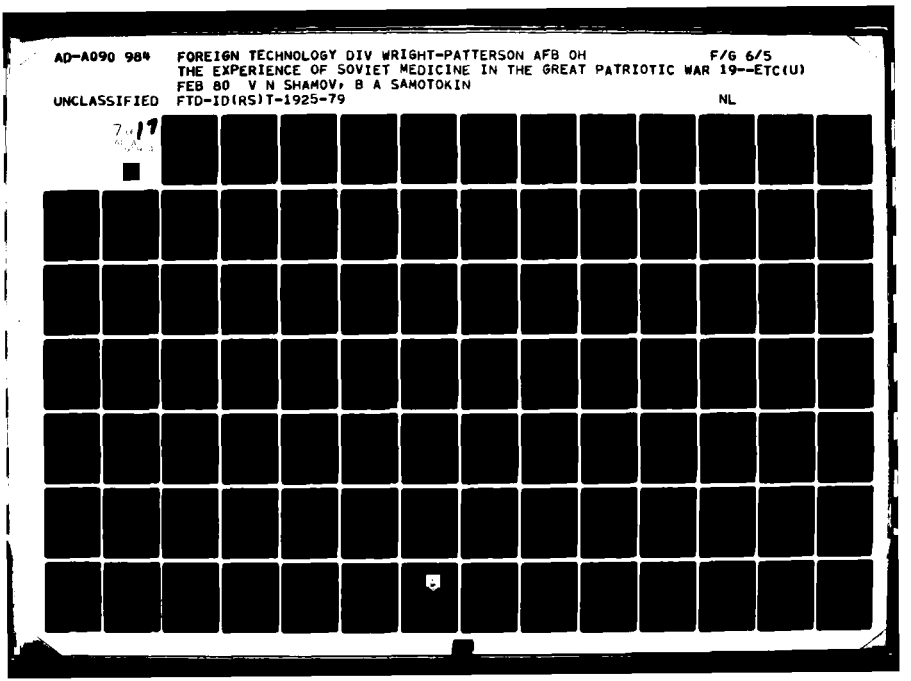
The symptom complex of the growing compression of brain.

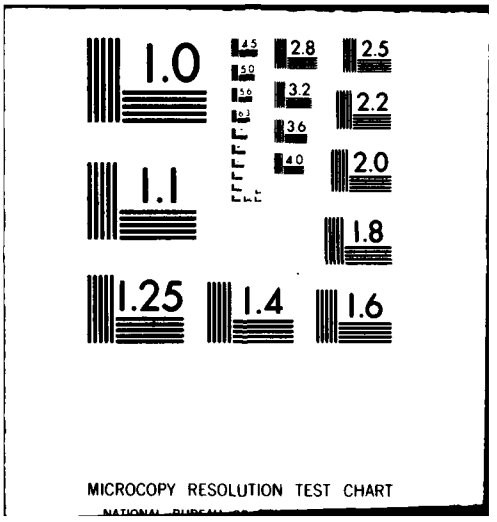
(1) Название симптома	(2) Оценка симптома
(3) Головная боль	(4) Огромное диагностическое значение имеет нарастание ее, появление распирающих головных болей
(5) Нарушение сознания	(6) Диагностическое значение имеет нарастание вялости, сонливости, заторможенности и более или менее постепенное развитие бессознательного состояния, вплоть до полной утраты сознания
(7) Рвота	(8) Появление рвоты в течение болезни в сочетании с другими симптомами—признак нарастающего повышения внутричерепного давления
(9) Двигательное беспокойство	(10) Имеет значение при появлении после периода относительного благополучия или при резком усилении ранее существовавшего симптома
(11) Нарушение дыхания	(12) Может быть несколько ускорено или замедлено Дыхание свыше 30—35 в минуту свидетельствует о наступлении коматозного состояния
(13) Изменение пульса и кровяного давления	(14) Диагностическое значение имеет брадикардия (ниже 60 ударов в минуту), развивавшаяся в течение болезни. Брадикардия как изолированный симптом не является признаком нарастающего повышения внутричерепного давления. В типичных случаях кровяное давление повышается (напряженный пульс), в терминальных стадиях падает
(15) Изменение глазного дна	(16) Типичны застойные соски, иногда гиперемия их, легкая смытость границ. Отсутствие изменений не исключает возможности нарастания внутричерепного давления
(17) Давление спинномозговой жидкости	(18) Типично резкое повышение. Уменьшение давления (редкие капли) не исключает повышения внутричерепного давления
(19) Зрачки	(20) На стороне гематомы реакция зрачков на свет слабее, зрачок может быть более узким или более широким на стороне гематомы

Key: (1). Name of symptom. (2). Evaluation of symptom. (3). Headache. (4). Vast diagnostic value has its build-up/growth, appearance of bursting open headaches. (5). Violation of consciousness. (6). Diagnostic value has build-up/growth of apathy, somnolency, retardation and more or less gradual development of unconscious condition, up to total loss of consciousness. (7). Vomiting. (8). Appearance of vomiting during disease/sickness/illness/malady in combination with other symptoms - sign/criterion of growing

intracranial pressure increase. (9). Motor restlessness/anxiety. (10). It has value upon appearance after period of relative prosperity or during sharp reinforcing of earlier than existed symptom. (11). Violation of respiration. (12). Can be somewhat accelerated or delayed. The respiration of more than 30-35 per minute testifies about the offensive of comatose condition. (13). Change in pulse and blood pressure. (14). Diagnostic value has bradycardia (below 60 strikes/shocks per minute), which was being developed during disease/sickness/illness/malady. Bradycardia as the isolated/insulated symptom is not the sign/criterion of the growing the intracranial pressure increase. In the typical cases blood pressure rises (stressed pulse), in terminal stages it falls. (15). Change in eyeground. (16). Are typical stagnant nipples, sometimes their hyperemia, light blurring of boundaries. The absence of changes does not exclude the possibility of the build-up/growth of intracranial pressure. (17). Pressure of cerebro-spinal fluid. (18). Typically sharp increase. Decrease of pressure (rare drops) does not eliminate the intracranial pressure increase. (19). Pupils. (20). On side of hematoma reaction of pupils to light/world is weaker, pupil can be narrower or wider on side of hematoma.

Key: (1). Name of symptom. (2). Comatose condition. (3). Agonic condition. (4). Respiration. (5). Are more than 30-35 per minute, wheezing, that bubbles, surface. Frequently the liberation/excretion of froth from mouth. (6). Cheyne-Stokes's type. Participation of auxiliary muscles. (7). Bubbling is sometimes removed by cleaning mucus from throat. (8). Pulse. (9). Are more than 90-120 per minute, sharply weakened, filamentary. Sometimes the pulse of satisfactory filling. (10). It is not probed. Frequently it is retained even after the cessation of respiration. (11). Blood pressure. (12). It is lowered. (13). Lowered or it is not determined. (14). Ingestion. (15). It is absent or it is sharply delayed. (16). It is absent. (17). Value of pupils. (18). They can be sharply narrowed or expanded. (19). It is sharply expanded. (20). Pupil reflexes. (21). It is sharply weakened or are absent. (22). They are absent. (23). Corneal reflexes. (24). They can be maintained, sometimes sharply lowered. (25). They are absent, it is sometimes maintained, but it is sharply lowered. (26). Vomiting. (27). It can be. (28). Tone of musculature. (29). It can be lowered, sometimes sharply increased. Sometimes decerebrational rigidity. (30). It is sharply lowered. (31). Tendinous reflexes. (32). They can be retained. (33). Meningeal disorders. (34). They can be. (35). They disappear, if they occurred earlier. (36). Pathological (pyramidal) signs. (37). They disappear, if they were earlier. (38). Reactions for painful stimulations. (39).


AD-A090 984
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OH
F/G 6/5
THE EXPERIENCE OF SOVIET MEDICINE IN THE GREAT PATRIOTIC WAR 19--ETC(U)
FEB 80 V N SHAMOV, B A SAMOTOKIN
UNCLASSIFIED
FTD-ID(RS)T-1925-79
NL
7 of 17


1.0
1.1
1.25
1.4
1.6
1.8
2.0
2.2
2.5
2.8
3.2
3.6
4.0
4.5
5.0
5.6
6.3
MICROCOPY RESOLUTION TEST CHART

Page 215.

Schematic characteristic of comatose condition and its final stage - agonic condition.

(1) Названные симптомы	(2) Коматозное состояние	(3) Агональное состояние
(4) Дыхание	(5) Свыше 30—35 в минуту, хрипящее, клокочущее, поверхностное. Часто выделение пены изо рта. (7) Клокотание иногда устраняется очисткой горла от слизи	(6) Типа Чейн-Стокса. Участие вспомогательных мышц
(8) Пульс	(9) Свыше 90—120 в минуту, резко ослабленный, нитевидный. Иногда пульс удовлетворительного наполнения	(10) Не прощупывается. Часто сохраняется даже после прекращения дыхания
(11) Кровяное давление	(12) Снижено	(13) Снижено или не определяется
(14) Глотание	(15) Отсутствует или резко замедлено	(16) Отсутствуют
(17) Величина зрачков	(18) Могут быть резко сужены или расширены	(19) Резко расширены
(20) Зрачковые рефлексы	(21) Резко ослаблены или отсутствуют	(22) Отсутствуют
(23) Роговичные рефлексы	(24) Могут быть сохранены, иногда резко снижены	(25) Отсутствуют, иногда сохранены, но резко снижены
(26) Рвота	(27) Может быть	(16) Отсутствует
(28) Тонус мускулатуры	(29) Может быть снижен, иногда резко повышен. Иногда децеребрационная ригидность	(30) Резко снижен
(31) Сухожильные рефлексы	(32) Могут сохраняться	(22) Отсутствуют
(33) Менингеальные расстройства	(34) Могут быть	(35) Исчезают, если они имели место ранее
(36) Патологические (пирамидные) знаки	(32) Могут сохраняться	(37) Исчезают, если они были ранее
(38) Реакции на болевые раздражения	(39) Частично могут сохраниться	(22) Отсутствуют
(40) Вазомоторные реакции. Потливость	(41) Цианоз лица, конечностей. Цианоз иногда уменьшается после того, как горло очищается от слизи. Резкое потоотделение	(42) Резкий цианоз лица и конечностей. Резкое потоотделение

Partially they can be retained. (40). Vasomotor reactions. Sweating. (41). Cyanosis of face, extremities. Cyanosis sometimes is decreased after throat is cleaned of mucus. Sharp perspiration. (42). Sharp cyanosis of face and extremities. Sharp perspiration.

Page 216.

However, when the disorders of respiration and swallowing proved to be the consequence of the strictly local damage/defeat of the medulla oblongata, which was not being escorted/tracked by the violations of consciousness (for example, with the breaks of the basis of skull, during hemorrhages in the region of posterior cranial pit), disorder of respiration and ingestion did not serve as the indicator of the presence of comatose or agonic condition. For the local forms of hanger-on violations is typical in initial period the retention/preservation/maintaining consciousness, the presence of dysarthria, sometimes weakening reflexes from cornea, cerebellar disorders. In contrast to this in comatose condition is a process of the general/common/total decompensation of the functions of nervous system.

On page 215 is represented the schematic characteristic of these conditions, undertaken from instructional instructions of one of the fronts.

Breaks of arch/summary and basis of skull.

The closed breaks of arch/summary and basis of skull, just as the mechanism of their onset, they were solidly studied even in the pre-x-ray period, beginning with middle of XIX century, with N. I. Pirogov, O. V. Ignatov, I. L. Levshin and by many others. These authors established that the bones of the arch/summary of skull possess the known elasticity which most of all is inherent in cortical layer, also, to a lesser degree - glassy plate. It was proved that the wall of cranial arch/summary can cave in without the break of bone. By this deflection of bone subsequently frequently was explained the origin of the contusion of brain, although recently the dominant role is assigned to the linear and rotary movements of the brain itself, which is hit against the walls of skull.

The break of bone depends on the diameter of body, which deposits contusion to the surface of the arch/summary of skull, force, direction and region of the application/appendix of strike/shock. It is proven that the contusions with the traumatizing objects/subjects of low diameter under the force, which exceeds the elastic limits of bone, usually lead to the restricted breaks, whereas according to the type of bend, with contusions by the

traumatizing objects/subjects with large surface are more frequently observed the extended cracks and breaks, according to the type of the crackings which frequently convert/transfer to the basis of skull.

The elasticity of the bones of skull decreases with age, in connection with the large impregnation of bone substance by lime salts. Therefore the older people, the greater the bone is inclined them to cracking. In young people under similar conditions rather appear the depressed breaks. It was also shown that in the depressed breaks of the bones of arch/summary the diameter of the defect of cortical layer does not frequently correspond to the diameter of the defect of internal plate (L. L. Levshin et al.). This fact, which has vast practical value, was confirmed by numerous observations in the period of the first world war and especially during the Great Patriotic War. Frequently with the insignificant scratch of the surface stratum of bone and even with its integrity occurred the break of glassy plate, sometimes with the divergent to different sides cracks and the introduction of the fragments of bone into the tissue of solid cerebral shell and brain.

The arch/summary of the skull of adult person possesses the considerable durability: in order to decrease one of its diameters on 1 cm, it is necessary to exert considerable force. However, as is known, not all regions of cranial arch/summary are equally durable.

Page 217.

While its some sectors have thickenings, for example, in the region of the cruciform increase of postcranial bone, in the region of mastoid extension, the parasagittal line, leading to large longitudinal sinus/antrum, etc., other sectors prove to be less durable. Here it is related the scale of temporal bone, the bottom of postcranial pit, etc. Is especially nonuniform the thickness of different bone education in the basis of skull which is more easily subjected to breaks.

Here there is no need for setting forth the information, known from textbooks, relative to the types of the breaks of the bones of arch/summary and basis. The separation of the first into linear cracks, breaks with depression and without the depressions, fragmented, etc., but the second to breaks different cranial pits did not lose its value, also, until now . However, at present the dominant role is assigned to the degree of implication in the morbid process of brain.

For the old authors of XIX century the breaks of skull chiefly had the theoretical interest; their special features/peculiarities

were studied mainly on sectional material. At present, with the development of neurosurgery, the breaks of the bones of skull acquired especially practical interest.

As showed experiment/experience, the breaks of the bones of arch/summary and basis of skull are not sometimes escorted/tracked by the visible violations of the functions of brain. This is related not only to single or multiple linear cracks without the displacement of the bones of skull, but also to depressed fractures. At present should be considered it established/installed that the absence of the expressed symptoms of damage/defeat of nervous system yet does not mean that the closed injury was restricted only to the bone unit of the skull. The pathoanatomical damage of the brain tissues and shells in initial period always do not become apparent by the specific organic symptoms. Frequently with the break of the bones of arch/summary, which flowed/occurred/lasted satisfactorily initial period, through several months, and sometimes also years appear the signs/criteria of the damage/defeat of nervous system, in particular, epileptic fits or hypertension symptoms (late abscess, the cysts of brain, hydrocephalia, etc.). Therefore the breaks of the bones of skull in the period of the Great Patriotic War attracted attention of the doctors without depending on the degree of the manifestation of the visible violations of nervous system in initial period.

The diagnosis of the breaks of the arch/summary of skull was light only when of sharp depression and displacement of the bones of skull are present. In certain cases the considerable and multiple linear and even depressed closed breaks with examination/inspection and palpation cannot be determined was. On the other hand, when of hematoma and swelling of external integuments is present, the diagnosis of the break of bones sometimes was not confirmed. Small linear cracks, especially in temporal bone, and also the breaks of internal plate sometimes were not diagnosed also by ordinary X-ray analysis, if were not conducted special aiming photographs. On the break of frontal or latticed bones with a certainty spoke the subcutaneous emphysema in the region of face, which in this case appeared as a result of setting of the communication/report of subcutaneous cellular tissue with the sinuses of nose. In rare cases in this case was noted pumping air from paranasal sinuses into sub-arachnoidal space and ventricles of brain or into the area of the formed abscess of brain. Is given below the similar case.

K. obtained the closed injury of skull and the contusion of right eye with accident with the automobile, which collided with mine. After 5 days it was evacuated from MSB as transferred the contusion of average/mean severity into specialized KhPPG. At first its condition suggested no suspicions to complication. In further patient it began to complain about headaches.

Page 218.

With the X-ray analysis of the bones of skull was discovered the circular air shadow, reminding the defect of bone after trepanation, against the background of this shadow - linear crack of frontal bone. With process/operation are discovered: the crack of the posterior plate of frontal sinus, the break of solid cerebral shell and the abscess of the right portion of brain. After the autopsy of abscess - smooth course.

The determination of the local stricken area of soft integuments (scratch, hematoma), and the more depressed break of bone was frequently decisive, also, for determining the basic stricken area of brain. As showed experiment/experience, difference between the bullet breaks of the arch/summary of skull and by the closed injury lies in the fact that with latter/last more frequently are noted contusion foci according to the type of shock/counterblow. In the overwhelming majority both with those and with other breaks the maximum of the damage of cerebral tissue is noted in the region of the injury of skull. Large diagnostic difficulties appeared only in the absence of local changes in tissues and bones of skull or with multiple breaks. Decisive importance in the similar cases had neurologic research.

For the identification of the breaks of bones the bases of skull used the mainly clinical method of research. In the initial period of the course of injury, in the heavy condition of patient, the production of special X-ray photographs was considered counter-indicative. Usually diagnosis was placed in the presence of liquorrhea from ear or nose, abundant hemorrhage from ears, nose and mouth, multiple damages/defeats of craniocerebral nerves, tunicary symptoms and common heavy picture of disease/sickness/illness/malady. Liquorrhea virtually was observed very rarely. Hemorrhage from ears is noted into 42.7o/o, from nose - into 38.8o/o, from mouth - into 25.3o/o of all clinically established/installed cases of the breaks of the bones of the basis of skull. The analysis of materials shows that the hemorrhages from nose, ears and mouth, especially insignificant, frequently were overestimated and were considered the sign/criterion of the break of bones the bases; less not typical these signs/criteria, as showed experiment/experience, were with barotrauma. The source of small hemorrhages could be also the contusions of the mucous membranes of nose and cavity of mouth. To the presence of the break of the basis of skull with the larger portion of probability could indicate only the abundant, continuous hemorrhage from nose and ear.

In the evaluation of these hemorrhages in the differentiation of deafness caused by barotrauma from the deafness, caused by the damage/defeat of auditory nerve with the break of the basis of skull, high value had otiatric examination/inspection.

To a number of signs/criteria which frequently were established/installed with the break of the basis of skull, are related diffuse hemorrhages in to the conjunctiva of eye with its sharp swelling and bruises in near-eye socket cellulose ("goggles"). The latter are noted into 23.8o/o of all clinically established/installed cases of the break of the basis of skull.

Most frequently "goggles" were stated/established with the breaks of the bones of front/leading cranial pit, sometimes with another localization and even in the cases, with which the break of basis subsequently was not established/installed. Were confirmed old observations that with the breaks of front/leading cranial pit the bruises into near-eye socket cellulose have more expressed character/nature, but they appear not immediately, but they grow in the course of time and escorted/tracked by the diverticulum of the eyeball. In identical measure this is related to bruises in the region of mastoid extension during hemorrhage into posterior cranial pit.

Page 219.

With the breaks of the base of skull most frequently is damaged face nerve (17.9o/o), then auditory (16.5o/o) and visual (8.7o/o). From oculomotor nerves damage/defeat of VI pair was noted 4.1o/o cases. Other cranial nerves were involved into process much less frequently. The simultaneous damage/defeat of the VII and VIII pairs of cranial nerves was with the breaks of the basis of skull most frequent combination (11.3o/o).

Tunicary symptoms and painted by the blood cerebrospinal fluid with the breaks of the basis of skull were noted almost always, but these signs/criteria were observed also with other forms/species of the closed injury of skull. In 16.4o/o of all clinically established/installed cases of the break of the basis of skull in section are revealed the intracranial hemorrhages, most frequently subdural.

The short period of unconscious condition, the absence of the typical symptoms, which indicate in acute/sharp period the break of the bones of basis, the satisfactory course of disease/sickness/illness/malady during the first days and in weeks after the transferred closed injury of skull led sometimes to the underestimation of possible in such cases of the break of the bones

of basis skull. It suffices to say that 11.9o/o of all victims with the established/installed breaks of the basis of skull consciousness did not lose. In the same approximately/exemplarily percentage were noted the unconscious condition of victims, lasting not more than two hours. Almost in the half of all cases of the break of basis it was not established/installed any damage/defeat of the cranial nerves and other focus symptoms.

In the period of war it was accept as rule/handspike in each heavy case of the closed injury of skull assume the presence of the break of the bones of the basis of skull, even if for this assumption it was not sufficient clinical and, in particular, roentgenological data.

Treatment.

Surgical treatment with the closed injuries of skull in the period of the Great Patriotic War was applied rarely. The frequency of surgical interventions with respect to all those wounded in skull composes 2.9o/o, without considering the numerous cases of the primary surgical perfecting of the bullet breaks of the bones of skull. The percentage indicated is related to the process/operations, which were being conducted mainly apropos of the compression syndrome, which escorted/tracked the closed damages of skull and the

partially bullet breaks of the bones of skull by its nonpenetrating damages.

As a rule, process/operations were not conducted when the general condition of patients during the nearest days after injury clearly was improved and began the reverse/inverse development of local violations. Here are related the cases of contusion without the damage of the bones of the skull with which occurred motor, sensitive and other phenomena of organic origin.

Surgical interventions frequently were undertaken with the depressed breaks of the bones of arch/summary and gave in the larger unit of the cases good results.

The late diagnosis of the break of bone led sometimes to the fact that the process/operations were conducted within later periods, but also in these cases they frequently proved to be very effective. During process/operation they tried to minimally traumatize solid cerebral shell, and in the presence of its damage - cerebral tissue, driving out only the clearly necrotized sectors. As especially important was considered the observance of this principle with localization of wound in the region of motor and vocal zones. Is given below an example of similar surgical intervention.

Page 220.

O. was contused with the break of mine. It for a long time lost consciousness. After two days after obtaining of injury it is delivered into PPG: consciousness clear, alignment complete, speech incomprehensible, to the right hemiparesis (decreasing in latter/last day), symptom of Babinskiy, weakening ventral reflexes. In the region of sagittal suture to the left surface wound under scab, tissues around it are edematic. Diagnosis: the "contusion of average/mean severity". During the following two days the general condition gradually deteriorates, are reinforced headaches. Hemiparesis remains stable. Pulse of 72 strikes/shocks per minute, satisfactory fillings. On the 7th day - trepanation of skull. It is discovered the depressed break of left sincipital bone with the divergent to sides cracks, the surface breaks of solid cerebral shell. During the average/mean membrane artery. Hemorrhage is stopped. The autopsy of the solid cerebral shell: the crushed cerebral substance protrudes into the lumen of wound. To integuments are superimposed anechoic sutures with rubber protuberance - solid cerebral shell is not sew. Next day the general condition deteriorated, appeared vocal violations, developed

almost complete hemiplegia to the right. Not after 6 days after process/operation - progressive improvement in the general condition; in one-and-a-half month - small paresis of hand with an increase in the tendinous reflexes. Patient walks freely, there are no vocal violations, it complains about blurred headaches.

With the linear (single and multiple) cracks of bone without displacement in the overwhelming majority of the cases of process/operation they were not conducted. Only with the displacement of scrap of bones, the suspicion to their depression into the substance of brain, and also when the signs/criteria the intracranial pressure increases are present, was undertaken the process/operation, which consisted of the distance/separation of the free fragments of bone. Very large, even mobile/motile bone fragments with the multiple breaks of the arch/summary of skull it was accept to leave, smoothing only the acute/sharp ones of the edge of bones, protruding into the lumen of wound. In a good general condition of patient, if it was not the expressed symptoms of the compression of brain, solid cerebral shell was not revealed.

In the presence of the blurred hypertension phenomena frequently it suffices it was sufficient to be restricted to the distance/separation of the bone, depressed into the solid cerebral shell; in this case sometimes the disappearance of head pains and

bradycardia was noted already on the operating table; subsequently the condition of patient gradually was improved. Even absence of the pulsation of solid cerebral shell and slightly cyanotic stain/staining did not serve as reading to its autopsy. Main reading to the autopsy of solid cerebral shell were the expressed symptoms of the compression of brain, but its not local changes. Sometimes incorrectly were treated the results of the puncture of the solid cerebral shell: suction with syringe of a small quantity of blood from the undamaged/uninjured vessels of brain was estimated as the sign/criterion of subdural hematoma. However, the puncture of solid cerebral shell can be considered the measure, which completely justified itself. unshown was considered the puncture of solid cerebral shell in the presence of the distinct pulsation, although the absence of the latter in no way testified about the presence of subdural hematoma. Frequently the pulsation was not noted in the zone of the contusion foci without massive hemorrhage, especially with edema and bloating of brain.

In the presence of stable organic damage/defeat, for example, hemiparesis, aphasia is present, (without the expressed clinical signs/criteria of intracranial pressure increase), arose the question about the advisability of the autopsy of solid cerebral shell with the subsequent distance/separation of crushed tissues and blood clots. A question about surgical intervention in the majority of the

similar cases was solved negatively, since process/operation more favorable it was make within the later periods (if for this there will be readings, in particular, epilepsy), than in initial period or period of early reactions and complications when there is a risk to obtain prolapse and secondary infection of cerebral tissue.

Page 221.

A question about the autopsy of solid cerebral shell with the closed injuries of skull remained one of the difficult ones and it was not finally solved. Equally unfavorable in the sense of outcome proved to be the cases where the need for autopsy was overestimated or underestimate. The excessive duration of the "expressed signs/criteria of the growing increase in intracranial pressure" led sometimes to time loss. The appearance of these "expressed signs/criteria" in certain cases meant that the optimum periods for process/operation and rescue of victim were missed.

With the breaks of the basis of skull surgical interventions were undertaken extremely rarely, mainly during the combination of such breaks with the break of the bones of the arch/summary of skull.

Comatose or agonic condition served as contraindication to surgical interventions in all forms of the closed injury of skull.

However, in certain cases the doctors of field medical installations, desiring to utilize even the least chances to the rescue of victim, mounted an operation, also, in comatose condition. Is given below the similar case.

B. is delivered into hospital in unconscious condition with diagnosis "jolt and contusion of brain with shelling". During the day of the entrance: vomiting, sharp general/common/total excitation, pulse of 60 strikes/shocks per minute, stressed. Pupils are uniform, reaction to light/world flaccid. The tone of muscles is somewhat stressed, reflexes living, to the right somewhat higher than to the left. In frontal region to the right extensive subcutaneous hematoma. Diagnosis: the "heavy cortusion of brain". Through several hours after the entrance: the pulse of 48 strikes/shocks per minute, stressed, convulsive twitchings in right hand, increase in the tone of muscles in right extremities, bilateral symptom of Babinskiy. The cerebrospinal puncture: cerebrospinal fluid ensues/escapes/flows out under elevated pressure, quite transparent/hyaline. Diagnosis: "epidural hematoma". Urgent surgical intervention. Up to the moment/torque of process/operation the pulse of 50 strikes/shocks per minute, weak fillings and the quickened, bubbling respiration. Process/operation is not abolished. Is conducted the trepanation of skull in left temporoparietal region. Are discovered: depressed break of the glassy plate of the scale of temporal bone, extensive fresh

hematoma with the continuous hemorrhage from average/mean membranous artery in its temporal department. Vessel is ligated. Are removed the blood clots, which were being spread upwards and toward the rear. Solid cerebral shell is not revealed. During process/operation involuntary urination, attacks/seizures/paroxysms of cough, convulsive contractions/abbreviations of muscles. After the process/operation of patient it reacts to painful stimulations, but remains without consciousness, pulse frequent, satisfactory filling. Subsequently convulsive twitchings disappeared, respiration intermittent. Next day: respiration rare, surface, Cheyne-Stokes's type, the pulse of 62 strikes/shocks per minute, weak fillings, arrhythmical. The fatal result. In section is discovered subdural hematoma.

The given case shows that during the decision/solution of a question about surgical intervention have a value not only hours, but also literally minute. This case demonstrates also the failure of surgical intervention after the development of gross hanger-on violations, in particular the bubbling quickened respiration.

With timely intervention, already on operating table, but that it is more subsequently course of disease/sickness/illness/malady, frequently was noted the complete or partial reverse/inverse development of the disorders of consciousness, speech, movements and

so forth and even some cardiovascular violations, especially bradycardia. Exception are patients with the sharply quickened, wheezing, bubbling and arrhythmical respiration of Cheyne-Stokes's type.

Contraindication to surgical interventions was counted also the presence of purulent meningitis.

Page 222.

However, with suspicion for festering of intracranial hematoma sometimes were undertaken the process/operations, which, as a rule, proved to be unsuccessful during the spilled, suppuration. The best results were obtained during the restricted festerings on the surface of solid cerebral shell.

In conclusion one should say that the surgical treatment of edema of brain with the closed injuries was successful only during the mildly expressed process. In the similar cases the symptoms, connected with edema, it was possible to remove or to decrease by trepanation bone in the region of the closed break without the autopsy of solid cerebral shell, and sometimes by conservative treatment. As a rule, during 4-6 days after process/operation was observed certain deterioration in the general condition in connection

with edema of brain, as this is generally after process/operations on cerebral tissue.

Decompressive trepanation with violently growing edema and bloating of brain was done extremely rarely and almost is always unsuccessfully. The removal of the extensive sector of right frontal bone, recommended to N. N. Burdenko, was applied only in the unit cases.

Conservative treatment. Patients with the heavy closed damages of skull were hospitalized in MSB or, if it was not contraindications to evacuation, in specialized $_{1}^{kh}$PPG. As contraindication to evacuation served comatose and agonic condition, presence of the sharply pronounced symptoms of intracranial pressure and motor excitation of victims.

As showed the analysis of materials, in the overwhelming majority of the cases injured/damaged with the closed injury skulls were treated by conservative methods. These methods were in many respects similar during treatment of open and closed injuries of skull. It was first of all considered necessary to ensure with victim rest. Even with relatively good health after output/yield from unconscious condition to patient was ordered/prescribed strict bed confinement during 15 days after injury, but in the heavier cases -

it is not less than 3 weeks. Experiment/experience confirmed old observations that on the general view of patient and his complaints always it is possible correctly to judge about the severity of the damage/defeat of brain. In certain cases good health and euphoria of patients, absence of "organic symptoms" led into deception, they gave the possibility to assume that the victim transferred minor injury (commotion, contusion), and in view of this to reduce the period of the bed content. Yes even patients themselves, without understanding their position/situation, persistently required shortening the period of painful for them bed mode/conditions. However, the results of too rapid a getting up from bed frequently manifested themselves during the same day: in patient were reinforced the headaches, appeared vomiting, etc.

High value had breeding cadres of average/mean and junior personnel, training in their rules/handspikes care of heavily sick, who transferred the injury of skull (feeding, drinking, transference and turning of patients, care of the cavity of mouth and the skin). Frequently in the directly handling patients persons of average/mean personnel, well briefed, it was possible to obtain the valuable supplementary data, concerning the general condition of patients.

Struggle with shock was carried out only when were expressed the typical signs/criteria of shock, which especially frequently was

observed during the combination of the closed injury of skull with the bullet or closed damages of extremities, thoracic or ventral area.

Page 223.

In that case were applied ordinary antishock measures - heating of body, transfusion 150-200 cm^3 of blood, it is thinner/less frequent - blood-replacing fluids/liquids. However, with the injuries of skull they avoided morphine and alcohol. The blood transfusion in the cases of the closed injury of skull, not complicated by the damage of other organs/controls, was conducted rarely.

Basic measures during the conservative treatment of victims were directed toward struggle with the intracranial pressure increase. Patient was placed on dry diet; on the nearest 10-12 days after injury reduced amount of liquid, were introduced into vein hypertonic solutions of common salt and glucose (sulfate magnesia was introduced very rarely, since the majority of victims obtained simultaneously sulfanilamides), frequently intravenously were introduced 40o/o solution of urotropin.

Cerebrospinal puncture as therapeutic measure was applied comparatively not frequently. Puncture they most frequently used only

for purposes of primary diagnosis. Contraindication to repeated punctures was suspicion to the presence of intracranial hematoma, a sharp decrease in ligucr pressure, and also reinforcing of headaches and vomitings and deterioration in the general condition after the removal of cerebro-spinal fluid. Spinal punctures were considered counter-indicative also with the suspicion to localization of process of posterior cranial pit. During sub-arachnoidal hemorrhages in initial period was conducted only primary diagnostic puncture. Repeated punctures were done usually in later period, after disappearance from cerebrospinal fluid of the fresh blood and when symptoms of the increased intracranial pressure are present,. Suboccipital punctures by the closed injuries were conducted very rarely. I obtained wide acceptance recommended by some authors and intravenous introduction of the destilled water with liquor hypotension, although in certain cases this gave favorable effect. With the large portion cf probability liquor hypotension could be suspected during the massive outflows of cerebrospinal fluid in the cases of the break of the basis of skull. The neurologic diagnosis of this condition, until now, has available only one, very reliable symptom - the decrease of headaches in the low position/situation of head and reinforcing - in its high position/situation. Identification can aid the methods of encephalography, but they in initial period were not applied. Low liquor pressure and reinforcing of headaches after puncture or intravenous introduction of dehydrants always still

they speak about liquor hypotension, since these phenomena can be, also, at the increased intracranial pressure. It is known that after the introduction of the hypertonic solutions of glucose and especially sodium chloride hypertension phenomena in patients for some time are decreased. One should also consider that the removal of cerebrospinal fluid causes in certain cases its overproduction as a result of the stimulation chorioid webes/plexi, which emphasizes the relativity of the mentioned signs/criteria of hypotension. Virtually it was considered that in the overwhelming majority of the cases with the closed injury of skull is the intracranial pressure increase.

Contraindication to dehydration therapy and cerebrospinal punctures were not so much setting of hypotension syndrome, as much as a deterioration in the condition of patients under the effect of this form/species of treatment.

With all severe closed injuries of skull, complicated by infectious processes, patient, as a rule, assigned sulfanilamide preparations - sulfidine or sulfazole; sometimes was applied white streptocide.

Page 224.

Sulfanilamides were given at ordinary doses during the first 6 days

after injury, by entire patient were obtained 24.0-30.0 sulfanilamides; sometimes were assigned repeated courses.

The activity of penicillin with the infectious complications of the closed injury of skull during war test could not. Cerebrospinal punctures widely were applied with purulent meningitis, by which were complicated mainly the breaks of the basis of skull. Punctures were done daily, it is thinner/less frequent in a day/every other day, moreover usually it was driven out from 60 to 120 cm^3 of the cerebro-spinal fluid; sometimes was driven out almost entire cerebrospinal fluid "dry". Experiment/experience showed that the decisive importance in the treatment of purulent meningitis belongs to sulfanilamides in combination with the massive removal of purulent cerebrospinal fluid.

During the motor excitation of the patient of extremity they were fixed/recorded to cot with the towels or sheets. From medicinal/medicamentous substances were applied the luminal, chloralhydrate, scopolamine, and in the heavy cases and hexenal. Frequently in these conditions cerebrospinal puncture with the removal of certain quantity of liquor exerted therapeutic activity. With the closed injuries the skulls abstained from the designation/purpose of the preparations of morphine. These preparations were considered as especially counter-indicative in the

presence of hanger-on symptoms.

With epileptic fits, besides luminal, were applied spinal-cerebral punctures and intramuscularly was introduced hexenal.

Bloodletting in all forms of the closed injuries of skull was not applied.

Clinical outcomes [1].

FOOTNOTE [1]. the data about roentgenological changes with the closed injury of skull are given according to M. B. Kopylov. ENDFOOTNOTE.

The severity of the closed injury of skull sharply manifests itself also the clinical outcomes.

The analysis of the results of treatment (correspondence with victims, that pertains to the year 1948), study of a considerable quantity of record sheets of autopsies, and also literature data make it possible to more completely describe outcomes and distant results of the severe closed injury of skull during the Great Patriotic War.

Closed injury of skull - polymorphic group. In initial conditions are noted diverse residual focus and general/common/total

symptoms, depending on the character/nature of severity and localization of the damage/defeat of brain. In the overwhelming majority those transferred injury communicate about a gradual improvement in its condition in comparison with initial period. This concerns both the focus and general/common/total symptoms of the damage/defeat of brain. However, patients, who transferred the severe injury of skull, in the overwhelming majority it is not possible to recognize as those completely recovered. At best the discussion deals with stable compensation. According to the data of S. P. Vorobyev and A. I. Slobodchikov, who inspected in 1948 a considerable number of invalids of the Great Patriotic War, 4.0o/o were by them referred in the group of those transferred the closed injury of skull. From them 70.6o/o are acknowledged restricted by able-bodied ones (disablement of the third group); in the others were noted the heavier degrees of disablement.

Page 225.

The latter is related mainly to persons with residual organic violations - paralyses, paresis, cerebellar and extrapyramidal disorders, etc., with changes in the psychics/psyche and phenomena traumatic of epilepsy.

After the severe closed injury of skull occur reparative

processes according to the type of "pathological organization" (P. Ye. Snesarev). The as characteristic feature of the late period of the severe closed injury of skull must be considered ability to functional compensation defect and restoration/reduction of functions. Because of the abundance of connections/communications and great possibility of using these ccnnections/communications functional device/appliance to a certain degree occurs even in the cases in which occur the stable organic damage of cerebral tissue. Of course in late period after the injury of skull cannot go speech about that completely being steady, but the more about the completed process. The latter requires the long time, during which are observed different oscillations, and sometimes even deterioration in the condition of patient. Only in small number of cases there is complete decompensation, which leads to heavy disablement, and sometimes also to lethal outcomes.

Large role belongs in this respect to age factor, vasopathies, which associate the phenomena of arteriosclerosis, the connection of infection, life condition, etc. To the most severe complications of late period it is necessary to relate chronic subdural hematomas; the latter in the period of late complications were noted rarely and even more rarely they were distinguished. A. S. Shmar'yan describes 2 cases of not identified with life chronic subdural hematomas, from which into one acutely expressed general/common/total and focus

symptoms were revealed through 8, but in other - 3 months after the closed injury of skull. In the clinical picture of late subdural hematomas predominate the symptoms of the violation of psychical function. Chronic subdural hematomas are developed, as a rule, in elderly people.

To vascular complications in those transferred the closed injury of skull should be related the arteriovenous aneurisms of internal carotid artery. The group of severe complications includes late abscesses and meningitis, which develop mainly after the breaks of basis skulls.

As an example can be given the case of meningitis, which arose 4 years after the transferred during war "contusion" (clinic of V. N. Shamov).

Sick D. during 4 years after "contusion" it was intensely and successfully occupied by mental work, complaining only about episodic headaches toward the end of workday. Unexpectedly in patient developed severe meningitis, which ended lethally. In section was discovered penetrating through all layers of bone crack of Blyumenbakhov of slope, which was complicated by osteomyelitis and subsequent purulent inflamation of solid cerebral shell. It is doubtless, in this case there was unrecognized break of the basis of

the skull.

After the breaks of the basis of skull were observed also the cases of the development of late meningitis in connection with chronic suppuration in middle ear and in paranasal sinuses.

Epilepsy after the suffered injuries of the skull is developed in later period. According to the data of the Leningrad institute of the appraisal/review of ability to work and job placement of invalids, among patients, who transferred the closed injury of skull, it was revealed 9.2o/o suffering traumatic epilepsy.

Page 226.

M. O. Gurevich emphasizes the difference between the traumatic and congenital epilepsy, without denying that the closed injury of skull sometimes provokes the found in latent condition "epileptic" predisposition. According to his data a main difference in congenital epilepsy from traumatic lies in the fact that with latter/last less are expressed the phenomena of the mental degradation of individual. However, frequently and with traumatic epilepsy are observed the psychotic conditions: irritability, spite, inclination to the conflicts; sometimes patients reach paranoid conditions with the phenomena of pursuit. With traumatic epilepsy these violations have

usually transient character/nature, more easily they are compensated.

Clinical observations of patients, who transferred in the past the severe closed injury of skull, including concussion and contusion, show that - with an entire polymorphic quality of the detectable phenomena - the majority of patients complains about the permanent or periodic headaches which are reinforced under the effect of heat, heat, meteorological conditions, to the loss of capability for physical and especially for mental work, to light enervation even with small load. However, upon examination/inspection sometimes are noted different residual organic symptoms of more frequent altogether only vegetative violations - the increased sweating, vasomotor disorders, etc.

One should recognize that the concept the "organic symptoms" at present underwent considerable changes. It is considered proved that repulsing organic process after the closed injury of skull can be not only aphasia, pyramidal, sensitive, cerebellar, extrapyramidal disorders, symptoms of the damage of cranial nerves, etc., but also violations of mental function, or the subjective perceptions, not confirmed by the "objective" symptoms of the damage/defeat of central nervous system. Vegetative violations at present frequently are considered as the consequence of the local damages/defeats of the hanger-on and mesodiencephalic departments of brain. D. G. Shfer

secretes in those transferred the closed injury, besides the syndromes, connected with the damage/defeat of cortex and cranial nerves, hypertension and diencephalic syndromes. In the latter/last cases the picture of disease/sickness/illness/malady resembles the functional disorder of a nervous system of the type of old authors' concussion or contusion neurosis.

However, the newest methods of research give the possibility to establish/install in these cases organic changes.

With hypertension syndrome the disease/sickness/illness/malady becomes apparent by frequently only headaches. The only objective proof of the transferred closed injury of skull is sometimes a considerable liquor pressure increase.

It is at present widely acknowledged that the ordinary complaints of those, who transferred the closed injury of the skull, to vertigo, overall weakness, increased irritability, sometimes typical hysterical conduct, descent in the efficiency, absence of staying power to noise and bright light, reinforcing of headaches after the agitations which previously were treated as neurotic, are frequently repulsing organic process.

Much new introduced into the understanding of this question the

data, obtained with encephalo- and ventriculography. The latter widely were applied in the late period of the closed injury.

Page 227.

An increase in the liquor spaces, surplus accumulation of fluid/liquid in the ventricles of brain and in sub-arachnoidal space with the appropriate decrease of the volume of cerebral mass frequently are observed with the closed injury of skull in late period. The massiveness of the changes, detected by the methods of encephalography, frequently proves to be unexpected with the relatively small or compensated deflections from the side of nervous system and mental sphere. The more passes time with the moment/torque of obtaining the closed injury of skull, the more frequent are encountered the cases of external hydroencephalia, which is sometimes escorted/tracked also by the uniform expansion of ventricles. A similar picture is characteristic for the consequences of the brain concussion, barotrauma. Frequently in this case are created the conditions of the difficult resorption of air, introduced sub-arachnoidally. If in norm resorption occurs during 2-3 days and in this case barely is observed air locks in sub-arachnoidal space, then in the late period of the closed injury air is accumulated/stored in the expanded sub-arachnoidal space where keep several days, sometimes to three and more than weeks. Process this is

escorted/tracked by a decrease in intracranial pressure and by the decrease of the absorptivity of the shells of brain.

Frequently the consequence of the closed injury of skull is the local external hydroencephalia. Cicatrical and atrophic processes in brain in the absence of joints in shells lead to the development of vicarious local external hydroencephalia. The extended adhesive process in shells is passed to the limitation of suction of cerebrospinal fluid, in connection with which is developed the open internal hydroencephalia. Disorder of liquor circulation brings about a gradual increase in dropsy of brain. This continues until the processes of production and resorption of cerebrospinal fluid to known degree are evened. Elevated pressure in ventricles causes the progressive atrophy of brain tissue, especially its white substance. The atrophy of brain tissue increases with closed internal dropsy, which appears as a result of the unit of sylvian aqueducts or apertures IV of ventricle.

External and internal hydroencephalia can be both the symmetrical and unsymmetric, and also regional. With regional hydroencephalia protrusion of ventricle can achieve almost the surface of bone.

The continuous adhesive process of substances soft cerebral

shells after sub-arachnoidal hemorrhages roentgenologically gives the picture of spilled arachnoidite. During the limited adhesive process in shells is noted sometimes cystic arachnoiditis. Adhesive process in the ventricles of brain with ventriculites in cases of the closed injury is reflected/represented by roentgenolcgically incomplete extensibility of ventricle, by contraction of its slot and by more turbid image of lumen, than on healthy/sound side. adhesive process can lead to the complete obliteration of entire ventricle or its unit.

Methods of encephalc- and ventriculography considerably supplemented previous representations about the organic nature of the closed injuries of skull. Tc known degree this is related also to the widely used at present methods cf oscillography (G. V. Gershuni, V. N. Myasishchev, P. M. Lisits, S. A. Chugunov and many others). Numerous electrophysiological, and also biochemical research helps to come to light/detect/expose "organic" basis in those patients, in who during traditional neurologic research it was detected no deflections from norm.

Page 228.

These changes, however, they were noted also in patients, suffering the relatively minor injury, which was complicated by surdimutism and

similar to it conditions.

In certain contradiction with this are located numerous patients, who transferred the severe closed injury of skull and by gross motor, sensitive, cerebellar and other violations, that damage by a small quantity of complaints of general character/nature. It suffices to say that in entire analyzed material it was observed not one case of surdimutism and only in one of the patients after contusion hemiplegia had persistent stuttering. Disproportion between the severity of pathoanatomical changes and neurotic symptoms was noticed even in the first world war. Vulgar neurologic symptoms were treated whereas "flight into the disease/sickness/illness/malady" of those easily traumatized. Now the presence of neurotic symptoms is not considered contradicting organic process in brain tissues. However, neuro-surgical practice imperatively requires the demarcation of wounded, who transferred severe injury, from those easily traumatized. It is possible to consider it established/installed that the temporary/time fluctuations of biochemical and electrophysiological indicators although characterize known deflection from norm in the course physiolcgical processes in those transferred injury, then it is still insufficient for the specific diagnosis, especially in the cases of the mild cases of the closed injury of the skulls with which the disease/sickness/illness/malady yields by the conservative

therapy.

The analysis of the mortal cases [1] showed that 52.5o/o of all dead persons from the closed injury of skull obtained the damage of skull in combat circumstances with the breaks of artillery shells, aircraft bombs and mines.

FOOTNOTE [1]. The analysis of the mortal cases is based on the development of the record sheets of the autopsies of dead persons from closed damages of skull in the limits of one month from the moment/torque of injury according to S. V. Gol'man's data. ENDFOOTNOTE.

The others suffered injury with different accidents, collapse of buildings, dugouts, etc. In 11.2o/o of cases are stated/established the simultaneous closed damages of extremities (breaks of bones), spine, edges/fins, organs/controls of thoracic and thoracic area (breaks of the liver, spleen, intestine, etc.). In these cases the reason for death can be placed the dependence not only on the damage of skull, but also on the closed injury of other organs/controls.

High value as the reason for death in these cases has traumatic shock.

One should, however, note that more than in third of cases of the combined closed injury of skull and other organs/controls are noted the breaks of the bones of the basis of skull.

The general/common/total percentage of wounds in the dismantled material is equal to 39.9, of them 12.0o/o of cases are related to the wounds of the soft tissues of skull and its nonpenetrating damages (scaling of internal plate, atrophy of cortical layer, etc.).

To accurately determine the percentage of lethal outcomes from the direct effect of air wave (barotrauma). On the basis of the accounting of the associated closed damages of the organs/controls of chest and specific changes in the pulmonary tissue it is possible to consider that this form/species of injury was the reason for death approximately into 10.0c/o of cases.

The time, which passed from the moment/torque of injury to lethal outcome, is given in Table 24.

Page 229.

Thus, about half (47.0o/o) of those obtained the closed injury of skull it perished in the first twenty-four hours, of them into 14.5o/o of cases death advanced in the first two hours from the

moment/torque of injury. Consequently, almost in half of victims death advanced within such periods which always did not give the possibility in combat circumstances to deliver victim to the specialized medical agency and to in proper time render it qualified assistance.

Furthermore, in a considerable number of cases death is caused by damage of those regions of brain which practical doctors and pathologist-anatomists since olden times designated as "vital centers" ventricle, barrel of brain). On surgical interventions during similar damages/defeats, certainly it could not be and speech.

In those been killed into the first they are frequent after injury, as a rule, are noted the breaks of the basis of skull, intracranial hemorrhages or the combination of that, etc. In all cases of hemorrhages into IV ventricle of brain death attacked/advanced in the first two or three hours from the moment/torque of delivering the damage. Infectious complications (meningitis) were determined, beginning with the second day, but a great quantity of these complications it fell on the periods of more than three days with the moment/torque of injury.

In pathoanatomical conclusions the breaks of the basis of skull are noted into 36.3o/o of cases, the breaks of arch/summary - into

13.9o/o. More than in half of them was the combination of the break of arch/summary and basis of skull.

On frequency of the damage/defeat of different cranial pits (taking into account their combined damages) the first place occupies average/mean cranial pit, the second - front/leading and the third - posterior cranial pit. The breaks of the basis of skull into 61.5o/o were combined with intra-tunicary and multiple intra-cerebral hemorrhages.

Intracranial hemorrhages were established/installed into 79.0o/o of all sectional cases, of them into 42.4o/o when the breaks of the bones of arch/summary and basis of skull, rough decomposition of the substance of brain, damages of other organs/ccntrols and infectious complications of brain are present, the intracranial hemorrhages it is not noted.

Thus, in a considerable number of all of those been killed the intracranial hemorrhages were only pathoanatomical diagnosis.

On the basis of sectional material it is not always possible to conduct division between diffuse, multiple lightly flowing hemorrhages and restricted hematomas. This in identical measure belongs to intra-tunicary ones and intracerebral hemorrhages.

Table 24.

(1) Время с момента травмы до смертельного исхода	(2) Количество случаев (в %)
(3) До суток	47,0
(4) От 1 до 2 суток	14,6
» 2 » 3 »	8,3
» 3 » 5 »	11,3
» 5 » 10 »	12,0
(5) Свыше 10 суток	6,8

Key: (1). Time from the moment/torque of injury to the fatal result. (2). quantity of cases (into o/c). (3). Up to days. (4). From 1 to 2 days. (5). It is more than 10 days.

Page 230.

If all cases of intracranial hemorrhages are accepted for 100 (are here connected also the combinations of different means of hemorrhages in one and the same face), then it is possible to establish/install their localization in the follcwing percentage relationship/ratio (table 25).

Thus, the most frequent form/species were subdural hemorrhages. The subdural hemorrhages, however, included sometimes not only the massive accumulation of the blood in subdural space, but also its lamellar dissemination over the surface cf brain, but sometimes also sub-arachnoidal hemorrhages.

The dependence of the periods of death, which passed from the moment/torque of injury, from localization of hemorrhages is shown in Table 26.

The fate of the majority of victims with intracranial hemorrhages is solved into the first two days from the moment/torque of delivering the closed damage of skull, and only some suffered with intracranial hemorrhages perish after 5 and even 15 days from the moment/torque of injury.

Table 25. Distribution of intracranial hemorrhages according to localization.

(1) Локализация кровоизлияния	(2) Количество (в %)
(3) I. Над- и подоболочечные	65,7
(4) Из них: эпидуральные	12,3
субдуральные	33,3
субарахноидальные	9,6
различные их сочетания	10,5
(5) II. Внутримозговые	34,3
(6) Из них: в паренхиму полушарий мозга	14,0
в боковые желудочки	6,3
в III желудочек мозга	3,5
в IV желудочек мозга	3,5
во все желудочки мозга	7,0
(7) Всего	100,0

Key: (1). Localization of blood discharge. (2). Quantity (into o/o). (3). super- and subtunicary. (4). From them: their epidural, subdural, sub-arachnoidal, different combinations. (5). Intra-cerebral. (6). From them: into parenchyma of hemispheres of brain, into lateral ventricles, into III ventricle of brain, into IV ventricle of brain, into all ventricles of brain. (7). In all.

Table 26. Time of the advanced lethal outcomes with different localizations of hemorrhages.

(1) Локализация кровоизлияния	(2) Время летальных исходов (с момента травмы) (в %)		
	(3) до суток	(4) от 1 до 5 суток	(5) свыше 5 суток
(4) Эпидуральные	30,7	46,2	23,1
(5) Субдуральные	48,7	42,7	8,6
(6) Субарахноидальные	53,4	26,6	20,0
(7) В желудочки мозга	78,7	17,8	3,5

Key: (1). Localization of hemorrhage. (2). Time of lethal outcomes (from moment/torque of injury) (into o/o). (3). up to days. (4). from 1 to 5 days. (5). it is more than 5 days. (6). epidural. (7). Subdural. (8). Sub-arachnoidal. (9). In ventricles of brain.

Page 231.

The infectious complications of brain and its shells were established/installed into 14.6o/o of cases, moreover in third of them the violation of the integrity of the bones of arch/summary and basis of skull it is not noted. It is difficult to determine, in what measure the development of infectious complications in the similar cases depended on the metastatical transfer of infection into sub-arachnoidal space and brain tissue from the damaged soft tissues of skull, from the paranasal sinuses and ear and to what degree - from the direct march/passage of infection on the adventitial spaces of the vessels of the integuments of skull, bone and solid cerebral shell. In a number of similar cases infectious foci are found in pulmonary tissue after contusion. Is not excluded the possibility of the presence of the smallest cracks of the bones of basis, not discovered by simple eye on sectional table.

In the unit cases of the early abscess of brain also could not note the damages of the bones of skull.

The presence of the infectious complications of brain with the closed injuries of skull, not accompanied by the violation of the integrity of bones, it esphasizes conditionality indicated higher of the subunit of the injuries cf skull by those opened and closed.

Edema of brain and point hemorrhages intc cerebral substance - ordinary finding with the closed injuries of skull, which ended lethally. Characteristically the absence of indications of edema of brain in those been killed immediately and into the first hours after injury. Edema of brain is noted in a small number of cases toward the end of the first day from the moment/torque of injury, but more frequently it appeared during the subsequent days after injury.

Thus, the fatal results into the first hours after injury it is not possible to ascribe to edema of brain. Virtually it is possible to recognize that edema of brain with the closed injury of skull as the sole reason for death is encountered very rarely.

It is necessary to consider that edema of brain frequently is developed in agonic period in those been killed not only from the injuries of skull, but also from other different reasons, especially if agonic period considerably is involved/tightened.

The closed injury of skull as the reason for death in certain cases remained doubtful. Only when the damages of the external tissues of face, torso, extremities are present, it is possible with certain de probability to assume the traumatic nature fatal outcome. Pathoanatomical autopsy always did not help to explain the facts of injury and the reason for death.

Thus, sometimes difficulties were encountered not only in clinical, but also in pathological-anatomical diagnosis. In some cases the heavy picture of the damage/defeat of brain led to the underestimation of the damage/defeat of internal organs/controls.

Converting/transferring to a question about the relationship/ratio of clinical and pathoanatomical diagnoses, it should be noted that in the overwhelming majority of the cases the diagnosis was placed by the doctors of the foremost medical stages of evacuation. The absence of conditions for detailed clinical examination/inspection in therapeutic installations army area caused the individual cases of the disagreements between the intravital and sectional diagnosis. In particular, the break of the basis of skull, diagnosed intravitally, was not discovered in section into 22.2o/o of cases; in this case most frequently found the contusion foci, crushing of brain and intracranial hemorrhages.

Page 232.

General conclusions on the closed injury of skull.

In the period of the Great Patriotic War the surgeons of field medical installations collided with the closed injury of skull comparatively rarely. In the center of their attention there were mainly the bullet wounds of skull. Meanwhile the heavy forms/species of the closed injury of skull on clinical course and outcomes approach the penetrating wounds of skull, especially the breaks of the basis of skull, intracranial hemorrhages and the heavy contusions of brain. The frequently closed injury of skull is combined with the bullet and closed damages of face skeleton, body, internal organs/controls and extremities.

During the Great Patriotic War the surgeons shared the closed injuries of skull into three classical forms: concussion, contusion and compression of the brain; were secreted also the breaks of arch/summary and basis of skull. Experiment/experience showed that this classification could serve only the purposes of the initial,

tentative characteristic of the various forms of closed trauma of skull. Frequently was noted their combination. The refinement of diagnosis, especially the liberation/excretion of the composed surgeons' basic task.

The special feature/peculiarity of the closed injury of skull consists in the fact that character/nature of damage/defeat and localization of process in brain in the overwhelming majority of the cases remain unexplained. Clinical picture in initial period is extremely complicated, which is explained by abundance and mutability/variability for the short time of its causative factors. Among them the principal value belongs to vascular-liquor violations, edema and bloating of brain, which develop frequently against the background of multiple intracranial hemorrhages and contusion crushing of brain tissue. Is especially complicated clinical picture during the combination of the closed injuries of skull with the damage of other organs/controls and tissues, that should be considered it typical.

In the heaviest cases is observed the picture (due to N. N. Burdenko, "chaotic" condition), which impedes local diagnosis.

The experiment/experience of war showed that the duration of the loss of consciousness in the majority of the cases corresponded to

the severity of the closed injury of skull. Hcwever, in the characteristic of the severity cf the condition of victim more important value had the hanger-on violations which were combined also with the partial disorders of consciousness. Moreover, lungs themselves with clinical course the cases, in the initial period of injury the escorted/tracked only by short-term loss consciousnesses, in later period were sometimes complicated by meningitis and intracranial hemorrhages. The closed breaks of arch/summary and especially basis of skull in initial period always were not distinguished, since they flowed/occurred/lasted sometimes under the guise of the uncomplicated contusion and concussion

Operational intervention by the closed injuries of skull rarely were conducted, with exception fractures of bones of skull. As a rule, process/operations were not done with the breaks of the basis of skull, although the reason for death with this form/species of injury were sometimes the subdural, thinner/less frequent epidural hemorrhages.

It should be noted that in a considerable number of victims from most severe injury the lethal outcome attacked/advanced in the course of first hours or twenty-four hours after injury, i.e., to the moment/torque of delivery/procurement into the specialized hospitals.

Page 233.

Surgical interventions from "vital" readings were conducted more frequently in MSB and KhPPG of the first line. Readings were established/installed on the basis of the described above clinical signs/criteria.

As showed experiment/experience, the correct setting of readings to operational intervention in the initial period of the closed injury of skull was for the doctors of these installations by extremely difficult task. As reading usually served the so-called syndrome of the "compression of brain", mainly with intracranial hemorrhages. Only when the depressed break of arch/summary is present, the diagnosis of compression syndrome proved to be relative to available. Identification occurred, also, with strictly typical clinical picture, i.e., with the more or less gradual and stretching by several days development of the syndrome of the compression of brain. However, the cases with the gradual increase of the symptoms of intracranial pressure increase, with the presence so of that called "bright interval", that separates/liberates the moment/torque of injury from the period of the greatest develcpment of the compression of brain, in wartime are enccuntered exclusively rarely. The suppressing number of victims enters therapeutic installations in heavy condition, without indications of "bright gap/interval".

The analysis of lethal outcomes among these operated gives the possibility to explain the series/row of the reasons, which determined these outcomes. The diagnosis of localization of intracranial hematomas frequently was impeded, since local symptoms were shaded by general/common/total vascular-liquor violations and edema of brain. Sometimes operational intervention were conducted by the heavy contusions main characteristic which were the extended small/fine and large/coarser hemorrhages, multiple foci of crushing of brain and its massive edema. The differential diagnosis between the heavy common contusion of brain and the violations, caused by epidural or subdural hemorrhages, in the period of the greatest development of symptoms is difficult even under clinical peacetime conditions. Furthermore, subdural hemorrhages were frequently bilateral.

Sometimes interventions were conducted in heavy comatose condition, moreover in these cases by surgeons led the wish to utilize at least and the extremely problematic possibility to save victim, than its to allow is unavoidable to moved death. However, operational interventions in comatose conditions proved to be ineffective.

The main characteristic of this condition are the expressed hanger-on violations, first of all respirations and ingestions. With the frequency increase of respiration it is more than 35 per minute, with arrhythmia of Cheyne-Stokes's type, with the sharply pronounced truncal symptoms, and also when the phenomena of spilled purulent meningitis are present, process/operation in the majority of the cases did not give the desired results.

In the diagnosis of the various forms of the closed injuries of skull, especially the "compression of brain", basic remains the principle, established/installed already N. I. Pirogov: observation of patient, after the dynamics of clinical picture, the accounting to entire totality of symptoms of disease/sickness/illness/malady, in particular, accounting of the damages of other organs/controls and tissues. This will give to doctor more than setting individual signs/criteria (bradycardia, expanded pupil, etc.) upon one-time examination/inspection. However, N. I. Pirogov's this principle in conditions of the Great Patriotic War could be used only to victims, whose development of the syndrome of the compression of brain was dilated/extended for more or less prolonged period after injury.

Page 234.

The problem about intervention frequently it was necessary to solve

immediately under conditions, eliminating detailed examination/inspection and observation. Otherwise the doctor risked to miss time and to lose victim.

The struggle with with hypertension phenomena and the preventive medical measures, which warn the development of infectious complications, were the basic methods of the conservative treatment of victims from the severe closed injury of skull.

The analysis of the distant results of treatment shows that the suppressing number of patients, that transferred the closed injury of skull, completely gets better. However, with severe injuries known unit lost ability to work. Depending on localization and degree of damage, subsequently are retained the residual violations of the functions of nervous system - paresis, cerebellar, extrapyramidal and other disorders.

From late complications most frequently was developed traumatic epilepsy. Much more rarely are noted purulent complications and chronic subdural hematomas.

The condition of the majority of the patients, who transferred in the past the severe closed injury of skull, is characterized by the instability of vascular-liquor circulation and functions of vegetative nervous system. However, these violations subsequently frequently are compensated, which gives to patients the possibility to participate in work.

Chapter II.

BULLET WOUNDS OF THE SOFT TISSUES OF SKULL.

Classification of the bullet wounds of the soft tissues of skull and statistical data.

The bullet wounds of skull without the damage of bones are related to the category of most of the frequent ones and at the same time lightest wounds of skull. According to the data of the maps/charts/cards of the deepened development, the bullet wounds of skull without the damage of bones compose 54.6o/o of a total number of all bullet wounds of skull.

The classification of the bullet wounds of the soft tissues of skull is simpler in comparison with the nonpenetrating wounds of the bones of skull and penetrating wound of brain.

Like all bullet wounds of skull, wound of soft tissues are divided according to the type of the wounding weaponry into bullet ones (15.5o/o) and fragmentation ones (to 84.5o/o). Should be

considered also the observing frequently wounds of the soft tissues of skull by the secondary shells: the small/fine fragments of calculus, tree/wood, by crushed stone, dense lumps of the earth/ground, fragments of steel helmet, etc.

During the Great Patriotic War, in particular, with the surface and light wounds of the soft tissues of skull, were observed in the majority of the cases single fragmentatien wounds (88.5o/o); frequently nevertheless occurred and sets (11.5o/o). The latter were deposited usually by the fragments of mines during bursts at close distance.

In the depth of penetration of the wounding shell into the soft tissues of skull it is expedient to differentiate: 1) the wound of soft tissues with the damage of skin integuments, 2) the wound of soft tissues with the damage of the aponeurosis (galea aponeurotica), 3) the wound of soft tissues with the damage of periosteum.

For the first the characteristically very surface disposition of the small/fine and narrow, as a rule, unhealing wounds of skin integuments in the form of scratches, scratches or small/fine apertures, from which limber project outside or they are thrown out the jammed in them small/fine foreign bodies. With these surface scratches, abrasions and contusions of the surgical perfecting of

wounds usually it is not required.

For the second is characteristic the hiatus of the skin wound, especially linear, torn or flap, as a result of the damage of dense and intractable aponeurosis, tightly soldered from the elastic, easily reduced by skin head. These wounds, as a rule, are subject to operational perfecting. In the adequate/approaching cases on skin wound are laid primary sutures.

Page 236.

For the third is typical the presence on the day of the wound of the exposed sector of bone, deprived of periosteum. In these cases of limber are observed also the contusions or the surface damages to bone in the form of finest scratches, capillary cracks and even partial breaks of external or internal bone plate, always determined with the examination/inspection of wound and even with the X-ray analysis of skull.

All these small/fine associated damages to bones, which should be considered as the transitional forms to the heavier group of bullet breaks, burden the course of the light wounds of the soft tissues of skull. In the underestimation of the position/situation indicated these unnoticed small/fine damages to bone can be the

source of protracted purulent infection - osteomyelitis, chronic relapsing/recidivism/recidivist/recidivity purulent fistulas and even more severe secondary intracranial complications (meningitis, abscess of brain). Sometimes the wounds of the soft tissues of skull (without the damage of bones) are escorted/tracked by the intracranial damages in the form of contusion foci, tunicary hemorrhages, etc. Such wounds should be considered as transition group to the closed injury of skull.

According to the mechanism of wound and the character/nature of wound canal all wounds of the soft tissues of skull are divided into tangents, through ones and blind ones. The ricocheting wounds (12.4o/o of soft tissues of skull are outwardly similar to tangents and blind ones, and their differential diagnosis is difficult even with the aid of X-ray analysis.

The tangential wounds of the soft tissues of skull, depending on their depth, take the form of simple surface scratch (dash wound), and during the damage of the aponeurosis - the deeper gaping and usually bleeding wound. With tangential wounds the wounds can be linear, with even smooth edges, resembling cut, or with uneven ones, torn and even crushed edges as the lacerated-contused wounds. In certain cases with the tangential wounds of tissues by the Krupp and flat/plane fragments of shells are encountered flap wounds in the

form of the tongue; with the simultaneous wound of skin and subject of the aponeurosis they easily are converted into the scalped wounds. Such wounds are encountered predominantly in the postcranial and temporal region above the corresponding layer of muscles. The tangential wounds of the soft tissues of skull compose 57.5o/o of all cases of the wounds of skull.

The perforating wounds of the soft tissues of skull on clear reasons are encountered very rarely - according to the data of the maps/charts/cards of the deepened development into 0.3o/o. Usually they are observed with the bullet wounds of postcranial and temporal region with thick muscular layer and it is exclusively rare - with the small-splintered wounds of the integuments of the arch/summary of skull. In the latter/last cases they appear with the wound of skin integuments by very small/fine fragments at short distance (in the region of frontal and postcranial mound, superciliary arc, etc.).

The blind-end wounds of soft tissues are encountered considerably more frequent than preceding/previous (29.8o/o of all wounds of skull). In the overwhelming majority of the cases of wound of this type they will be deposited by the fragments of shells, min and, it is considerably thinner/less frequent, by bullets. By localization blind-end bullet and large-splintered wounds, as a rule, are detected in the temporal and postcranial region, rich in soft

tissues (musculature and fatty cellulose). However, on the arch/summary of skull usually are encountered the blind-end, frequently multiple wounds of soft tissues by the small/fine fragments of mines and shells.

Page 237.

With multiple small/fine mine fragment wounds at close distances it is observed impregnation of skin of head by metallic dust, and also the extensive mine burns/scalds of all degrees, especially open front of skull and visible mucosas of mouth, nose and eyes.

With the multiple blind-end small-splintered wounds of soft tissues one should constantly remember about the mixed possible character/nature of these wounds, about the presence of a deeper penetration of one or several fragments of mine into the area of skull and even into the substance of brain. The survey of such wounds is pregnant with severe complicatiens.

With each of the enumerated basic mechanisms of the wounds of soft tissues the character/nature of wound canal is not characterized by special diversity. Exception are the wounds of the temporal and postcranial region where due to the complexity of the bone relief, which facilitates the skipout of shell and the presence of the

massive layer of the mobile/motile, actively reduced musculature, which displaces sometimes the direction of the motion of shell and the course of wound canal, are possible very whimsical bendings of the latter.

According to localization the wounds of soft tissues are divided usually on the regions of skull into frontal, sincipital temporal, postcranial, two adjacent regions - frontal-orbital and temporal-orbital, ear and mastoid extension. According to sides they are divided into right and left, sagittal and parasaggital.

From the typical complications of the bullet wounds of the soft tissues of skull one should indicate the phlegmon, lamellar osteomyelitis and purulent fistula of soft tissues (pseudoosteomyelitic).

In 0.7o/o of cases the bullet wounds of soft tissues were complicated by the phlegmon, which required surgical measures.

Lamellar osteomyelitis composed the basic group of bullet osteomyelitis of the bones of skull with the wounds of soft tissues (98.4o/o) and, based on materials of Leningrad Front, it was observed into 2.0o/o of all cases of these wounds. Osteomyelitis of skull generally with the wounds of soft tissues, according to the data of

the specialized hospitals, which concentrated these wounded at different fronts, were observed into 2.0-5.0o/o of cases.

Purulent fistulas with the wounds of the soft tissues of skull are noted into 0.7o/o. The intracranial complications of infectious character/nature with the bullet wounds of the soft tissues of skull are very rarely (meningitides - 0.1o/o, meningoencephalites - 0.2o/o, abscesses - 0.1o/o).

Some data on pathological anatomy.

According to published data the wounds of soft tissues were the insignificant percentage of all sectional cases of the bullet damages of skull.

It was above indicated that the wounds of the soft tissues of skull were single and set. According to the data of the developed maps/charts/cards of sections, into 6.6o/o of cases of the wound of soft tissues the skulls were combined with other (penetrating) wounds of skull. In the unit cases the penetrating character/nature of the latter with life was not identified.

The wounds of the soft tissues of skull are simple on building/structure. Their sizes/dimensions in the majority of the

cases oscillated in the limits of 0.5-5 cm. The form of wound aperture was different and to a considerable degree conditioned by the character/nature of wound.

Page 238.

With tangential wounds it approached rectangular, with blind ones - to circular. Kray the wounds of limber were torn, crushed, impregnated with the blood and had dirty purple color. With the significant margins of skin galea aponeurotica edge of wound resembled to rags, turned by free end to wound canal. Sometimes, true, it is considerably thinner/less frequent than with blunt injury, was observed partial scalping (less than 1.0o/o cases). As the bottom of wound served deep layers of skin, galea aponeurotica, periosteum or bone. In the unfinished wound the ordinary finding were the hair, the small pieces of the tissue of head-gear, the fragments of helmet and so forth, etc. Frequently with blind wounds in depth wounds found the wounding shell. With wounds by the fragments of the mines, which were torn at close distance, small/fine metallic particles were introduced in edge and the periphery of wound. Small wounds often in the first twenty-four hours were already covered/coated with the rapidly gotten dry crust.

In 2.4o/o of cases (according to the data of the

maps/charts/cards of sections) with the wounds of soft tissues were observed the breaks of the internal plate of the bones of skull. Frequently the fragments of internal plate damaged shells and substance of brain. At the same time the violations of the integrity of shells and substance of brain were encountered also with the completely undamaged/uninjured bones of skull (into 10.2o/o). In this case into 4.8o/o of cases were observed the contusion foci in the substance of brain, into 2.4o/o - sub-arachnoidal hemorrhages, into 1.8o/o - subdural hemorrhages and into 1.2o/o of cases - epidural hemorrhages. Actually the wounds of soft tissues, which were being escorted/tracked by the enumerated intracranial changes, it should be related to the closed injury of skull. In morphological sense the contusion foci and tunicary hemorrhages with the wounds of soft tissues differed in no way from analogous changes with the closed injury and the nonpenetrating wcunds of the bones of skull.

With the wounds of soft tissues in the periphery of wound greatly frequently were observed the small hemorrhages, which gave to its edges crimson stain/staining. Considerably thinner/less frequent (3.6o/o of cases) were observed the accumulations of the blood between the individual layers of the integuments of skull, is more frequent under galea aponeurotica and sometimes under periosteum. Large/coarse hematomas of soft tissues were observed rarely and they were arranged/located in temporal or postcranial region. In the

uncomplicated cases small hematomas were resolved. Unremoved/uneliminated large/coarse hematomas finally were replaced by dense connective tissue, among collagenic filaments of which were detected the accumulations of the macrophages, filled with the small lumps of hemosiderin.

In certain cases of the wounds of soft tissues already into the first hours the surface of the exposed bone in the restricted sector had the gray-blue stain/staining. On the cut of this sector of bone could be seen gummy substance saturated with blood. Subsequently in the region of such intracsseous/intraosteal/endoosteal hemorrhages sometimes was developed osteomyelitis.

The infectious complications of the wounds of soft tissues were encountered rarely, usually only during comparatively deep damages (wound galea aponeurotica and deeper layers of soft tissues). Most important complications they were: festering wound canal, festering around foreign body, phlegmon and osteomyelitis. High value for the development of complications had an absence of surgical perfecting of wounds. Complications primarily of the processed wounds were observed extremely rarely.

Festering wound canal was escorted/tracked by the appearance of purulent exudate, which filled wound canal and secreted from wound.

Page 239.

During the histological research of the walls of wound canal was detected ordinary purulent inflammation. Festering wound canal in the majority of the cases concluded without further complications of the healing of wound via secondary tension. In more rare cases festering wound canal was complicated by phlegmon or osteomyelitis. Exclusively rarely festering wound canal served as the source of the dissemination of purulent infection into the area of skull. In the presence of tunicary hematomas or contusion foci in the substance of brain sometimes was observed their infection, rarely led to purulent leptomeningitis.

The phlegmons of soft tissues usually were developed during festering of wound canal, but sometimes they appeared and independently. More frequently were observed the subaponeurotic phlegmons, which in a number of cases led to peeling galea aponeurotica from periosteum. The cases of intracranial dissemination of purulent infection from phlegmons were observed very rarely. The course of phlegmons in certain cases was complicated by the secondary hemorrhage reason which was the melting of the wall of vessels.

The peculiar complication of the wounds of soft tissues was the festering around foreign body, which appeared in different periods and it frequently continued sufficiently for long. The storage of exudate in the depth of soft tissues into some cases led to the education of phlegmon, in other, more frequent cases - to the formation of the fistula, covered by the granulating tissue, separating/liberating pus. This fistula could simulate osteomyelitis. During festering around the foreign body, which lies directly on the surface of bone, sometimes actually/really appeared osteomyelitis of the subject of the sectcr of bone.

Osteomyelitis of skull, according tc the data of the maps/charts/cards of sections, complicated the wounds of soft tissues (without the damage of bones) into 0.6o/o of cases. It was observed during the extensive damages of soft tissues, the traumatic or operational exposure of bone, subperiosteal hemorrhages, hemorrhages into gummy substance of bone, purulent processes in soft tissues. A vital difference in osteomyelitis, which complicated the wounds of soft tissues, from ostecmyelitis with other means of the wounds of skull was the absence of the traumatic violation of the integrity of the bones of skull. Osteomyelitis with the wcunds of soft tissues on extent, as a rule, was restricted, moreover usually were destroyed the bones of the arch/summary of skull. Was otserved surface and deep osteomyelitis.

Surface osteomyelitis was macroscopically characterized by the damage/defeat only of the external plate of the bones of skull. Inflammatory process almost always led tc the education of multiple sequestrations from the surface strata of the external plate of bone. Sequestrations rarely exceeded 1 cm in diameter and were thin, brittle, yellowish plates with the notched edges and rough internal surface. After the distance/separation of sequestors was detected the uneven corroded grey-yellow surface of deep layers of external plate. In the overwhelming majority of the cases were observed the fistulas, which were being opened/disclosed on the surface of head, sometimes in the thickness of fresh scar. The walls of fistula formed granulating tissue, unit raised above the external aperture of fistula.

Deep osteomyelitis which was encountered more rarely, it was characterized by the damage/defeat of the porcus substance of bone. Essential pathogenetic factor were necrotic changes in external plate of bone, which appeared as a result of the traumatic or operating peeling of periosteum.

With deep osteomyelitis usually was observed the sequestration of the casualty sector of bone. Sequestrations more frequent were single and they achieved considerable sizes/dimensions (to 6 cm). Usually they took the form of the oval or oblong plates of yellowish color with serrated edges, smooth external and rough internal surface. The sutures of skull did not impede the spread of osteomyelitis. Were observed the cases, when sequestrations consisted of the adjacent to each other bones and encompassed the unit of the suture skulls. Sequestration usually consisted of external plate and unit of the porous substance of bone. After the distance/separation of sequestration was bared rough jelly-like consistency the porous substance of grayish-yellow color, impregnated with pus. Were encountered the cases of the simultaneous sequestration of the external and internal plates of the bones of skulls, which were being escorted/tracked by the development of external purulent pachymeningitis. Deep osteomyelitis was characterized by the long unhealing wound of soft tissues. During the histological research of the sectors of the casualty bone was detected the picture of purulent inflammation with necrotic changes.

A question about the traumatic violation of the integrity of the bone of skull in the cases of osteomyelitis frequently could not be solved even by anatomical pathologist.

Exclusively rarely osteomyelitis led to the dissemination of suppuration into the area of skull and the formation of purulent pachymeningitis, leptomeningitis, encephalitis or abscess of brain. During war were observed the cases of the septicopyemia, proceeding from osteomyelitis of skull with the wounds cf soft tissues. Sometimes in this case was observed the thrombosis of the sinuses of solid cerebral shell with the purulent melting of thrombus.

The anaerobic infection of the wounds of the soft tissues of skull was observed rarely. The described cases always are not reliable ones.

According to the data of the maps/charts/cards of sections, in the overwhelming majority of the cases of the wound of soft tissues the skulls accompanied other, heavier wounds. In certain cases with the clinical diagnosis of the "wound of the soft tissues of head" with autopsy were detected the damages of the bones of the skulls, not identified intravitally. Such cases were related to the group of the nonpenetrating wounds of the bones of skull and in the statistical data in question were not included. In 5.4o/o of sectional cases of the wcunds of soft tissues by them was given the primary meaning in the offensive of the fatal result. The reason for death in these cases they were:

The contusion foci with the decomposition of the ventricles of brain ... 1.2o/o.

The contusion foci, complicated by acute edema or bloating of brain ... 0.6o/o.

tunicary hemorrhages ... 1.2o/o.

Festering contusion foci and tunicary hemorrhages, which ended by general/common/total purulent leptomeningitis ... 1.2o/o.

anaerobic infection ... 0.6o/o.

festering wound canal in soft tissues, complicated by purulent leptomeningitis ... 0.6o/o.

From the given data it is obvious that those a little the case of deaths which were observed with the wounds of the soft tissues of skull, in essence were caused by intracranial damages and in an insignificant quantity of cases they were only the result of the complication of the very wound of soft tissues.

Clinic.

The wounds of the soft tissues of skull although are related to the group of light wcunds, are nevertheless scsetimes escorted/tracked by the damages of brain and its shells, which considerably burdens these wounds and in a number of cases requires urgent surgical intervention.

The ease/lightness of the bullet wounds of the soft tissues of skull is caused: 1) by the surface disposition cf wound canal in the limits of skin integuments, muscles and periostea; 2) by homogeneity and by simplicity of building/structure of wound canal, just as by the simplicity of the pathoanatcmical changes, which develop in these tissues; 3) with the absence or meagerness in overwhelming majority of the wounded cerebral symptoms; 4) by the rarity of severe infectious complications from the side of brain and its shells and by the predominance of less risky forms in the form of the surface phlegmons of soft tissues, planar osteomyelitis and purulent fistulas; 5) usually by the favorable course of the wound of the soft tissues of head, in spite of bacterial contamination of its fibrous unit and strong hemophilia, connected with exclusively rich vascularization.

Everything said determines in the majority of the cases the

rapid healing of the wounds of the soft tissues of skull and the complete recovery of wcunded.

Detailed description of the wound of the soft tissues of skull, depending on the depth cf damage/defeat and character/nature of bullet wound, is given in the chapter, dedicated to the classification of wounds, and in chapter about treatment.

Special attention with the examination/inspection of wound turned to the condition of bone with its exposure, since frequently roentgenological examination/inspection did not reveal/detect small cracks, scratches, breaks of internal plate, etc. Surgeon's attention must draw a change in the color cf bone, since cyanosis frequently indicates the intraosseous/intraosteal/endoosteal hemorrhage or the break of internal plate, and yellow or dark color, and also dryness of bone they are frequently the signs/criteria of osteomyelitic process.

The local sickliness of bone usually testifies about the break of internal plate or even about epidural, subdural and sometimes intracerebral hematoma. D. G. Schaeffer gives to this sign/criterion the leading value, considering as his straight/direct reading to trepanation.

The observations, carried out during the Great Patriotic War, showed that simple and lungs in the surgical sense of the wound of the soft tissues of skull can be escorted/tracked by the damage/defeat of brain and its shells. In these cases is developed one or the other neurologic symptomatology, which depends both on depth and force of damage/defeat and on localization of wound. During the damage/defeat of brain and its shells the wounds of soft tissues in character/nature and course approach the closed injuries of skull.

The wound of the soft tissues of skull is frequently escorted/tracked by the loss of consciousness, usually short-term, on what indicated still our compatriot O. M. Khol'bek according to the data of Russo-Japanese war 1904-1905. During Great Patriotic war, according to the data of the maps/charts/cards of the deepened characteristic, the loss of consciousness with the wounds of the soft tissues of skull is noted into 56.9o/o of cases. It should be pointed out that into this group are connected all cases of the violation of consciousness, including its short-term blackout, etc. Therefore a quantity of cases where there was the "true" loss of consciousness, will be, of course, considerably less.

Page 242.

The wounds of soft tissues flow/occur/last usually without

neurologic symptomatolcgy. However, as showed the data of the maps/charts/cards of the deepened development, individual symptoms can be observed, also, with the wounds of the soft tissues of skull (Table 27).

Thus, from neurologic symptoms with the wounds of the soft tissues of skull most frequently were observed vertigoes and violations of rumor. The symptoms of the stimulation of cerebral shells are noted in 1.9o/o of all wounded. From focus symptoms in the first place in frequency stand motor violaticns (3.0o/o), violations of sensitive sphere (1.5o/o) and finally different disorders of the speech of central origin (0.9o/o).

The given data confirm the need for the careful neurologic examination/inspection of those wounded in soft ones the tissue of skull.

According to N. I. Grashchenkov's data, the considerable percentage of the wounds of the soft tissues cf skull is escorted/tracked by the different degree of the contusions of brain.

In the majority of the cases such contusions easily and rapidly pass. Most frequently in these cases was observed general cerebral symptomatology. Sometimes with lumbar puncture is noted the elevated

pressure of cerebro-spinal fluid.

Of contusion focus symptoms from of different areas more frequently were observed nonpersistent paresis, it is rare paralyses of extremities, violation of sensitivity and aphatic disorders.

Special importance must be attached to the tunicary symptoms, which are the most sensitive exponent and force of damage. With the wounds of temporal and frontotemporal region, besides the symptom of Kernig, there can be irradiating pains into temple, orbit and upper jaw on similar/analogous side.

L. Ye. Kortyn, observing 128 those wounded in soft ones the tissue of skull, in 38 of them established/installed sub-arachnoidal hemorrhage.

In the clinical picture of sub-arachnoidal hemorrhages with the wounds of the soft tissues of skull during the first days frequently it was possible to note a subfebrile increase in the temperature. Bradycardia was not observed; more frequent into the first two days was noted tachycardia. Headaches, as tunicary symptoms, were variable. Focus cerebral symptomatology was also observed not always and it was rapidly passing.

Table 27. Frequency of the presence of different symptoms with the bullet wounds of the scft tissues of skull (in percentages).

(1) Симптомы	(2) Частота
(3) Головокружение	20,8
(4) Ослабление слуха	5,1
(5) Шум в ушах	3,6
(6) Оболочечные симптомы	1,9
(7) Брадикардия	1,6
(8) Двигательные нарушения	3,0
(9) Нарушения чувствительности	1,5
(10) Расстройства речи	0,9

Key: (1). Symptoms. (2). Frequency. (3). Vertigo. (4). Weakening rumor. (5). Noise in ears. (6). Tunicary symptoms. (7). Bradycardia. (8). Motor violations. (9). Violations of sensitivity. (10). Disorders of speech.

Page 243.

Thus, the clinical symptomatology of sub-arachnoidal hemorrhages with the wounds of the soft tissues of skull is variable, and a precise diagnosis can be set only after cerebrospinal puncture (blood-containing cerebrospinal fluid). Sometimes wounded the soft tissues of skull at first of complaints did not present, itself it felt well and only later several days in it appeared headache and nausea. However, neither tunicary nor focus cerebral symptoms come to light/detected/exposed cculd not be. Cerebrospinal puncture indicated

the presence of sub-arachnoidal hemorrhage.

The wounded the soft tissues skulls in the presence in them of focus symptoms must be located in the specialized hospitals.

The wounded, in whom soon after entrance into hospital (to 10 days) is detected the tendency toward the reverse/inverse development bothof focus, general cerebral, and also tunicary symptoms in the absence the data, which indicate the violation of the integrity of bone, operated should not be. However, perfecting the wound of soft tissues in these cases is carried out through the general/common/total principles, presented below. Presence of stable focus symptoms, manifestation of tunicary phenomena in combination with the symptoms of the increased intracranial pressure (headache, nausea, apathy, bradycardia, etc.) and especially the build-up/growth of entire enumerated symptoms serve by reading to surgical intervention - the trepanation of skull.

According to data some authors, the most frequent reason for the hypertension phenomena were subdural hematomas. It should be pointed out that with subdural hematomas hypertension phenomena can be developed gradually, in the specific time after injury when occurs the organization of hematoma, which calls local edema - the bloating of brain. The organization of hematoma clinically frequently becomes

apparent by focus symptomatology.

The phenomena of intracranial pressure increase with the wound of the soft tissues of skull were caused not only by hemorrhages (epidural, subdural, intracerebral), but also cystic restricted and diffuse arachnoidites, or by edema - the bloating of brain. Surgical intervention in these cases gave usually positive result.

During the treatment of sub-arachnoidal hemorrhages is recommended cerebrospinal puncture. It is here important in practical sense to establish/install the height/altitude of cerebrospinal pressure, since on this depend therapeutic measures.

To patient necessary is bed mode/conditions to 15-20 days and dehydration therapy.

After the small sub-arachnoidal hemorrhages of heavy consequences usually it does not remain, and wounded after three-week hospitalization and further medical observation during 2-3 weeks they heal.

One should emphasize that the cerebral symptomatology with the wounds of the soft tissues of skull can become apparent relatively late. Therefore such wounded must be found under the observation of

the doctor who during the first manifestations of cerebral symptoms is obligated to draw for neuropathologist's consultation. In a number of cases immediately after the wounds of the soft tissues of skull there was no indications of intracranial damage/defeat, and only subsequently, sometimes after prolonged period, appeared cerebral symptomatology as a result of the development of purulent complication from the side of brain or its shells.

Page 241.

Purulent complications are observed as in the form of that restricted, that and diffuse infection (festering hematoma, abscess, purulent encephalitis, meningoencephalitis, meningitis). After the wounds of the soft tissues of skull sometimes were noted the complications from the side of brain and its shells of noninfectious nature - arachnoidites, foci of contusion softening, cyst.

From entire aforesaid it follows that with the wounds of the soft tissues of the skull (it is true, in a small number of cases) can be casualty brain and its shells, which brings the wounds of the soft tissues of skull closer to its closed injuries.

The wounds of the soft tissues of skull are related to the group of the lungs; however, this on no account eliminates the needs of the

most careful and most attentive examination/inspection of these wounded for exclusion or setting in them of one or the other neurologic symptomatology, which indicates the damage/defeat of brain or its shells. The underestimation of the wound of the soft tissues of skull leads to heavy and even disastrous consequences, about which tells the following observation.

P. entered into one of the evacuation hospitals to the 5th day after the tangential fragmentation wound of the soft tissues of left sincipital region. With wound was noted the short-term loss of consciousness. At the moment of entrance into hospital the condition of wounded satisfactory, consciousness clear, there is no focus symptomatology. Wound in left sincipital region by the size/dimension 6x3 cm, with even edges, considerable exposure of bone, with moderate purulent discharge. With the examination/inspection of the wound of damage to bone it is not discovered. In the X-ray photographs of damage to bone it is not discovered. Further carving of the edges of wound it was not conducted. Wound was treated by rare dressings with weak antiseptic solutions. Through 2 1/2 weeks the bone darkened, it acquired dirty green hue. For the first time appeared complaints of headache. After 2 days developed meningeal symptoms. With lumbar puncture is obtained turbid cerebro-spinal fluid under high pressure. Cytosis 3680, sharply positive protein reactions. In the blood leukocytosis, shift/shear of the formula of

the white blood to the left, increased ROE, mcderate anemia. Is initiated the course of sulfanilamide therapy. Next day process/operation. Are cut all cver edge wounds. Is superimposed cutter aperture. Bone is soft. Diploe is impregnated with dense green pus. Bone is trepaned tc unchanged sections (6x4.5 cm). On the surface of solid cerebral shell are discovered they are purulent the raids. In several places the latter in the form of the narrow purulent tags they perfcrated sclid cerebral shell. Pcst-operation course is heavy. Grew stupefaction, general/common/total apathy, cachexia, bilateral pneumonia. Appeared stagnant phenomena on ocular day. With the punctures cf subtunicary space and brain of pus it is not discovered. Seeding/inoculation of the blcod gave increase of Streptococcus pyogenes. Was set the diagnosis of sinus thrombosis. Use/application of sulfanilamides and anti-streptococcus serum effect did not give. Is produced the puncture of upper longitudinal sinus. Is obtained the liquid blood. Sinus was not revealed. Next day lethal outcome. On the autopsy: the small sector of the impregnation of bone by pus in the posterior department of trepanation window. Small/fine epidural abscesses, by the places perforating solid cerebral shell with education in the brain core of surface smallest abscesses. In the posterior department of upper longitudinal sinus (y confluens sinuum) the septic thrombus near the wall. On the basis of brain - turbid arachnoidal joints. Abcess-forming bilateral pneumonia.

The given above observation sufficiently demonstrative shows the route/path of the dissemination of infection from the wound of soft tissues into depth on directions to shells and brain. As is evident, the extensive exposure of bone with wound in combination with its unnoticed smallest capillary small cracks or the breaking of internal plate favor the development of osteomyelitic process.

Contusions and small damages of solid cerebral shell and cerebral cortex make possible the dissemination of infection still deeper.

Page 245.

It is doubtless, considerable role in the dissemination of infection play the wounds of the emissaries which connect the venous net/system of soft tissues with intracranial venous net/system.

Treatment of the uncomplicated wounds.

SURGICAL TREATMENT.

A large quantity of those wounded soft tissue of skull gives to methods and periods of the treatment of the damages indicated particularly important practical value.

First of all does arise the basic question: all whether bullet wounds of the integuments of skull are subject to surgical processing? Before answering it, it is necessary to be stopped at two facts.

First, the special features/peculiarities of the anatomical building/structure of the soft tissues of skull (small thickness,

good conditions for the outflow of wound contents, abundant blood supply, absence on the arch/summary of the skull of cellular and muscular layers) create unfavorable conditions for the develcpment of the taking root with wound micrcbes and they contribute to the relatively smooth course of wounds. Anatomical conditions make it possible during surgical processing tc thoroughly remove the nonvital and contaminated sectors of tissues and in the majority of the cases to finish primary processing by tne imposition of anechoic suture.

In the second place, the existing methods of diagnostic research, including roentgenological, during their mass use/application under field conditions do not always give the possibility to exclude the presence of small cracks or breaks of the bones of skull. It is known, in particular, that the damages of external bone plate (crack, restricted depressions and intraosseous/intraosteal/endoosteal hematomas) usually in X-ray photographs are not detected and are established/installed only on operating table after the careful revisicn of the damaged sector of skull. Therefore it is necessary to recognize that primary surgical processing must undergo all wounds of the soft tissues of skull during the damage of the integrity of the aponeurosis and deep-lying tissues.

Are not necessary in surgical treatment only the surface

tangential damages of one skin (without the disagreement of the edges of wound). Such damages rapidly (during 7-10 days) heal under incrustation or under the bandages, impregnated with weak antiseptic solutions/openings.

Early anechoic suture. The primary surgical processing of the bullet wounds of the soft tissues of skull must precede the shave compulsorily of an entire surface of head, in order not to look over supplementary small-splintered wounds.

Anesthetization, as a rule, local - laminar infiltration of anesthesia by 0.5o/o solution of novocaine. The impregnation of all layers provides the complete painlessness of tissues. A great quantity of solution is introduced under the aponeurosis so that the formed "cushion" would raise integuments on 4-5 cm in the periphery of wound.

To carving are subject tangential wounds, and also small unit of the through ones and [illegible] ones (with the slantwise going channel). Sections/cuts as far as possible are done simple, and if allow form and position/situation of wound, then in parallel to the course of arteries, i.e., radially with respect to the arch/summary of skull.

With this less are damaged the vessels and are created the best conditions for the healing of wound. Exclusion present the wounds of the frontal region where for cosmetic reasons sections/cuts are done on the course of the natural folds of skin.

Basic requirement lies in the fact that section/cut would attach to wound form, that the periods of the treatment of the wounds of the soft tissues of skull, frequency and severity of the subsequent complications in many respects depend on the value of the defect of soft tissues, especially if the latter is spread to periosteum. Therefore the carving of the integuments of skull makes sense only in such a case, when it is finished by the occlusion of wound or at least by the considerable decrease of its sizes. Otherwise the process/operation only increases the hiatus of defect and makes the conditions worse of healing. The experiment/experience of the Great Patriotic War completely confirmed the correctness of this point of view. The carving of wounds in the form of "ovals" or "rhombs", which was being applied during the first year of war by individual surgeons, it was gross error and it unconditionally increased the frequency of surface osteomyelitis of skull (Fig. 48).

The carving of wound is conducted compulsorily in layers. First

is driven out only skin- aponeurotic layer. The cessation of hemorrhage is achieved via the pressure of skin on the edges of wound to the bones of skull with the subsequent gripping of vessels by terminals. Then will be inspected periosteum and in the case of wound also it is cut all over, but it is more economical than surface stratum. Generally periosteum must be in every way possible spared. If it is not damaged and contaminated, impregnated with the blood and it is not scaled from bone by hematoma, driven out it should not be. In the doubtful cases for the examination/inspection of the proper sector of bone the periosteum is cut by small linear section/cut with the subsequent approach of its edges. The plastic of periosteum it is very difficult, and large defects in it can cause the necrosis of bone, which for a long time complicates the course of wound.

Furthermore, the integrity of periosteum contributes to the education of mobile/motile skin scar.

In the presence of subaponeurotic or subperiosteal hematomas the latter as far as possible they drive out, what helps the washing of the wound with a stream of warm physiological solution. However, to attempt to retract hematoma completely during extensive hemorrhage is inexpedient. This will cause the excessive injury of tissues and can lead to the transfer of infection in undamaged/uninjured sectors.

With the tangential wounds of the soft tissues of skull the best section/cut, which usually ensures the subsequent approach of the edges of wound, is the simple bordering section/cut (Fig. 49).

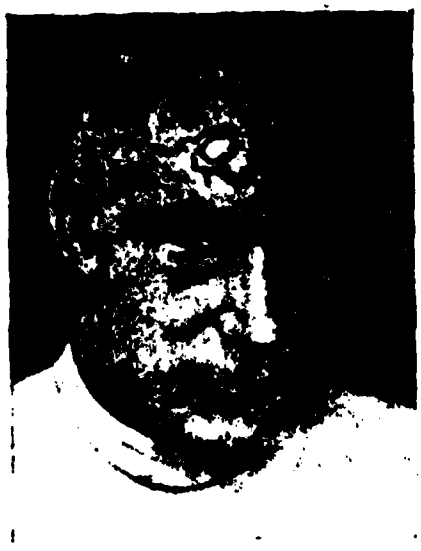


Fig. 48. Exposed sector of bone with the excessive carving of the wound of soft tissues.

Page 247.

With wide hiatus and exposure of bone the sewing up of it is possible only after the mobilization of wound, for which in such cases it is necessary to deposit the lateral skin-aponeurotic cuts, which decrease the stress/voltage of tissues. However, with the latter one ought not to damage periosteum.

If wound has the lateral pockets with the considerable scaling of the aponeurosis, which contain sand, scraps of hair, the clothing and other small/fine foreign bodies, then for occluding the defect

also it is necessary to sometimes deposit supplementary splitting up.

The perforating wcunds of integuments, which are characterized by short canal and called by small/fine fragments, are more frequent on the spot of the remaining compartments of the arch/summary of skull (region of frontal and postcranial mounds), in a number of cases it is possible tc cut all over together with intake and outlet. So they act with the unit of the blind-end wcunds where there is a relatively long course in the integuments of skull.

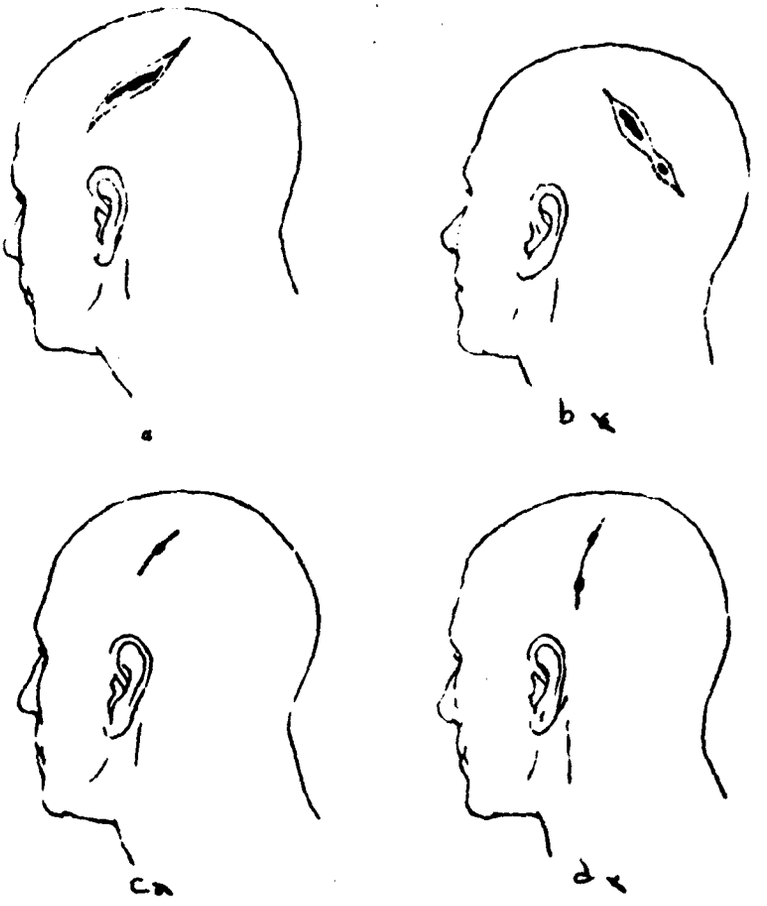


Fig. 49. Schemes of carving and splitting up of the wounds of soft tissues. a, b) the carving of the wound; c, d) splitting up wound.

Page 248.

With the wounds of irregular form it is necessary to apply more complicated sections/cuts and to attempt to compulsorily cover the

nude sector of bone.

An important question is the determinatien of the periods of imposition on the wounds of anechoic suture. Practice showed that the primary carving of the wound of the soft tissues of skull with the subsequent sewing up of its edges gives a good result in the absence of the signs/criteria of inflammation, i.e., in the first two days after wound.

By basic contraindications to the imposition of primary anechoic suture on the wound of the integuments of skull, in the opinion of different authors, they are: 1) festering wound with the marked signs/criteria of inflammation, 2) the strong contamination of wound with small/fine foreign bodies which it is impossible to move away completely, 3) the wounds of a lower-temporal and lower-postcranial region where the layer of muscles is more expressed, 4) wound with the large scaling of the aponeurosis and the presence of hematoma.

In the latter/last two cases surgeons' majority produced the partial approach of the edges of wound (laying sutures).

As is shown experiment/experience, for conducting the skin section/cut sufficiently it is to step back from the edge of defect on the average on 5-7 mm.

If from the moment/torque of wound it passed not more than two days, it is possible to be restricted to the distance/separation of the less thick strip of tissues, which is important during processing of the open unit of the frontal region.

Suture technique is simple: is laid it into one tier, in this case the skin is captured compulsorily together with the aponeurosis. In the lower bearing/angle of wound under the aponeurosis is started the graduate in water of the thin strip of glove rubber. Graduate is extracted after 1-2 days.

After process/operation on head is laid the dry pressure bandage with the wadded cylinder which is placed in wound above the gauze towel before bandaging.

Primary splitting up of wounds is shown with all blind-end wounds of the integuments of skull, including plumb ones; its main target - revision of bone. Diagnostic errors are observed most frequently precisely with blind-end wounds, and therefore the latter require the greatest attention. Especially this is related to the wounds of the temporal region where the breaks of thin bone always are not revealed/detected roentgenologically.

Splitting up of wounds is carried out by linear section/cut on the course of the vessels of this region and it is compulsory at entire depth of wound canal. With blind-end wounds on the day of wound canal frequently are detected the scraps of hair and head-gear, carried by the wounding fragment. Section/cut in 3-4 cm of length completely provides the distance/separation of foreign bodies and the examination/inspection of the subject of the sector of bone. Those contaminated of the edge of inlet and wound course in a number of cases can be cut all over.

When the multiple small-splintered wounds of the soft tissue of skull are present, (sometimes more than 10) it is necessary to process only the most "suspicious" wounds, which penetrate under the aponeurosis. The wounds of temporal region are subject to necessary surgical revision.

During processing of wounds it is necessary to bear in mind the possibility of wound by secondary shells (fragments of calculi, glass, tree/wood, etc.), which give weak shadow or completely are not reflected/represented in X-ray photographs.

In winter in Zapolyar'ye were observed the multiple wounds of

the integuments of head by the acute/sharp as razor, fragments of ice. These wounds were characterized by low size/dimension, by linear form and they did not gape, although they penetrated under the aponeurosis.

Page 249.

With through wounds of the soft tissues of skull with relatively long subcutaneous canal the latter is revealed by the section/cut, connecting both apertures. In the ratio of the periods of perfecting wounds, contraindications to the imposition of anechoic suture, its technology and other moments/torques of process/operation the surgeons usually adhered to the same tactics as with the carving of wounds.

A primary-deferred suture on the integuments of skull is applied comparatively rarely. It is shown mainly with the wounds of a lower-temporal and lower- postcranial region where the primary perfecting of wounds is not escorted/tracked by their complete occlusion. Suture is laid before the appearance of granulations, i.e., into the first 4-5 days after carving, if to the period indicated did not appear purulent infection. Its imposition technique does not differ from previously described.

Secondary suture. Ic all wounds of the soft tissues which according to one or the cther reasons did not undergo primary perfecting or the latter was not completed by the sewing up of wound, is laid secondary suture. The earlier was applied this suture, the better there were the results and the shorter the period of treatment.

To it it is necessary to resort at the first opportunity, independent of the period, which passed from the moment/torque of wound, as soon as will allow tne condition of wound and wounded.

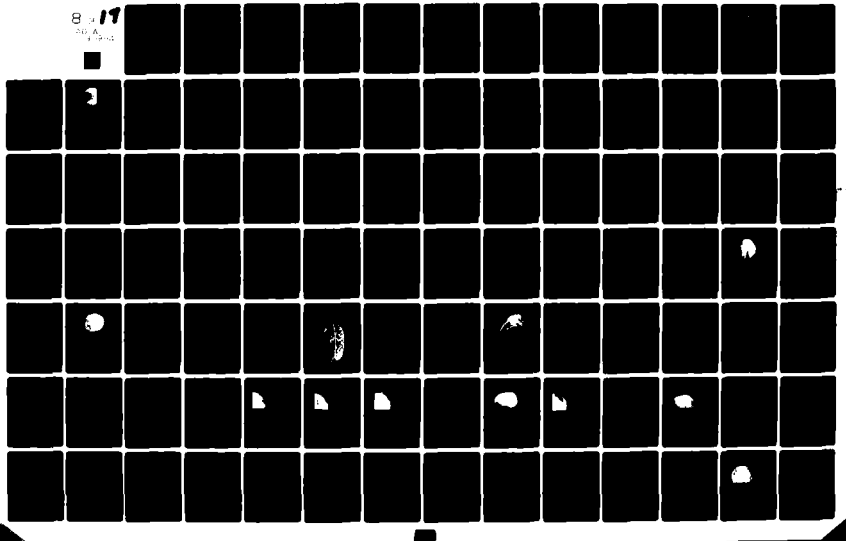
Contraindications tc the imposition of secondary suture are divided into general/common/total cnes and local ones.

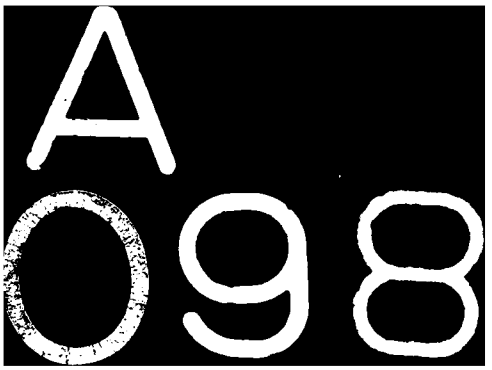
The first include the presence of the associated diseases or wounds, which are escorted/tracked by feverish condition, and also the sharp general/commcn/total depletion of wcunded.

To the second it is related the inflammation of wound with ichorous, purulent or serous- purulent discharge, different dermatitides and maceration of skin in the periphery of wound, osteomyelitis of skull.

In accordance with this training wounded for the

AD-A090 984 FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OH F/G 6/5
THE EXPERIENCE OF SOVIET MEDICINE IN THE GREAT PATRIOTIC WAR 19--ETC(U)
FEB 80 V N SHAMOV, B A SAMOTOKIN
UNCLASSIFIED FTD-ID(RS)T-1925-79 NL




A
098

process/operation of secondary suture is composed from the measures of general and local character/nature.

The general/common/total ones include the struggle with the basic disease, which calls an increase in the temperature of body, the intensive nourishment and other substances. High value has addition to the food of vitamins, especially vitamin C.

In a number of local measures in the first place stand the substances, directed toward the elimination of inflammatory changes in wound itself and in its periphery. The success of the process/operation of secondary suture depends, first of all, on the degree of the infection of wound.

For accelerating the process of the cleansing of wound from microorganisms and regeneration of tissues are applied chemical, physical and biological methods. Most practical value had first two.

From the chemical substances, which obtained in war mass use/application, it is necessary to note the solutions of sodium chloride (5-10o/o), permanganate potassium (1-3o/o), Rivanol (1:1000), chloramine (1-2o/o) and other weak antiseptics[1].

FOOTNOTE [1]. In detail about this see in the section of "Work",

dedicated specially to the wounds of the soft tissues of body. ENDFOOTNOTE.

Very good effect during the treatment of the purulent wounds of soft tissues skulls showed the emulsion of sulfanilamide preparations in which is included the fish oil.

Page 250.

Among the physical methods of treatment of more frequent than others was applied the irradiation of wound by the increasing doses of quartz in a day/every other day during 8-10 days.

Bacteriophages, different sera and other biological substances did not receive wide distribution during the treatment of the wounds of the soft tissues of skull, although according to the observations of the individual surgeons gave good results.

For the preparation of the wound of the soft tissues of skull for the imposition of secondary suture one of the methods indicated depart on the average of approximately 10-12 days. As show control seedings/inoculations, during this period the wound almost completely is cleaned of the micrcflora; clinically this coincides with the disappearance of purulent discharge. Redness and swelling of skin on

the edges of wound to this period also pass.

To apply antiseptic bandages to wound in the form of small gauze cloth is must daily during entire preparatory period, thoroughly observing asepsis of dressings. It follows to add that the microbial contamination of the wounds of the soft tissues, trained/prepared for secondary sutures, it did not have so large a danger, as wrote foreign surgeons.

High value for the success of process/operation has care of the cleanliness of skin - washing by its balls/spheres, moistened in soap water, and then rubbing by gasoline or by alcchol. Hair on head periodically are shaved cff.

In the presence of eczematcus stimulations the skins the latter daily cover/coat with the thin layer of zinc paste, with the solution 5o/o silver nitrate or by other substances with the aid of which usually succeeds in eliminating the complication indicated.

"Readiness" of the wound of the soft tissues of skull for the imposition of secondary suture is determined by two clinical signs/criteria: complete absence of purulent discharge and by normal state of skin integuments. Bacteriologically supervision of wound is desirable, but it is not necessary. The appearance of granulations,

the degree of their development do not have vital importance. Only the complete absence of granulating tissue during prolonged period from the moment/torque cf wound (more than 2 weeks) in the weakened wounded, that indicates a sharp decrease in the regenerative processes in wound, can serve as temporary/time contraindication to the imposition of secondary suture.

In the presence of the gaping wound with the exposure of bone it is necessary to use preparatory period also as far as possible to decrease its lumen via the gradual approach of edges with the aid of the strips of adhesive mat/patch. This makes it possible with stitching to avoid the supplementary lateral sections and other, more complicated methods of occluding the defect. With relatively small and narrow wounds this method provides the approach of the edges of wound and the success of surgical intervention.

The imposition technique of secondary suture little differs from the imposition technique of primary suture. Process/operation begins with the laminar carving of the edges of wound with the simple bordering section/cut compulsorily at entire depth together with granulations. The bottom of wound, formed usually Rubtsov changed periosteum, is also subject to distance/separation. Then will be inspected the surface of the exposed bone of skull and, if the latter is not casualty, they take up the sewing up of wound by knotted

sutures. Process/operation concludes with introduction under the aponeurosis of rubber strips for 24-48 hours.

In the case of the detection of the signs/criteria of osteomyelitis (change in the color of bone, its disintegration, etc.) the bone undergoes the special processing (see the appropriate section about osteomyelitis of skull).

Page 251.

During a good course of wound secondary sutures are removed/taken on the 8-10th day after imposition.

In post-operation period can be observed the following complications: subaponeurotic hematoma, festering of individual sutures or entire wound, subaponeurotic phlegmon. During the partial festering of wound usually it suffices to remove/take one-two sutures. Dissolved all sutures should be only during abundant festering with the sharply pronounced inflammatory reaction in the periphery of wound (swelling, reddening).

In conclusion it is necessary to note that good results of the secondary suture of the soft tissues of skull are nevertheless inferior to the results of primary suture, which once more tells in

favor of the latter.

GENERAL PRINCIPLES OF THE CONDUCT OF WOUNDED.

The general/common/total principles of the conduct of those wounded the soft tissues of skull are reduced in essence to bed rest, rational nourishment and medicinal/medicamentous therapy during readings.

If wounded at the moment of wound did not lose consciousness, bed mode/conditions can be restricted by 7-10 days during the smooth, asymptomatic course of process. Period the stays in bed increase to 2 weeks with the expressed general brain disorders, but without focus symptoms. As indication for inclining the wounded serves the reverse/inverse development of common brain violations. However, during observation of similar wounded one should be sufficiently to attentive ones in order to in proper time recognize organic disorders and to delimit them from functional layerings. In the latter/last cases excessively prolonged bed mode/conditions only moves aside the period of recovery.

The duration of bed mode/conditions in wounded with the expressed symptoms from the side of brain is determined by the dynamics of the reverse/inverse development of these symptoms and by

general condition. In any case previously getting up can be fraught with different intra-cerebral complications (hemorrhage, epileptic fits, etc.). It is extremely desirable to have at the wards where lie/rest those wounded the skull complete silence and strict isolation of these wounded in initial period frcm general-surgical easily wounded. The head of patient must be lain/fallen/laid in the elevated position/situation.

With the nourishment of those wounded the soft tissues of skull during the first days after wound must be considered the severity of damage. With the sharply pronounced common brain symptoms (vomiting, headache, etc.) for such wounded is necessary high-energy nourishment by frequent, but low portions. In the heavy, complicated cases to feed of wounded it is necessary for medical personnel. Medicinal/medicamentous treatment - symptomatic. With excitation, sharp headaches they assign veronal, luminal, pyramidon, etc. The introduction of narcotics is undesirable. The expressed phencmena of edema of brain made it necessary to resort to the dehydrating therapy.

During complicated course of wounds (phlegmon, erysipelatous inflammation, etc.), and also with infectious ccmplications from the side of brain and its shells are assigned antiseptics on the conventional schemes.

Occupational therapy it is shown after 3-5 days after the beginning of getting up, moreover it is necessary to consider the condition of wounded and to rationally dose load.

Page 252.

Complications and their treatment.

Hemorrhages, hematomas, aneurisms, phlegmons, etc.

The bullet wounds of the soft tissues of skull are escorted/tracked by different complications which can be divided into two basic groups: noninfectious and infectious.

The first includes external hemorrhages, hematomas, intraosteal and tunicary hemorrhages, aneurisms of surface vessels, reactive arachnoidites.

The second group includes purulent flows, phlegmons, fistulas of integuments, erysipelatous inflammation of skin, osteomyelitis of skull and intracranial purulent complications.

Hemorrhages. Primary arterial hemorrhage from the integuments of skull at the moment of wound is considerable, but it stops by the usually pressure bandage. Application of ligatures is required rarely, to them it is necessary to resort usually with the wound of the barrels of surface temporal and postcranial artery.

The dressing of vessels on PMP and in MSB apropos of hemorrhage from external temporal artery was required in the unit cases.

Venous hemorrhage from subcutaneous net/system usually insignificantly and stops spontaneously.

Hematomas. The special features/peculiarities of building/structure of the integuments of skull, the presence of several layers of tissues determine the type of hematoma and route/path of its dissemination. Are distinguished subcutaneous, subaponeurotic and subperiosteal hemorrhages. The expressed subaponeurotic space, carried out by loose cellulose, is the place of the greatest accumulation of the blood.

In appearance hematomas of soft tissues are lamellar and are spread predominantly in the direction of the lower departments of the arch/summary of skull, converting/transferring sometimes in posterior-lateral departments of neck and upper unit of the face.

Each wound of the integuments of head is escorted/tracked by the education of the hemorrhages indicated; however, in the majority of the cases they are limited to the circle limits of wound. Extensive

subaponeurotic and subperiosteal hemorrhages are encountered rarely and they are caused by the damage of relatively large/coarse arterial vessels (Fig. 50).

Greatest hematomas are observed with the wounds of the soft tissues of temporal and postcranial region, smallest - frontal. The issuing from blood impregnates the integuments of skull and after 2-3 days protrudes on the surface of skin in the form of bruises in typical places.

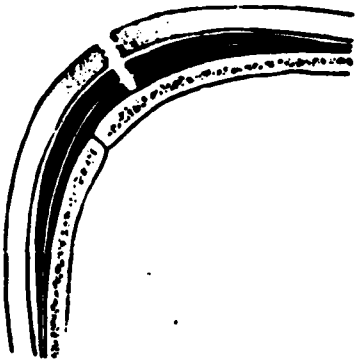


Fig. 50. Scheme of hematomas with the wound of soft tissues.

Page 253.

So, during damage to sincipital region subaponeurotic hematoma is spread down behind the ear (it is thinner/less frequent in front) to a posterior-lateral triangle of neck, with the wound of frontal region - to the side of the corresponding upper eyelid.

Considerable subaponeurotic and subperiosteal hemorrhages are driven out during primary surgical processing. Within later periods they usually are resolved. Only with extensive hematomas can be shown the puncture of integuements with the suction of the blood.

The special variety/subspecies of this complication are post-operation, relapsing/recidivism/recidivist/recidivity hematomas, observed sometimes as the complication of the puncture of vessels

with local anesthetization. The wound of artery by needle at the moment of the production of anesthesia with simultaneous introduction under the aponeurosis of a large quantity of solution leads to education at this place of hematoma. In such cases on the 2-3rd day after process/operation beside wound, on course after piercing needles, is detected the more or less restricted swelling, which slightly fluctuates with scanning. With its puncture from under the aponeurosis is exhausted the changed dark blood. Usually such a hematoma contains 10-15 cm^3 of the blood, sometimes it is more (to 50 cm^3).

Through several days after suction hematoma can again arise and it it is necessary to drive out repeatedly with the aid of syringe.

Intraosseous/intraosteal/endoosteal hemorrhages. The tangential wounds of the integuments of the skulls, especially bullet, and the unit of the blind ones are sometimes escorted/tracked by the contusion of the subject of the sector of bone with hemorrhage into diploetic substance. On bone in such cases with the integrity of external plate is determined the small macula of bluish hue. Experiment/experience shows that in this case usually are damaged not only the diploetic veins, but also internal bone plate. Therefore in the presence of intraosseous/intraosteal/endosteal hemorrhage in the unit of the cases is shown diagnostic trepanation by the cutter of

average caliber.

Tunicary hemorrhages. The wounds of the soft tissues of skull are frequently complicated by the tunicary hemorrhages, especially sub-arachnoidal. Their diagnosis and treatment are presented in chapter the "Nonpenetrating wounds of the bones of skull".

Aneurisms. Aneurisms and fluctuating hematomas in the integuments of skull are encountered extremely rarely, only into 0.1o/o of all cases of the wounds of the soft tissues of skull. Are arranged/located they in temporal and postcranial region along the course of the damaged barrels a. temporalis superficialis et occipitalis. Aneurisms have usually not more than 1-2 cm in diameter, but cause to wounded large sufferings. Permanent "hum" in the head forces wounded to insist on process/operation.

In view of the rarity of such complications is given the following case from practice (Fig. 51).



Fig. 51. Aneurism of surface temporal artery.

Page 254.

K. obtained the blind-end fragmentation wound of the soft tissues of left lower- temporal region.

Wound was escorted/tracked by the strong hemorrhage which was stationaryy pressure bandage.

In a day/every other day after wound wounded felt the noise in the left half head, which since then does not cease and causes to it permanent suffering.

In the neuro-surgical separation/section of front line evacuation hospital it entered 3 weeks after wound with the healed wound. Upon the examination/inspection of wounded in left temporal region, ahead of the pinna, is noted small fluctuating, oval form diverticulum, arranged/located on the course a. temporalis superficialis.

During palpation and auscultation of neoplasm distinctly is determined the characteristic noise of "gyroscope".

On process/operation (after wound) is discovered and cut all over aneurysmatic bag by size/dimension 3x1 cm together with the expanded sector of the barrel of surface temporal artery. Lower pole aneurisms was tightly soldered with the parenchyma of parotid gland. The perception of noise in the head of wounded ceased immediately following by distance/separation aneurisms.

Post-operation course smooth, on the course of skin scar was formed the "point" salivary fistula which was shut after several cauterizations by silver nitrate.

Treatment aneurisms operational. Surface disposition of vessel gives the possibility of full of carving aneurysmatic bag, and the presence of a large quantity of arterial anastomoses in the

integuments of skull provides the normal nourishment of tissues.

Morbid neuromas. To the group of rare complications with wounds of the soft tissues of skull is related the appearance of pains on the course of skin nerves. pains appear usually in the period of the healing of wound, apparently as a result of the compression of micro-neuromas by skin scar, predominantly in frontal and postcranial region on the course of branches n.supraorbitalis, nn. occipitales major et minor.

On intensity and duration these pains occur different and sometimes resemble neuralgic.

In some wounded of pain they pass through several days, in others they keep for long, and then it is necessary to resort to surgical treatment. In particular, is shown the blockade of each nerve or the carving of morbid scar.

Infectious complications. The special features/peculiarities of building/structure of the integuments of skull contribute to the relatively rapid healing of wounds in this region and to the weak manifestation of infection. During festering of wounds the process bears local character/nature, it flows/occurs/lasts favorably and is not escorted/tracked by general/common/total reaction.

Local changes consist of small reddening and swelling of the edges of wound, sense of buzzing/itch and weak sickliness. Purulent discharge is more frequent scanty; granulations are developed rapidly. The necrotic decomposition/decay of tissues is observed rarely and it destroys at first subaponeurotic cellulose and skin; the aponeurosis and pericsteum are involved into process lastly.

In the case of the delay of purulent discharge with blind-end and perforating wounds, not primary processed, is shown splitting up of wound canal.

The experience of the neurosurgeons of Western and 3rd Belorussian Front convinces that reversible sulfanilamide emulsions of better than other substances contribute to the rapid epithelization of the wounds of the integuments of head. The advantages of this method are especially noticeable when is exposed the sector of the bone of skull. The latter is rapidly covered/coated with granulations and more rarely becomes stiff.

Page 255.

Purulent flows and phlegmons. Phlegmons and flows are

encountered rarely (intc 0.7o/o) and complicate the predominantly flap wounds, abundantly contaminated by the fcreign inclusions/connections which were not thoroughly removed during primary processing. The rapid healing of skin wcund conducts in such cases to the delay of discharge under the apcneurosis, thinner/less frequent under periosteus, to the development of purulent flcw or phlegmon.

Sometimes the phlegmons of the soft tissues of skull appear later several months after wound with the gctten stronger scar. This is - result of the outbreak of the silent infection around small/fine metallic fragments.

The development of late phlegmons is characterized by acute/sharper beginning and is escorted/tracked by the moderate general/common/total reaction (small increase in the temperature - to 37.5-38°, by an increase of the leukocytes in the blood to 10,000-12,000).

Locally is noted considerable edema, stress/voltage and sickliness of integuments and sometimes an increase in the regional lymphatic glands. Purulent flows and phlegmons are spread predominantly in the direction of the lower departments of the arch/summary of skull. In particular, during the development of the

process in sincipital and postcranial region they can take the posterior surface of neck, and with localization in frontal region - cause tuberculous abscess in the tissues of upper eyelid. However, in the majority of the cases the purulent damage/defeat of subaponeurotic cellulose bears more or less restricted character/nature and is developed near infectious focus.

The treatment of complication is of the disclosure/expansion of areas linear sections/cuts with the subsequent draining of subaponeurotic space by thin rubber strips. The suction bandages with the hypertonic solution of common salt and designation/purpose inside sulfanilamide preparations contribute to rapid recovery.

Purulent fistulas. The source of purulent fistulas on the course of the healed wound of the soft tissues of skull are usually metal fragments or ligatures. Probing this fistula and control X-ray analysis of skull help to distinguish its reason.

Ligature fistulas are noted, in particular, predominantly in the temporal, postcranial and superciliary region where pass relatively large/coarse arteries.

Purulent fistulas, according to the data of the maps/charts/cards of the deepened characteristic, are observed into

0.7o/o of cases (with respect to a total number of wounds of the soft tissues of skull).

Treatment consists of splitting up of fistula course and distance/separation of fragments. In this case compulsorily should be inspected the adjacent sector of the bone of skull. Insignificant cracks and depressions of external plate can serve as the place of the development of cortical osteomyelitis, which supports festering.

Erysipelas. The erysipelatous inflammation of the fibrous unit of the head as the consequences of the bullet wounds of the integuments of skull in the Great Patriotic War was observed extremely rarely, that can be attributed for the indisputable achievements of the organization of the specialized aid.

Erysipelas can arise with the long not healing wounds, purulent fistulas and poor care of skin of head.

Erysipelas becomes apparent by typical for it heavy clinical picture, high temperature (to 41°) and blackout of consciousness.

Page 256.

After being begun around wound, erysipelatous inflammation is spread

in the adjacent sectors of integuments of skull with characteristic local changes in the skin. In this case purulent discharge of wound sharply is decreased or completely it disappears. Treatment of erysipelatous inflammation - ordinary (sulfanilamides, iodine, quartz irradiation).

OSTEOMYELITIS OF SKULL.

According to the data of the maps/charts/cards of the deepened characteristic, the bullet wounds of the soft integuments of skull are complicated by osteomyelitis into 0.2o/o of cases from a total number of wounds of the soft tissues of skull. Osteomyelitis most frequently appears after the tangential wounds with which the wound of soft tissues reaches the external plate of skull and captures periosteum. Frequently osteomyelitis is developed as a result of the exposure of bone with the excessive carving of the edges of the wound of the soft integuments of skull. Tangential wounds fairly often cause the considerable disturbance of the nourishment of the sector of bone, which is the bottom of the wound of soft tissues, as a result of which is developed local osteonecrosis or lamellar osteomyelitis. Depending on the value of the defect of periosteum and on the local conditions of blood supply, lamellar osteomyelitis can be: a) partial or surface, with which is torn away only external plate, and b) by complete or deep ones, for which are characteristic

the damage/defeat of porous substance and the sequestration of the almost entire thickness of bone.

Osteomyelitis, which complicates the bullet wounds of the soft integuments of skull, usually flows/occurs/lasts sufficiently favorably. Entire/all necrotized bone is completely torn away after only 6-8 weeks after wound, and process usually is not spread beyond the limits of the bottom of the wound of soft tissues.

The clinical picture of described osteomyelitis is uniform. Disease flows/occurs/lasts with normal or, it is thinner/less frequent, to subfebrile temperature. Patients frequently complain about headache, especially in the region of wound. In the blood frequently is detected small acceleration of ROE, but the formula of the blood usually does not change. During the neurologic research of such patients, as a rule, it is established/installed no pathological symptoms, since peripachymeningitides are not characteristic for osteomyelitis of this type.

The clinical and roentgenological diagnosis of osteomyelitis with the wound of soft tissues is most simple. Clinical diagnosis is based on the local symptoms which are detected during observation of wound. The wound of the soft integuments of skull does not heal, it is filled with the magnificent edematic granulations sometimes is

formed fistula. The presence of fistula is not pathognomonic for osteomyelitis because after the bullet wound of soft integuments of skull fistula can arise, also, as a result of chronic festering around the foreign body, which is arranged/located in soft tissues. A differential-diagnostic value in such cases acquires the local sickliness of skull which with osteomyelitis is revealed/detected by cautious tapping by finger/pin around fistula.

Furthermore, during the cautious probing of osteomyelitic fistula in the initial stages of process is established/installed the roughness of bone. Later during probing sometimes is defined certain displacement of the corresponding sector of bone which as it were "springs" with pressure on it. This symptom testifies about the complete sequestration of this sector of bone.

Page 257.

Diagnosis is very simplified, if on the day of wound, among granulations, is visible the exposed bone. In the presence of osteomyelitis the latter becomes dry and acquires dark grayish color, sometimes with waxy yellow hue.

If in X-ray photograph is detected a deep wound, which reaches the external plate, it is possible to predict the probability of the

development of lamellar osteomyelitis. Such wounds rarely flow/occur/last without complications. During primary x-ray examination in the similar cases is established/installed the presence of completely normal cranial bones. The bullet wounds of the soft integuments of the skulls, not complicated by osteomyelitis, flow/occur/last without any reaction of bone, of course, to the extent that is established/installed roentgenclcgically. Because of this ary subsequent change in the structure of bone, detected during repeated x-ray examination, he indicates the development in it of inflammatory process. Thus, the early roentgenolcgical diagncsis of this fcrm/species of osteomyelitis can be set only during multiple x-ray examinations. In this case the diagnosis is based on the careful anatomical analysis of tangential X-ray photographs. Diagnosis considerably is simplified, when attacks/advances at least the partial rejection/separation of the necrctized sector of bone. This is observed usually in time from 3 to 8 weeks after wound. In the presence of complete demarcatien roentgenclogically distinctly is detected detached necrctic sectcr of bone. In such cases in tangential photographs are outlined all special features/peculiarities of the sequestration which consists only of external plate or, it is more frequently, frcs external plate and spongy substance, but sometimes from an entire thickness of bone. However, internal plate even with complete lamellar osteomyelitis it will be sequestrated fcr considerably smaller elongation/extent, than

external plate and spongy substance. This is explained by the presence of the independent blocd supply of internal plate from the side of solid cerebral shell. This special feature/peculiarity of the sequestrations, which are torn away with complete lamellar osteomyelitis, differs them from the bone fragments which appear with all through breaks of skull, since the latter, as a rule, have high value on internal plate, than on external.

With osteomyelitis of skull, which complicate the wounds of its soft integuments, is required surgical treatment. Only in a very small quantity of cases surface lamellar osteomyelitis can cure spontaneously, if the torn away sequestrations are secreted from wound together with pus. However, also in these rare cases the complete elimination of festering usually occurs only under the effect of irradiation by ultraviolet rays, and also because of the use/application of the over-all strengthening substances and vitamins B_1 and C.

For operational intervention apropos of osteomyelitis are done the skin sections/cuts, which border the unhealed wound or scar with fistula. Process/operation is conducted differently within the early periods when the necrotized bone yet was not torn away, and into later periods, after occurred the complete sequestration of bone. In the first case surgical intervention begins with the imposition of

cut aperture. Then bites entire/all casualty bone to its normal structure. In the second case the use/application of a cutter is usually excessive, since the torn away sequestration is almost always easily extracted by tweezers.

Page 258.

After the distance/separation of the sequestration of granulation they are scraped by acute/sharp spoon and then by usual method it bites entire casualty sector of bone.

With described osteomyelites it is necessary to trepan entire thickness of bone. Only with surface lamellar osteomyelitis internal plate sometimes proves to be completely intact and does not require distance/separation.

After trepanation is bared the solid cerebral shell, on which frequently are detected the granulations. The latter is thoroughly removed. In post-operation wound is introduced the emulsion of streptocide, then are laid the laying sutures at skin. With the large defects of soft tissues sometimes it is necessary to produce the supplementary relaxing lateral sections.

INTRACRANIAL PURULENT AND OTHER COMPLICATIONS.

In spite of the existence of the straight/direct anastomoses between the vascular net/system of head and the vessels of the shells of brain, especially well represented in venous system (vv. emissariae), the penetration of wound infection into the area of skull with the integrity of its bones is observed rarely. this is confirmed by an insignificant number of purulent intracranial complications, which comprise with the wounds of the soft tissues of skull, according to the data of the maps/charts/cards of the deepened characteristic only 0.2o/o. From them in the portion of purulent leptomeningitides it is necessary 0.1o/o and so many it falls on abscesses (epidural, subdural, substances of brain).

Edema of integuments. Edema of the integuments of head accompanies many wounds of skull. Its appearance is explained so much early development of wound infection, as by mechanical disorder roof and lymph circulation, caused by injury. Edema appears after only several hours after wound, rapidly it grows and captures adjacent regions. Sometimes it destroys integuments for entire elongation/extent of the arch/summary of skull and even it converts/transfers to face.

So, during damage to frontal region into edema are involved

usually upper eyelids, which can be escorted/tracked by the complete occlusion of lid slit. Is spread edema predominantly in the direction of the lower-lying compartments of the arch/summary of skull, in particular, to that side of the head of wounded which is turned to cushion. In this case soft tissues are thickened here sometimes 2-3 times, and at a pressure on them finger/pin leaves a deep pit.

The abundance of vascular net/system in the integuments of skull explains not only the rapid development of edema, but also its rapid elimination. Usually after 3-4 days after wound edema almost completely disappears. Exclusion present the cases when into wound strikes the very virulent purulent infection, which calls the sharply pronounced inflammatory reaction of soft tissues. In such wounded edema can keep 2-3 weeks, until on calm down acute/sharp phenomena.

Subcutaneous emphysema. The [illegible] wounds of frontal region with the autopsy of aeriferous sinuses/antrums (frontal, latticed with small inlet are sometimes escorted/tracked by the subcutaneous emphysema of the integuments of skull. The latter usually occupies small elongation/extent (3-4 cm in diameter) and is arranged/located hereabout from wound.

In such cases with the scanning of soft tissues is determined characteristic crepitation, and on craniograms - air bubbles. Subcutaneous emphysema is observed during the first 2-3 days after wound and then rapidly it is resolved. Its presence is the indirect sign/criterion of the damage of pneumatic sinuses/antrums. It is logical that such wounds must be referred in heavier group - nonpenetrating. In individual, extremely rare cases the subcutaneous emphysema of the integuments of head can be the consequence of development in the wound of gaseous infection.

Results of treatment.

The surface wounds of the soft tissues of the skulls, which do not penetrate to the aponeurosis, flow/occur/last, as a rule, it is favorable, rapidly they heal and do not require special treatment. Similar wounds are observed approximately/exemplarily 1/4 units of all cases of the wounds of the soft tissues of skull, and as showed the experiment/experience of war wounded rapidly get better (if they did not have the phenomena of the damage of brain).

About 70.0o/o taken into consideration those wounded the soft tissues of skull had deeper damages (the aponeurosis, muscles, periosteum) and, therefore, they required the surgical treatment. However, as showed the data of the maps/charts/cards of the deepened

characteristic, the primary surgical processing of wounds was made not in all cases.

If we conditionally accept a number of those wounded the soft tissues of skull for 100, then there were operated during the first year of war 21.0o/o, the secondly - 23.6o/o, into the third - 25.2o/o and during the fourth year of war - 30.2o/o.

Although in the course of war the percentage of the operated with wounds soft tissues of skull continuously grew/rose, nevertheless it should be recognized insufficient. Surgeons' task lies in the fact that to learn to more widely place readings to surgical intervention with the wounds of the soft tissues of skull.

High value in the affair of the fastest healing of the wounds of the soft tissues of skull plays the method of the imposition of anechoic suture after process/operation, and also other different ways of the approach of the edges of wound and decrease of its sizes. The results of a similar genus of measures are represented in Table 28 (in percentages to entire number of those wounded the soft tissues of skull).

If one considers that in process/operation required only about 70.0o/o of those wounded into soft tissues, then the percentage of the use/application of the anechoic sutures and other methods of the operational occlusion of wounds grows/rises to 30.0-31.0.

Table 28.

(1) Вид шва	(2) Частота и результаты	(3) Частота применения	(4) Результаты (5) первично	(6) вторично
(7) Ранний глухой шов		4,2	2,2	2,0
(8) Частичные швы		3,9	0,3	3,6
(9) Первично-отсроченные швы		0,4	0,2	0,2
(10) Вторичные швы		6,1	4,7	1,4
(11) Всего		14,6	7,4	7,2

Key: (1). Form/species of sutures. (2). Frequency and result. (3). Frequency of use/application. (4). Results. (5). primary tension. (6). secondary tension. (7). Premature anechoic suture. (8). Partial sutures. (9). Primary-deferred sutures. (10). Secondary sutures. (11). In all.

Page 260.

Nevertheless this percentage is clearly insufficient, and, as can be seen from these data, bulk of the wounds of the soft tissues of skull was conducted in an open manner. At the same time, in the half the cases sutures it was necessary to remove/take partially or completely as a result of festering of wound.

This tells about the fact that the use/application of operational methods, which accelerate the healing of wounds, must be conducted by specialist-neurosurgeons, under the condition for prolonged observation of wounded in the hospital where is produced process/operation. The exceptional complexity of mobile warfare, the need for the rapid evacuation of wounded from the hospital where they were operated, and the series/row of other facts, connected with a medical-tactical circumstances, interfered with attaining better results, especially during the first year of war. Furthermore, at this time neuro-surgical service in armies did not have an even more adequate experience.

In the half all cases (50.3%) the wounded into soft tissues

skulls were located undergoing medical treatment in hospital to one month and 38.4o/o of -1-2 months. The more prolonged stay of wounded in hospitals (11.3o/o) was caused by the development of infectious complications - osteomyelitis and purulent fistulas. To this one should add that produced surgical intervention rapidly eliminated similar complications. Therefore the average duration of the hospitalization of those wounded the soft tissues of skull in the absence of any complications should be considered 1-1 1/2 months from the moment/torque of wound.

The data of the maps/charts/cards of the deepened characteristic show that after the wound of the soft tissues of skull 98.5o/o of wounded to the time of the extraction from hospital of any functional violations noted did not have. In 1.5o/o are noted these or other focus symptoms, connected with the damage/defeat of cerebral substance. Among focus symptomatology most frequently, namely into 09o/o, were observed the motor violations of different expression.

During the study of the outcomes of the bullet wounds of the soft tissues of skull from the point of view of the ability to work of the wounded of this group on the years of war were acquired following data (Table 29).

Consequently, each year of war increased a quantity of wounded, in whom completely was restored/reduced the ability to work, which is connected with conducting of the series/row of therapeutic and organizational measures.

Table 29.

(1) Исход / Год войны	(2) Полное восстановление, удесособности (в %)	(3) Временная нетрудоспособность и различная степень инвалидности (в %)	(4) Прочие и неизвестные исходы (в %)
Первый (5)	94,3	3,0	2,7
Второй (6)	94,9	3,1	2,0
Третий (7)	96,2	2,9	0,9
Четвертый (8)	96,5	2,5	1,0

Key: (1). Outcomes/Year of war. (2). Complete restoration/reduction of ability to work (in o/o).

(3). Temporary/time disablement and different degree of invalidism (in o/o). (4). Other and unknown outcomes (in o/o). (5). The first. (6). By the second. (7) The third. (8). The fourth.

Page 261.

According to the data of the maps/charts/cards of the deepened characteristic, with the wounds of the soft tissues of skull in the unit cases death advanced from the severity of the injury of the brain, other organs/controls and from suppurative processes in brain. Lethal outcomes from intra-cerebral hematomas barely it was noted.

Thus, reason for death with the wounds of the soft tissues of skull it was always the damage/defeat of brain or infectious

complications in it. By themselves the wounds of the soft tissues of skull and their wound complications the reason for death were never. This once again emphasizes the need for the most attentive relation to those wounded the soft tissues of skull for the timely development/detection of the damage of the bones of skull, brain and its shells and accepting the corresponding preventive and therapeutic measures.

During the analysis of the cases of the wounds of the soft tissues of the skull where death advanced from the damage of brain, it becomes obvious, that here occurred the heavy closed damages of skull with the wounds of soft tissues.

The elaboration of the reasons for death with the wounds of the soft tissues of skull, which were complicated by suppurative processes in brain, shows that death attacked/advanced from meningitis, meningoencephalitis and abscess of brain approximately/exemplarily in identical proportion.

Infectious complications, it is doubtless, were connected with the dissemination of infection from wound into depth by emissaries and diploetic veins.

General/common/total conclusions/derivations on the bullet wounds of

the soft tissues of skull.

The treatment of those wounded the soft tissues of skull must be organized in the nearest stages of evacuation. In no case these wounded are not subject to evacuation beyond the limits of front.

However, the experiment/experience of the Great Patriotic War showed that under the guise of the wound of soft tissues can hide itself the heavier damages of skull and even the penetrating wounds of brain. In connection with this arose the tasks of the correct identification of character/nature and severity of wound, in order to avoid severe complications.

In the absence of the sharply pronounced general brain symptoms the identification of the pathology of damage/defeat with the apparent surface wound is frequently connected with difficulties. Correct diagnosis in the similar cases is possible only after the X-ray research of skull, careful neurologic observation and especially after the operational revision of the place of wound.

These tasks were charged to specialized KhPPG, in which was determined neurologic status and in the doubtful cases was done x-ray examination.

With the wounds of the soft tissues of skull always one should remember about the fact that the unit of such wounds is escorted/tracked by the damage/defeat of brain, usually according to the type of the closed injury of skull, and this it forces to the most careful examination/inspection of wounded.

If were allowed medical-tactical conditions, the primary perfecting of the wounds of soft tissues was conducted by neurosurgeons in specialized KhPPG. In the contrary cases the wounded were headed for perfecting into the army hospital of general-surgical profile/specialty.

Page 262.

As showed the experiment/experience of war, sometimes only during primary perfecting it was possible tc accurately determine damage to bone. Therefore was advanced requirement as far as possible process all wounds of the soft tissues of skull, with exception of the surface damages one skin alone.

Taking into account the conditions for the anatomical building/structure of the soft tissues of skull, it was acknowledged by necessary complete the primary perfecting cf the wounds of soft tissues by anechoic suture during the first two days after wound,

which, as showed practice, gives good results.

The primary perfecting of wound with the imposition of anechoic suture sharply shortened the periods of the stay of wounded in hospital, provided mobile/motile good scar it prevented the development of complications in the form of osteomyelitis and purulent fistulas.

The primary perfecting of the wound of the soft tissues of skull with its carving must be conducted only in such cases if after process/operation it will possibly completely or to a considerable degree shut wound. In all remaining cases the carving of wound, which leads to an increase in its sizes/dimensions and the exposure of bone, lengthened the periods of treatment and was created the danger of the development of osteomyelitis.

If on any reasons primary suture was not superimposed, then subsequently good results were obtained from primary-deferred and secondary sutures.

It should be noted that, in spite of the comparatively large quantity of wounded which superimposed secondary suture, the latter was nevertheless applied insufficiently widely. Meanwhile secondary suture has extremely high value, since considerably are shortened the

periods of the treatment of wounded the soft tissues of skull, thanks to which is accelerated their return to army in the field.

After perfecting of the wound of the soft tissues of skull the wounded were maintained/withstood in bed from 7 to 10 days during smooth course. This was caused by the fact that in the majority of those wounded into the soft tissues of skull had brain concussion. The duration of bed mode/conditions was lengthened in the presence of the expressed general brain or focus symptoms.

Before extraction to wounded was assigned rational ergotherapy. The average period of hospitalization during smooth course was equal to one month. In the case of the development of infectious complications it was necessary to apply antiseptics. With the sharply pronounced general brain symptoms during the first days after wound favorable results gave use/application of the dehydrating substances under the condition for attentive observation of the dynamics of neurologic data.

As showed the experiment/experience of war, neurologic symptomatology was sometimes revealed/detected not immediately after wound, but it is later, when wounded was referred already in the group of convalescents. The complaints of wounded of headache, nausea, flabbiness, apathy, sometimes his strange conduct, euphoria

in combination with one or the other focus and tunicary symptomatology (but sometimes also without it) are the signs/criteria of the damage/defeat of brain and must draw to themselves doctor's special attention. It is important not to pass the moment/torque of the onset of cerebral ccmplications and to urgently operate wounded - the retardation of process/operation it leads to heavy consequences.

The treatment of the complications of the wounds of the soft tissues of skull was carried out through standard methods.

Page 263.

Lethality with the wounds of the soft tissues of skull depended on the heavy damages of brain according to the type of the closed injury or on the infectious complications, which were being spread from wound to bone, cerebral shells and brain.

Thus, wounded the soft tissues, being related to the lightest category of those wounded the skull, during the correctly set treatment within the limits of GBA rapidly got better and returned to army in the field. But at the sase time this group of wounds required attentive relation to itself, since only in this sense it is possible to in proper time reveal/detect the heavy penetrating wounds of skull and different complications from the side of brain.

Chapter III.

BULLET NONPENETRATING WOUNDS OF THE BONES OF SKULL.

Classification of the bullet nonpenetrating wounds of skull and statistical data.

The nonpenetrating wounds of the skull with the damage of bones, together with the penetrating wounds of skull with the damage of shells and substances of brain, form the single group of the heavy bullet wounds of skull "with damage to bones". The latter together with another group of the light wounds of skull "without the damage of bones" are two basic groups, which are accepted in the official medical account of Soviet army and differ from each other in the severity of wound.

Introduction during the Great Patriotic War of the additional form of account on the specialized neuro-surgical aid by that wounded into head brain contributed to further separation of the heavy bullet wounds of skull with the damage of bones into two new and independent groups: the penetrating wounds of skull and of brain and the

nonpenetrating wounds cf the bones of skull.

With the nonpenetrating wounds of skull cccurs the damage of its bones, but in contrast tc those penetrating the first are characterized by the integrity of solid cerebral shell, to be more precise, by an absence in it of the through defect, which opens/discloses the free access to wound infection into subtunic space and into the substance of brain. This is the fact to which it for the first time paid attentica into 1917 more. N. N. Petrcv, has exceptionally important value during evaluation of the severity of wound, with a sorting-evacuation characteristic and finally when prognosis and selecting of the rational methods of neuro-surgical treatment.

The nonpenetrating wounds of the bones of skull, being related to the category of the wounds of average/mean severity, considerably differ from the heavier penetrating wounds by the smaller diversity of the wounding weaponry and by the simpler mechanism of wound. Favorable in the majority of the cases clinical course and outcome of wound with the rapid and smooth healing of wound are caused by the decomposition only of the comparatively superficially arranged/located soft tissues and bones of skull. Cerebral shells and substance of brain are damaged with these wcunds not always and in the majority of the cases it is shallow, but the neurologic symptoms

of the restricted contusions of brain or hemorrhages, which remind the symptoms of the closed damages of skull, they bear the usually nonpersistent and reversible character/nature.

Page 265.

The structure of wound with the nonpenetrating wounds of the bones of skull in the majority of the cases is simple, with exception of the wounds of the basis of skull. Zone of the wound usually not large. The wound canal, as a rule, short, and its building/structure - simple. Foreign body and bone scrap are arranged/located usually superficially and together. The bottom of wound forms either bone or solid cerebral shell. The outflows of cerebro-spinal fluid and cerebral detrite, and also the fallouts and protrusion of brain with these wounds is not observed. Infectious complications are rare, uniform and by themselves are not threatening, with exception of the hemorrhages, especially subtunic, which can be heavy, sometimes even lethal; these hemorrhages are the early complication of such wounds.

The nonpenetrating wounds of the bones of skull are observed comparatively not frequently - into 17.3o/o of all bullet wounds of cerebral skull.

The differential diagnosis of the nonpenetrating wounds of the

bones of skull from the lighter wounds of soft tissues, on one hand, and heavier, which penetrate - with another, just as the classification of diverse forms and types of quite nonpenetrating wounds, it is possible only upon the composite neuro-surgical examination/inspection of wounded with the use/application of a surgical, neurologic and roentgenological method of research.

Target of the rational classification of the bullet nonpenetrating wounds of the bones of skull - liberation/excretion of different types of these wounds on the basis of the basic and most important signs/criteria, which characterizes wounds and defining the activity of specialist-neurosurgeons in the stages of evacuation. The component elements of this classification must give basis for the formation of the expanded/scanned clinical diagnosis of wound.

The nonpenetrating wounds of skull are divided according to the type of the wounding weaponry into bullet ones (15.6o/o) and fragmentation ones (84.4o/o).

According to the mechanism of wound and the character/nature of wound canal the nonpenetrating wounds of the bones of skull are divided into tangents, through ones and blind ones.

Relative to the ricocheting wounds it is possible to say the

following. With this character/nature the mechanism of wound frequently is it is not completed, and the wounding foreign body remains in short wound canal. The frequency of the ricocheting wounds composes 12.8o/o.

Tangential (tangential) nonpenetrating wounds are characterized by the presence of the open wound canal in the form of the extended chute or sulcus without intake and outlet. The walls of canal consist of two base layers of the tissues of skull - soft cover and bones. Depth and character/nature of the damage of the bones of skull are different depending on the form/species of the wounding shell, its direction and force. Sometimes wound takes the form of a deep scratch or sulcus on the surface of the exposed bone, sometimes there is the partial break of external or internal plate, sometimes the complete crushed break of an entire thickness of bone on that restricted, usually oval, sector. In this latter/last case in wound is located multitude of the small/fine bone fragments, free on the surface of the exposed, but whole solid cerebral shell. Among tangential and nonpenetrating wounds special position occupy the combined wounds of the basis of cerebral and face skull - fronto-naso-orbital and temporo-orbital wounds, which are characterized by the damage of the integrity of frontal sinuses and walls of orbit with its contents (by the eyeball), and also the wounds of mastoid extension and ear, sometimes with cracks and breaks of the pyramid of temporal bone.

The latter are frequently escorted/tracked by the damage of aural labyrinth (containing to endolymph, that is communicated through the internal auditory aperture with cerebro-spinal fluid of subarachnoid space) and, in the opinion of I. M. Rozenfel'd, are actually the penetrating wounds the skulls, since with them is possible the penetration of wound infection of one system into another, in spite of the integrity of solid cerebral shell in the zone of wound canal.

The tangential (tangential) nonpenetrating wounds of the bones of skull are observed into 43.5%.

The perforating nonpenetrating wounds, usually bullet, are encountered, on clear reasons, considerably thinner/less frequent than other wounds of this category. More frequently are observed perforating nonpenetrating wounds in temporal and neck-postcranial region, and also in the frontier departments of cerebral and face skull with the occurring outside bone formation of supercilium, bridge of the nose and edges of orbit (the so-called fronto-naso-orbital and temporo-orbital wounds).

Considerably thinner/less frequent (0.7o/o) are encountered the perforating nonpenetrating wounds of the arch/summary of the skulls, which arrive, as a rule, in the remaining sectors of frontal, sincipital and postcranial mound.

Blind-end nonpenetrating wounds are characterized by the presence of one aperture, which leads usually into the short wound canal, which is blindly ended in different layers of the bones of skull, up to solid cerebral shell, which remains in this case whole. At the end of this blind wound canal, as a rule, is located the foreign body - fragment of shell, which jammed in the thickness of bone (with its partial or complete break) or freely arranged/located on the surface of the damaged bone (on the spot of its depressed break), or lying among many small/fine bone fragments on the surface of solid cerebral shell (with the crushed break of bone). If metallic fragment projects outside from inlet, it jammed in soft tissues or finally completely it does not exist in wound, then in this case usually occurs the incomplete or final (in the latter case) mechanism of the ricocheting nonpenetrating wound. Blind nonpenetrating wounds are encountered into 43.0o/o of cases.

Together with these three basic mechanisms of wound and character/nature of wound canals, with the nonpenetrating wounds of the bones of skull there is another series/row of supplementary and

mongrels of wound canal, more complicated than with the wound of soft tissues, but less diverse, than with the penetrating wounds.

Thus, for instance, with tangential nonpenetrating wounds are possible the mongrels in the form of tangential perforating wound in the presence of the narrow skin cross connection above the open U-shaped wound or the tangential blind-end wounds, when the long open sulcate wound unexpectedly concludes with short blind canal with the jammed in its end foreign body.

With the ricocheting wound the shell can ricochet either perpendicularly - vertically to the surface of skull, or at sharp angle it; then the ricocheting wound approaches the through or tangential.

Page 267.

According to the character/nature of bullet breaks the nonpenetrating wounds of the bones of skull are divided into four groups:

1) linear break, or crack (1.9%/o of cases);

2) incomplete (12.3%/o): a) external bone plate in the form of

chip or scratch, b) the internal bone plate;

3) depressed (impressed) break (27.9o/o);

4) crushed break (57.9o/o).

On localization nonpenetrating wounds are subdivided into the wounds of arch/summary and wound of the basis of skull. The wounds of the arch/summary of skull on regions in turn, are divided into: frontal - 14.5o/o, sincipital - 29.8o/o, temporal - 10.5o/o, postcranial - 11.7o/o, frontal-orbital - 3.2o/o, frontoparietal - 8.4o/o, frontotemporal - 3.4o/o, frontal-postcranial - 0/3o/o, sincipital-temporal - 5.4o/o, sincipital-postcranial - 7.3o/o, temporal-postcranial - 1.5o/o, more than two regions - 4.0o/o.

Among complications are distinguished two basic groups: complication noninfectious and infectious. According to the periods of onset they are divided usually into early and late. To the changes, connected with the injury of the substance of brain, cerebral shells and their vessels, are related intracranial hemorrhages and contusion foci of brain. Intracranial hemorrhages are subdivided into epidural and subdural ones and they appear during the damage of the branches of average/mean tunicary artery, vessels of soft cerebral shell and with the wound of sinuses. Considerable

epidural and subdural hemorrhages are noted into 0.9o/o of cases, wound of sinuses - into 1.3o/o, the contusion foci - into 15.8o/o.

To infectious complications with nonpenetrating wounds are related osteomyelitis, pachymeningitis, epidural and intra-cerebral abscesses, meningitides and meningoencephalites. Infectious complications were encountered into 19.2c/o of cases. Most frequent complication is osteomyelitis (6.6o/o). The purulent fistulas, which are usually the consequence of festerings arcund bone fragments, infected foreign bodies and osteomyelitis, they are noted into 7.5o/o of cases. Osteomyelitis as well as purulent pachymeningitis, by themselves not risky, can produce the development of more terrible secondary complications in the form of the restricted ulcers or abscesses (epidural, subdural and intra-cerebral), or diffuse purulent meningitis.

The primary development of abscesses and meningitides with the nonpenetrating wounds of skull is observed comparatively rarely.

Some data on pathological anatomy.

The anatomical pathologists of Soviet army during the Great Patriotic War comparatively rarely observed the nonpenetrating wounds of skull. With respect to all cases of death from the bullet wounds

of skull the percentage of nonpenetrating wounds was units. It is logical that anatomical pathologists' attention to larger degree was directed toward the study of the penetrating wounds of skull. Therefore during the war of the special research, dedicated to the study of the pathological anatomy of the nonpenetrating wounds of skull, it is produced very a little. Much that is valuable into the morphology of nonpenetrating wounds introduced Soviet neurosurgery.

Page 268.

Basic pathoanatomical changes with the nonpenetrating wounds of skull are divided into two groups: 1) the changes, connected with the direct activity of injury (primary damage aof the integrity of tissues, the disorder of water metabolism/exchange in the brain tissue, disorder of liquorocirculation and blood circulation), and 2) the changes, connected with the connection of inflammatory process, in the majority of the cases of infectious origin (infectious complications).

Changes, connected with the direct activity of injury.

Among pathoanatomical changes in this group the leading value on their frequency and severity of clinical picture had tunicary hemorrhages and contusion foci.

With nonpenetrating wounds of the skull were observed epidural, intradural, subdural and sub-arachnoidal hemorrhages. Frequently in one and the same case were combined different means of tunicary hemorrhages, but almost always it was possible to secrete basic localization of this hemorrhage.

Epidural hemorrhages in the overwhelming majority of the cases appeared as a result of the anatomical damage of vessels by shell, bone fragments or edges of the displaced scrap of bones. The voiced in the literature opinion about the frequent onset of epidural hematomas as a result of the damage of trunk or branches of average/mean tunicary artery during war did not obtain confirmation - hemorrhage from these vessels they were observed rarely. Sometimes they appeared after certain time after delivering of injury. Issuing from in this case blood scaled solid shell from the bones of skull, proceeded the break of the veins, crossing/intersecting epidural space. As a result appeared the new source of hemorrhage and a quantity of issuing from blood increased still more, even number led to the education of massive hematoma. On autopsy such hematomas took the form of thick (to 2.5 cm) lamellar ones imposition from the blood clots, which occupied considerable part of epidural space. Sometimes on the surface of brain there was depression, which corresponded to the disposition of hematoma (Fig. 52). Somewhat more frequently were observed hemorrhage from the large/coarse sinuses of solid cerebral shell.

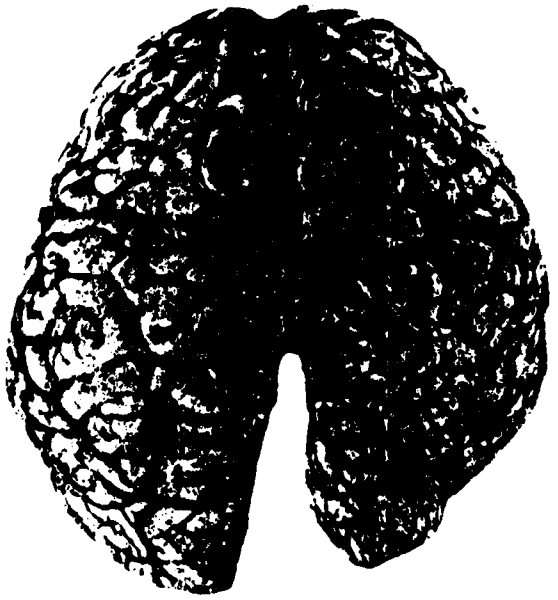


Fig. 52. Depression of the convex surface of brain with respect to the disposition of epidural hematoma.

Page 269.

These hemorrhages also led to the education of massive hematomas (Fig. 53). Most frequently the source of hemorrhage were the vein of the external surface of solid shell, intraosseous/intraosteal/endóosteal veins (vv. diploicae) and sometimes vein-emissaries (vv. emissariae). Appeared during the damage of these vessels hematomas were usually small according to sizes/dimensions and they took the form of loose blood clots, which

were being arranged/located on the surface of solid shell.

Almost with each nonpenetrating wound were encountered insignificant epidural hemorrhages in the region of wound, but they did not have special importance and frequently without leaving a trace they disappeared.

Usually after large/coarser hematomas appeared the dense pigmented cicatrical thickenings of the solid cerebral shell, joined with the bones of skull. Sometimes were formed the cysts, satisfied by fluid/liquid of chocolate color and by reddish-brown friable mass, frequently pierced by the bundles of collagenic fibers. In the unfavorable cases occurred the infection of hematoma with the subsequent development of the external purulent pachymeningitis (see below).

Intradural hemorrhages were observed rarely. Solid cerebral shell in this case became fragile and acquired cyanotic stain/staining. This picture with unopened solid cerebral shell sometimes simulated subdural hematoma.

Subdural hemorrhages with nonpenetrating wounds were encountered rarely. Subdural hematomas appeared during damage of vessels - the source of hemorrhage were usually the surface veins of brain, which

were being arranged/located in the thickness of soft cerebral shell. Most frequently the break of these veins occurred in the place of their inflow into the sinuses of solid cerebral shell. An ordinary quantity of blood, which issued from into subdural space, was small. Sometimes were encountered massive hematomas, wrapping the significant part of the cerebral hemisphere, the blood flowing in also to the basis of skull. In this case solid cerebral shell was stressed. Under it on the surface of arachnoid shell were arranged/located black- red succulent blood rolls or dark liquid blood. Were observed the cases when with injury was destroyed arachnoid shell for considerable elongation/extent. In these cases subdural hematoma was arranged/located directly on the surface of soft shell and freely was communicated with the maintained departments of subarachnoid space.

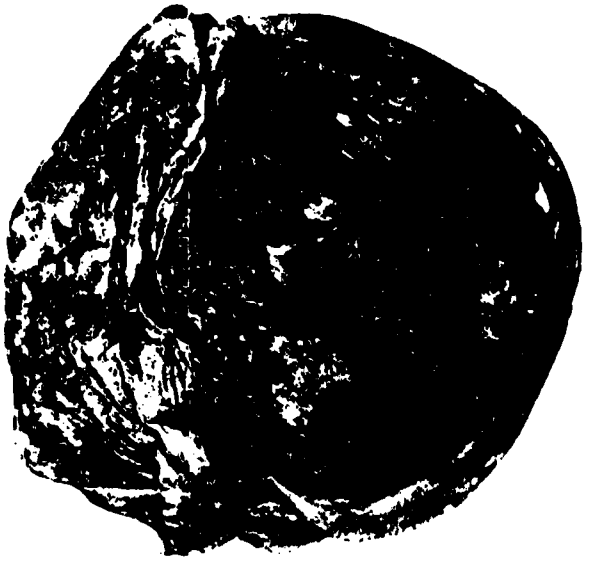


Fig. 53. Extensive epidural hematoma (external surface of solid cerebral shell).

Page 270.

By the ordinary outcome of subdural hematoma was substitution its connective tissue, which led to the education of the pigmented scar and the intergrowth of shells. More rarely appeared the encapsulation of hematoma with the education of the cyst, filled with reddish-brown fluid/liquid. Festering hematoma was observed rarely.

With nonpenetrating wounds the skulls frequently found subdural hemorrhages of the capillary net/system of the internal surface of

the solid cerebral shell, which did not have vital importance. These hemorrhages by larger unit were combined with the contusion foci of softening, but they were sometimes observed independent of them. Such hemorrhages took the form of the dark-red or rustily colored films of whimsical form, which were being arranged/located on the internal surface of solid cerebral shell and sometimes which x-rayed through it (Fig. 54). They easily were scraped off. According to form/species these hemorrhages resembled internal hemorrhagic pachymeningitis, actually they had with it nothing in common.

The contusion foci of hemorrhagic softening with nonpenetrating wounds are the become numb sectors of the substance of brain, impregnated with the blood.

Sometimes they appear as a result of straight/direct crushing of the substance of brain, whereas more frequent they are formed by another, more complicated route/path. In this case, as a result of angiospasm, which arose at the moment of delivering the injury, grows stiff the sector of the substance of brain. Subsequently attacks/advances paralysis of the vessels of the casualty region and coming out of the component elements of the blood via diapedesis. Thus appears the contusion focus of the hemorrhagic softening of the substance of brain.

Fresh contusion foci in the section/cut of brain took the form dark-red less frequently thinner/less frequent than ruby-colored maculae. Subsequently, sometimes into the first hours after wound, their tissue acquired flaccid paste-like consistency and peculiar stain/staining, which resembled the color of the crushed berry of raspberry. The contusion foci frequently were surrounded by the group of the small/fine hemorrhages, which had the form/species of circular or oval ruby-colored maculae. The size/dimension of foci oscillated in considerable limits. The usually contusion foci were arranged/located near wound and comparatively rarely were detected on opposite side. Sometimes in the substance of brain were encountered several foci. In brain core more frequently were observed single foci (Fig. 55), in white substance - sets.

In the course of time the color of contusion foci changed. They acquired brick, brown, rusty or brown stain/staining. Finally in the favorable cases from large/coarse foci were formed/activated the cysts. From small/finer foci were formed the pigmented heas. Barely the course of the contusion foci was complicated by festering. Its source was usually the dissemination of infection from Purulent focus in soft tissues, in the bones of skull or solid cerebral shell. The sometimes festering contusion focus cicatrized. In other cases the infection progressed and it led to the education of the abscess of brain or diffuse suppuration into substance and the shells of brain.

Complications.

From the complications, which were being observed with the nonpenetrating wounds of skull, vital importance they had osteomyelitis and pachymeningitis.

Osteomyelitis. In the cases of the breaks of skull, not complicated by infection, the process of the healing of bone wound concluded during 15-20 days.

Page 270a.

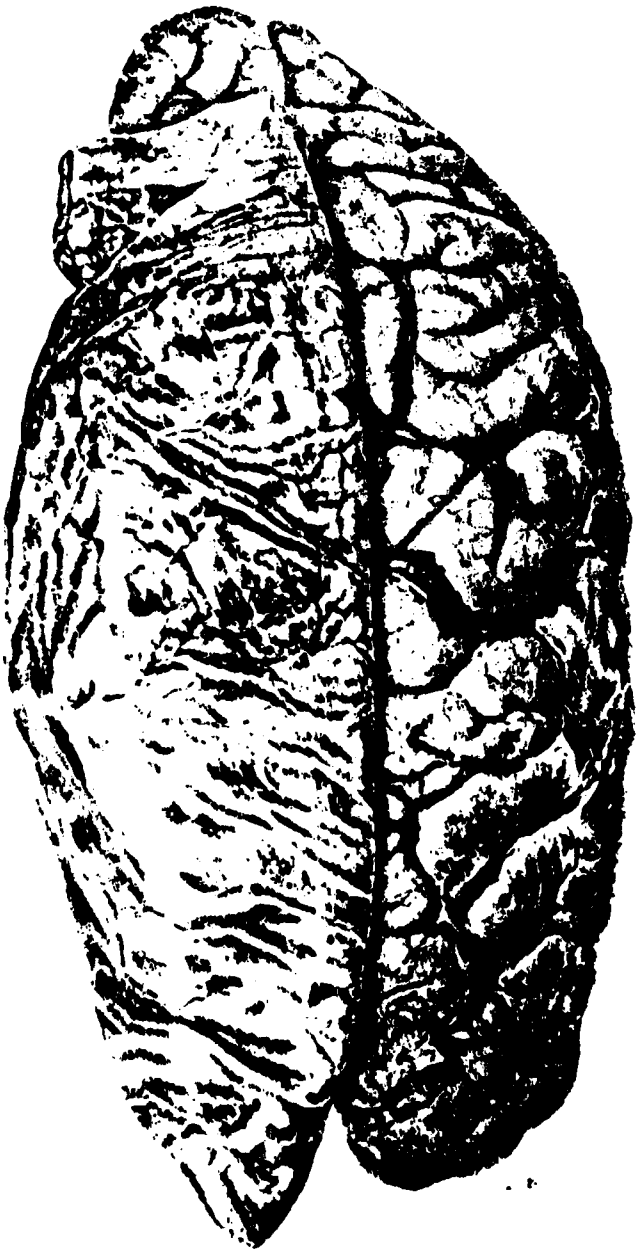


Fig. 54. Remainders/residues of hemorrhage from capillary net/system of internal surface of solid cerebral shell. Purulent leptomeningitis. (Artist T. V. Belyaeva).

Page 271.

Bone defects after the trepanation of skull were replaced by the dense fibrous membranes/diaphragms, joined with the soft tissues of head, with the edges of bone defect and the external surface of solid cerebral shell. As material for the formation of this membrane/diaphragm served the periosteum of external surface of bones skulls and osteogenetic layer of solid cerebral shell.

The healing of bone wound was disrupted in cases when the connection of infection led to the purulent inflammation of bone. Usually this was observed during poor primary perfecting of bone wound or in cases when primary perfecting completely was not conducted. High value had an exposure of the external surface of bone from periosteum, contributing to the development of infectious process. The experiment/experience of war showed that the purulent inflammation of bones can arise with the most varied forms/species of the breaks of skull. In bone wound frequently were detected the left with process/operation become numb or stiffened bone fragments, both free and not losing connections/communications with healthy/sound

bone. These fragments frequently served as a reason for the onset of suppuration in the arranged/located next to them healthy/sound bones of skull. Purulent inflammation of bone more frequently it was observed during the extensive damages of soft tissues.

During the Great Patriotic War with nonpenetrating wounds it was accept distinguish in the bones of the skull two means of the suppurations: 1) festering bone wound during which inflammatory changes were limited to a comparatively small border of the bone tissue (to 2-3 cm of width), adjoining its defect (usually this process was called edge/boundary or restricted osteomyelitis), 2) the diffuse inflammatory process, which was being spread to large distance from the place of the break of bone, true osteomyelitis of skull.



Fig. 55. Large/coarse contusion focus in brain tissue. Subdural hematoma.

Page 272.

The process of the purulent melting of the free at wound become numb bone fragments, occasionally referred to as osteomyelitis, in common with osteomyelitis actually nothing has nor is ordinary festering in the periphery of fcreign body.

In the overwhelming majority of the cases of purulent inflammatory changes in the bones of skull was observed suppuration of bone wound (edge/boundary osteomyelitis). Macroscopically with suppuration of bone wound was ncted the absence of periosteum on the edge of the external surface of bone wound, the swelling also of hemorrhage in the maintained periosteum, sometimes its peeling from bone. The bone, deprived of periosteum, on the edge of defect was dull, it had yellow or dull gray color and it frequently underwent sequestration . Sequestrations had different sizes/dimensions. Porous substance acquired either paste-like consistency or consistency of jelly and dirty yellow color. Damages/defeats in porous substance were always somewhat greater than in bone plates. Near from the edge cf wound the casualty porous substance sharply was delimited from invariable/unchanged tissue. By the edge of bone wound was

histologically detected sharp hyperemia and ccnsiderable infiltration cf porous substance with neutrophilic leukocytes.

Diffuse osteomyelitis of skull during the Great Patriotic War was observed very rarely. With it inflammatory process was spread on the bones of skull fcr considerable elongaticn/extent. The sutures of skull did not impede the march/passage of process from one bcne to another. Was observed extensive sequestration. The sequestrations, which adjoin the bone wcund, frequently achieved large sizes/dimensions. The bone, which surrounds sequestration, fcr considerable elongation/extent had a greyish-blue color and easily it broke. Upon cutting open it was detected that pyo ones the molten porous substance converted/transferred into invariable/unchanged tissue without clear boundary. Histologically was noted the picture of ordinary purulent inflammatin with the expressed necrotic changes.

Osteomyelitis of skull was most frequently escorted/tracked by the education unhealing cr periodically of these opening/disclosing from fistulas in soft tissues of head. Analogcus fistulas were observed also during other pathological processes, complicating wound of skull (extradural abscess, festering around bone fragments, etc.). With active surgical intervention the suppurations in the bones of skull were eliminated. However, in certain cases the course of osteomyelitis acquired unfavorable character/nature. Sometimes in

this case in the porous substance of bone at considerable distance from wound appeared the metastatical purulent foci, which were being revealed on the surface of bone and, its given atrophy.

Osteomyelitis of skull rarely served as the source of the dissemination of infection to shells and substance of brain. Most frequent complication was external less frequently less frequently internal pachymeningitis. In a number of cases is described the development of purulent leptomeningitis, purulent encephalitis and metastatical abscesses of brain.

Pachymeningitis. With nonpenetrating wounds pachymeningitis it is encountered more frequently than with other means of the wounds of skull. Usually was observed external pachymeningitis. They were encountered into the purulent, and nonsuppurative forms/species of pachymeningitis. A comparatively frequent and most typical form of pachymeningitis with nonpenetrating wounds was the restricted purulent pachymeningitis. This process more frequently complicated the badly/poorly processed or in no way processed nonpenetrating wounds of skull.

Page 273.

Vital importance had damage of bone sinus. The onset of purulent

pachymeningitis was connected either with the direct hit of infection into epidural space or, it is more frequently, as a result of propagation its s stagnate skull and soft tissues of head. Such "secondary" pacymeningitis adversely it affected the course of the wound of the soft tissues of head, osteomylitis of skull was caused suppuration of epidural hematoma or bone fragments, lying on the surface of solid cerebral shell.

The macroscopically restricted external purulent pachymeningitis is the planar growths of the festered granulating tissue over the external surface of solid cerebral shell. This process in the majority of the cases enveloped only the small territory of solid cerebral shell.

During war were observed the cases of the diffuse dissemination of purulent granulations over the surface of solid cerebral shell.

Exclusively rarely suppuration scaled sclid cerebral shell from the bones of skull almost for entire its elongation/extent. Thus [redacted], L. I. Smirnov observed the case when purulent pacymeningitis, after being begun in average/mean cranial pit, it was extended almost to entire basis of skull and was escorted/tracked complete by scaling solid cerebral shell and by the purulent impregnation of the rootlets of craniocerebral nerves.

It is histologically established/installed, that in the overwhelming majority of the cases of restricted purulent pacymeningitis were destroyed only the quite external departments of the solid cerebral shell where was detected the picture of ordinary purulent inflammation. Implication in the inflammatory process of all layers of solid cerebral shell was observed only sometimes. In this case appeared the necrosis of entire of the thicknesses of solid cerebral shell, sometimes led to its break.

Thus were created conditions for the straight/direct march/passage of infection to the sinus and soft cerebral shell of brain, and thereupon to brain tissue. During the appropriate treatment of purulent pacymeningitis inflammatory process concluded with the education of the intergrowth of solid cerebral shell with the bones of skull.

Sometimes was observed the peculiar variant of the restricted external purulent pacymeningitis of extra or of epidural abcess.

Epidural abscess is the restricted encysted external purulent pachymeningitis. Encystment occurs due to the education of the dense intergrowth between the solid cerebral shell and the internal surface

of the bones of skull. In formed thus area grew the granulating tissue, which separate/liberated a large quantity (to 300 cm^3) of pus. Sometimes were formed several encysted areas. They are described cases are described the cases, when extradural abscess occupied on solid cerebral shell the area more than 25 cm^2. With epidural abscesses, as with other forms/species of external pyo pachymeningitis, granulating tissue was usually arranged/located directly on the external surface of solid cerebral shell. However, were observed the cases, when granulating tissue was moved aside by purulent contents from solid cerebral shell and was arranged/located directly under bone. In other cases pus stratified granulating tissue, dividing it into two sheets: being adjacent to solid cerebral shell and being adjacent to bone. The area of the encysted external purulent pachymeningitis (epidural abscess) of limber was opened/disclosed by fistula course in soft tissues.

Page 274.

During insufficient treatment purulent pachymeningitis rarely was complicated by the purulent leptomeningitis, abscess of brain or by purulent encephalitis. The penetration of infection into brain tissue occurred both on the continuation and via dissemination on vessels. Were observed the cases of the complications of pachymeningitis of thrombophlebitis of sinuses with the subsequent generalization of

process and the development of pyaemia.

Incomplete pachymeningitis. Most frequencies the form of nonpurulent pachymeningitis was the so-called chronic external productive pacymeningitis. This process usually appeared as reaction to presence in epidural space of foreign bodies (bone fragments, hair, blood, etc.). More frequent productive pachymeningitis was the outcome of purulent pacymeningitis. With productive pacymeningitis, as a rule, were observed the intergrowth of solid cerebral shell with the internal surface of the bones of skull. After the separation of these intergrowth was detected peculiar villi of a sulfur-bluish color the surface of solid cerebral shell. The thickness of impositions on the surface of solid cerebral shell usually achieved 0.5 mm, and in rare cases it reached to 2-3 mm.

Histologically basic changes were detected only in the skin of solid cerebral shell. Here were determined powerful/thick outgrowths collagenic filaments, limber hyalinization. pemnogo-numerical cells were represented in essence lymphocytes and histiocytes. Inflammatory process had productive character/nature. In the case of introduction into the thickness of the skin of the solid cerebral shell of small/fine foreign bodies (hair, smallest bone fragments) under microscope sometimes was observed the educatien of the typical granulomas of foreign bcdy. Rarely this process was complicated by

festering by granulus and by march/passage in purulent pachymeningitis. The ordinary outccme of prcductive pachymeningitis was the education of Rubtsovs of the intergrowth of solid cerebral shell with the bones of skull.

The pathological anatomy of suppurative inflammatory processes in substance and soft shell of brain is described in the general/common/total unit of the present section.

X-ray diagnostics [1].

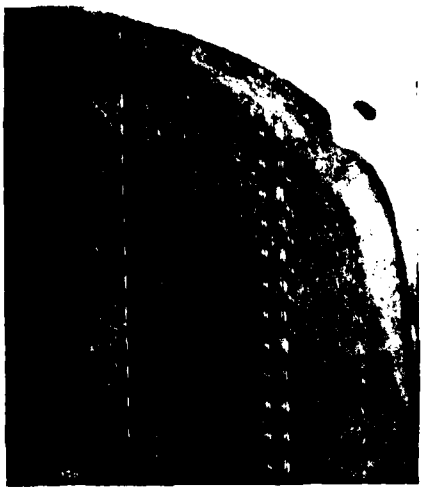
FOOTNOTE [1]. From a large quantity of very valuable X-ray photographs, which illustrate chapters on roentgenology, some X-ray photographs of skull are given partially or in the form of schemes. ENDFOOTNOTE.

After the first world war it was not published not one work, dedicated to the roentgenological picture of the nonpenetrating shell wounds of skull.

During the Great Patriotic War the Soviet authors accumulated a sufficient number of observations, making it possible to develop this chapter of roentgenology with sufficient completeness. However, in the foreign press on this theme it was not published not one work.

X-ray diagnostics of the nonpenetrating wounds of skull in comparison with those penetrating considerably more complicated. This is explained by the fact that with nonpenetrating wounds frequently appear very insignificant, sometimes surface, the violations of the integrity of bone. The latter are detected roentgenologically only during very careful special research, but sometimes they are not revealed/detected even with the flawless prccedure of X-ray analysis.

Page 274a.



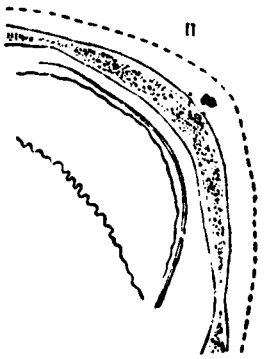
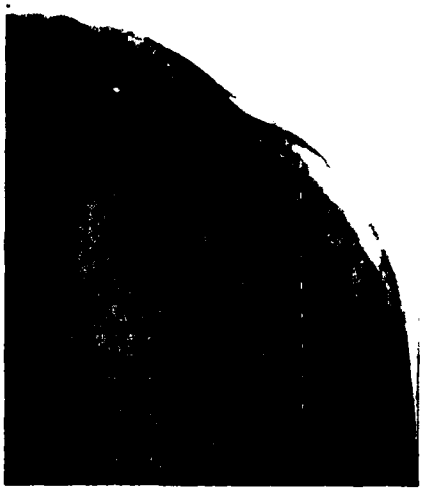


Fig. 56. Dead end fragmentation wound of right sincipital region. X-ray photograph, product with primary research. Is below - anatomical scheme from X-ray photograph. In the center of sincipital bone incomplete break. There is a surface defect of bone with the

exposed spongy substance. Several smallest scrap in defect. Foreign body is arranged/located in soft tissues of skull.



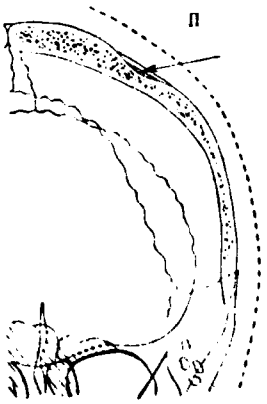
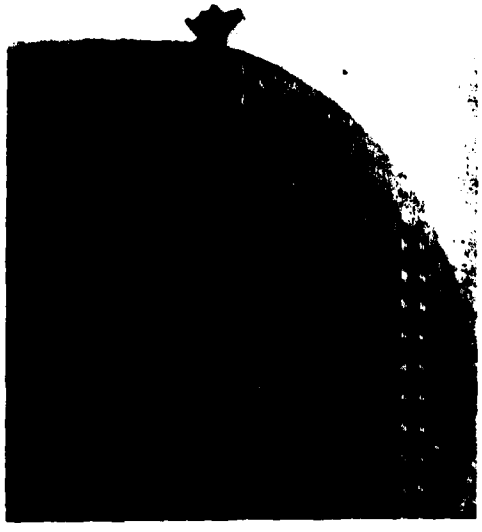


Fig. 57. Control X-ray photograph of right sincipital region of the same wounded. X-ray photograph is produced through 6 weeks after wound and operational intervention. a low- anatomical scheme from control X-ray photograph. There is a surface defect of bone, covered with the closing by plate. This it indicates the ending healing of bone wound. Closing plate on anatomical scheme is shown by arrow/pointer.

Page 274b.



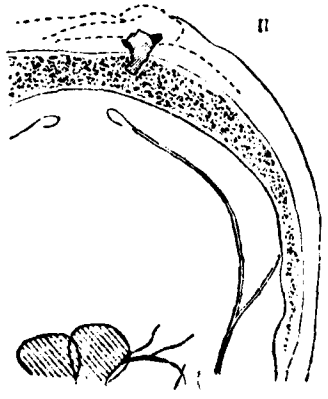
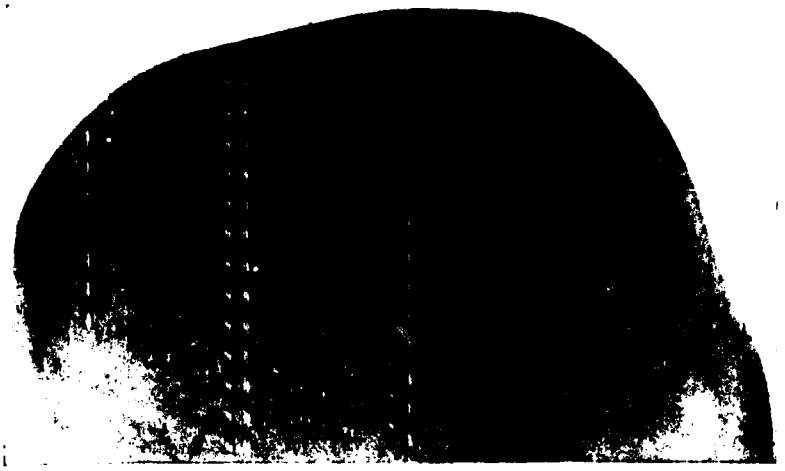


Fig. 58. Blind-end fragment wound of right sincipital region. X-ray, done during primary research. Is below - anatomical scheme from this X-ray photograph. There is an incomplete break of right sincipital bone into middle of its parasaggital zone. Break will arise as a

result of partial penetration into the bone of the bent plate of metal. Focuses attention the exceptional thickness of the bones of skull arch/summary.

Page 274c.



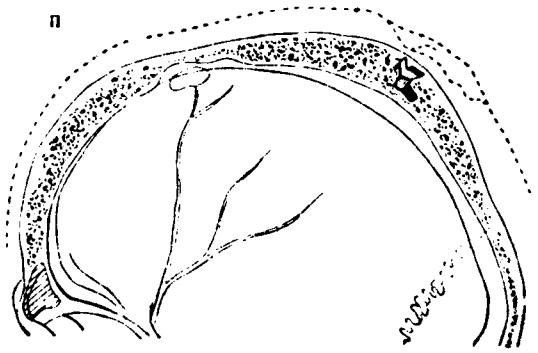


Fig. 59. X-ray photograph of skull of the same wounded in lateral projection. Is below - anatomical scheme from this X-ray photograph. The region of wound is located in the "silent zone" of skull, in consequence of which the break is not detected.

Page 274d.



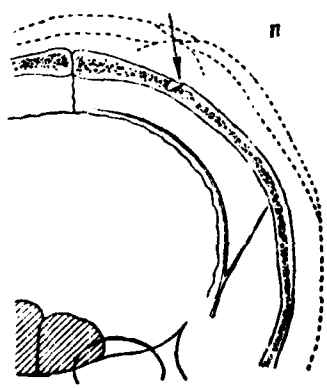
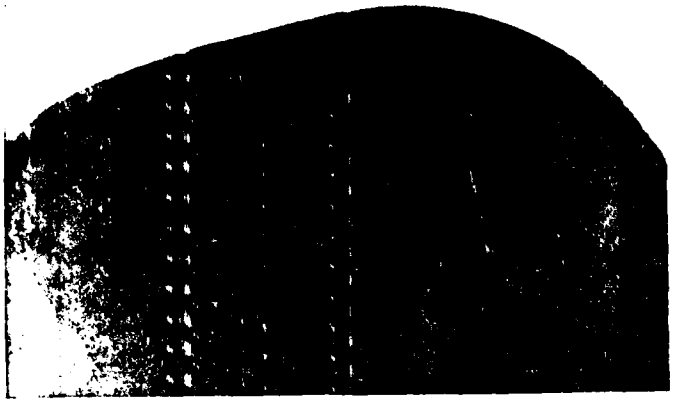


Fig. 60. Tangential zone sound of right sincipital region. X-ray photograph, produced during primary research concerning to the region of wound. Is below - anatomical scheme from this X-ray photograph. Is determined the incomplete break of right sincipital bone. Break takes

the form of the U-shaped defect of bone which reaches the internal plate of skull. On automatic scheme the break is shown by arrow/pointer.

Page 274e.



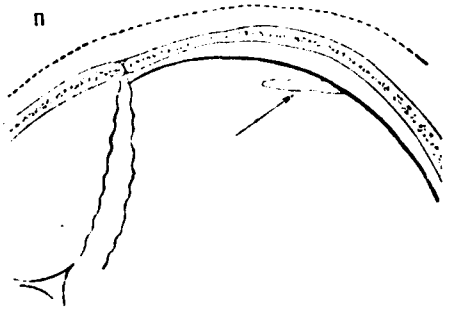


Fig. 61. X-ray photograph of right sincipital region of the same wounded in lateral projection. Is below - anatomical scheme from this X-ray photograph. The sector of damage is arranged/located in the intermediate zone of the image of skull and takes the form of narrow

oblong illumination. on automatic scheme the break is shown by arrow/pointer.

Page 275.

During the primary X-ray research of wounded with the nonpenetrating damages of skull are detected four types of the bullet type breaks of skull: incomplete, linear, depressed and crushed.

Incomplete break is characterized by the presence of the damage of outer plate and partially spongy substance with the retention/preservation/maintaining of the integrity of internal plate. Linear break is characterized by the presence of the isolated/insulated penentrating crack of skull, which appears in the region of the direct effect of shell. The depressed break is characterized by disturbance of the integrity of an entire thickness of bone with education of one or, it is more frequently, several sufficiently considerable bone fragments which penetrate the area of skull at the depth of 0.5-3 cm. The crushed break is characterized by the presence of the sector of the breaking up of an entire thickness of skull to the small/fine bone fragments which disorderly are displaced in the limits in all several millimeters. Furthermore, with the nonpenetrating wounds of skull of 0.3o/o are encountered the isolated/insulated breaks of internal plate. Such of confirmations

roentgenologically were diagnosed as the depressed or crushed break, since the roentgenolcgical image of these breaks of limber is similar to the image of the isclated/insulated break cf internal plate. This occurs because with the depressed and crushed breaks in tangential photographs is sometimes revealed/detected cnly the destructicn of internal plate, but damage to external is nct detected, since it strikes into the silent zone which on the external surface of skull has greater extent than cn internal. Thus, with the isolated/insulated breaks of internal plate frequently is allowed/assumed the roentgenclogical error, which does not have great practical value.

During the radiographic research of wounded with the nonpenetrating wounds of skull inccmplete break was detected into 12.3o/o of cases, linear - into 1.9o/o, depressed - into 27.9o/o and that crushed - into 57.9c/o of cases.

Solid cerebral shell is not damaged with first type breaks and exclusively rarely it is disrupted with second type wounds. With third and fourth type breaks question abcut the condition of solid cerebral shell on the basis of roentgenological symptoms it can be solved only supposedly.

Thus, with the breaks of the first two types the treatment of

the character/nature of wound is very simple. However, the X-ray diagnostics of these breaks is most difficult.

Incomplete break, as a rule, is distinctly detected only on X-ray photographs, tangents to the region of damage (Fig. 56-61). In photographs in other projections the breaks of this type give very indistinct image (Fig. 60 and 61) or are not revealed/detected completely. The zone of damage with these breaks is very insignificant. Sometimes its sizes/dimensions are so/such negligible, that the break does not succeed in establishing/installing even with the removal of the damaged zone into the edge-forming unit of the X-ray photograph.

Page 276.

With incomplete breaks in tangential X-ray photographs is determined the insignificant defect of external plate and adjacent sector of spongy substance with the smallest bone scrap in it (Fig. 56 and 57). With nonpenetrating wounds the sector of the violation of the integrity of bone has subglobose form, and foreign body frequently is arranged/located in the soft integuments of skull (Fig. 56). If the wounding shell is introduced in skull, roentgenologically usually is detected not the break of bone as such, but only, foreign body, which is located within bone (Fig. 58 and 59). The incomplete

breaks, which appear with tangential wounds, take the form of long narrow groove (Fig. 60 and 61).

Incomplete break is observed only in bones with the considerable thickness of the layer of spongy substance. Because of this these breaks are encountered predominantly in the parietal bones (Fig. 56) and in the scale of frontal bone. In the bones, deprived of spongy substance, these breaks are not observed.

The process of the healing of the bone wound, which was being formed with the incomplete break of skull, after the produced primary processing ends very rapidly. In such cases during the control x-ray examination 4-5 weeks after wound is detected the surface defect of skull, completely closed with the newly formed compact bone. The presence of this closing plate (Fig. 57) is the straight/direct roentgenological symptom of the healing of bone wound.

The incomplete break, which was not undergoing primary processing, sometimes flows/occurs/lasts favorably. In such cases bone scrap, forming wounds gradually are resorbed or they are secreted, and through 7-8 weeks attacks/advances spontaneous recovery (Fig. 60 and 61). less frequent bone scrap are necrotized and are infected; in these cases the process of their rejection/separation sharply decelerates. In this case appears the prolonged festering of

wound, and can be formed fistula. During the x-ray examination of such wounded through 3-4 and more than weeks after wound is established/installed the presence of necrotic bone scrap. The latter always give very intense image. Because of this when the necrosis of bone scrap is present, incomplete break is revealed/detected in the X-ray photographs 3-4 weeks after wound considerably more distinct than during primary research.

The surface fistulas of the origin indicated are cured after the distance/separation of bone scrap. Considerably less frequent incomplete break is complicated by osteomyelitis.

The X-ray diagnostics of linear breaks of skull is usually very difficult.

The identification of breaks of this type is based on the roentgenological symptoms of the through cracks of skull. KA to the beginning of the Great Patriotic War the corresponding strong points were already sufficiently developed on the material of the injuries of peacetime.

By most valuable roentgenological the symptoms of the through cracks are the "symptom of transparency", described by Schuller, and the "symptom of bifurcation", established/installed by D. G. Rokhlin

and V. S. Maykovoy-Strcganov . The "symptom of transparency" appears, if during X-ray analysis the central beam of X-rays is passed to the plane of crack. Under these conditions the image of the break of external plate coincides with the image of the break of internal plate, and in X-ray photograph is detected the transparent/hyaline line, which interrupts the structure of bone (Fig. 62 and 63). If the central beam of X-rays is passed at a bearing/angle to 45-60° to the plane of crack, the image of the break of external plate is separate/liberated from the image of internal plate. Under these conditions the roentgenological image of crack loses transparency and takes the form of two thin inosculating filaments (Fig. 62 and 63).

Page 277.

Is very frequently detected the alternation of two symptoms indicated for elongation/extent by one and the same of crack (Fig. 62). Crack not at all is detected in photograph, if its plane does not coincide in limits of 90° with the plane of incidence in the central beam of X-rays. Because of this the described symptoms are invariably/unchangedly detected only with the removal of the region of damage into the center section of the X-ray photograph (Fig. 62 and 63) and they are not very frequently revealed/detected, if the zone of break is located in the intermediate unit of the photograph. Crack never is determined in X-ray photograph, if it passes along the

edge-forming sector of skull (Fig. 63). Therefore on photographs, tangents to the region of damage, are established/installed only the cracks, crossing acrcss entire sector of skull, which comprises the edge zone of X-ray photcgraph. In such cases is established/installed the defect of an entire thickness of bone. Here spongy substance proves to be exposed, since in the region of crack external plate is not connected from internal (Fig. 64 and 65).

This symptom is observed only with crack and it makes it possible to distinguish it of the image of the skull suture in region of which in tangential photograph also is determined the defect of an entire thickness of bone, but spongy substance proves to be covered closing plate, since in cranial suture external plate directly converts/transfers intc internal (Fig. 64 and 65).

The X-ray diagnostics of the linear break of skull is especially impeded by the fact that during these damages the length of crack almost always proves to be very insignificant. Because of this during x-ray examination usually it is possible to trace just one of the two described symptoms (Fig. 66 and 67). In order to reveal/detect linear break, sometimes it is necessary to make several X-ray photographs with different relationships/ratios between the region of wound and the direction of the central beam cf X-rays (Fig. 68, 69, 70 and 71).

After the process/operation of the primary processing of wound apropos of linear break remains the through trepanation defect in region of which is developed the ordinary process of the healing of bone wound.

The X-ray diagnostics of the depressed breaks, as a rule, does not cause essential difficulties. Is most distinctly all special features/peculiarities of breaks of this type are detected in the edge forming unit of the X-ray photograph, i.e., in tangential photographs (Fig. 72 and 73). With all depressed breaks the zone of the violation of the integrity of external plate is considerably less than the break of internal plate (Fig. 72, 73, 74 and 75). In the majority of the cases with the depressed break internal plate caves in into the area of skull in the form of cone (Fig. 72 and 73). In the center of the sector of damage in the place of the greatest deflection of bone appears the break of internal plate (Fig. 72 and 73). The same breaks can be traced, also, on the periphery of the sector of break in the place of march/passage into undamaged/uninjured bone (Fig. 72 and 73). Because of this internal plate in the region of break is divided into several sufficiently large/coarse fragments. External plate in such cases usually completely is separate/liberated from internal and is granulated to a large quantity of small/finer fragments which are also somewhat displaced towards the inside. These breaks almost completely correspond to the so-called impression breaks, which appear with the injury of peacetime.

Page 278.

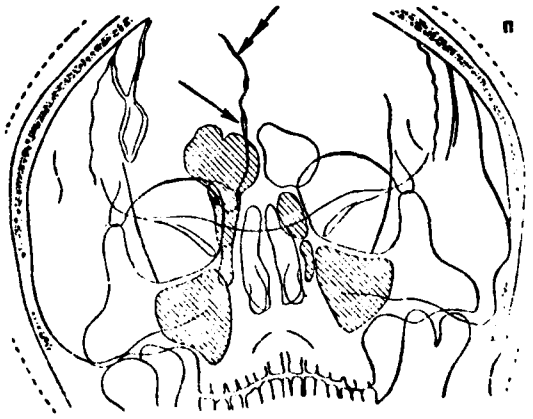


Fig. 62. Tangential fragmentation wound of frontal region. Anatomical scheme from the X-ray photograph, produced during primary research. The region of wound is located in the central zone of photograph. There is a linear break of skull which crosses/intersects the lower sector of the parasaggital department of the scale of frontal bone and which converts to the cerebral wall of left frontal sinus/antrum. In X-ray photograph in one sector of break it is detected symptom of bifurcation. This sector indicated by arrow/pointer. Elsewhere there is a symptom of the transparency (it is shown by dual arrow/pointer). Right frontal sinus/antrum of shaded as a result of hemorrhage into it. The image of this sinus/antrum is not shaded. Additional sinus of nose, preservation of normal transparency, are hatched.

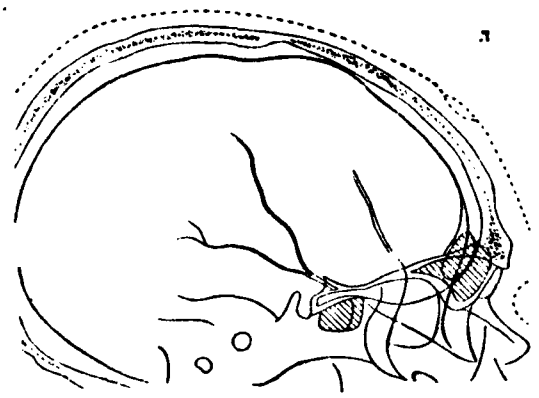


Fig. 63. Anatomical scheme from lateral X-ray photograph of skull of the same wounded. The violations of the integrity of bone are not determined, since crack passes along the edge-forming zone of photograph.

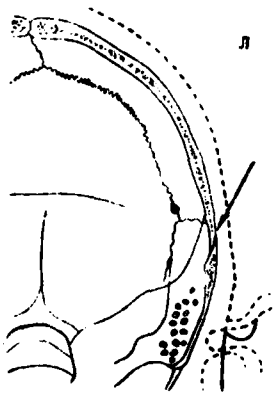


Fig. 64. Blind-end fragmentation wound of soft tissues of sincipital-postcranial region. Anatomical scheme from the posterior X-ray photograph of this region, produced during primary research. Arrow/pointer showed the interruption of the image of bone in the edge zone of photograph, caused by the ripple weld. In this region

spongy substance is covered with closing plate. This makes it possible to exclude the linear break of skull.

Page 279.

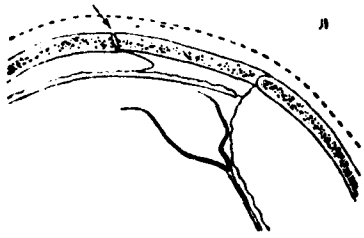


Fig. 65. Tangential fragment wound of right sincipital region. Anatomical scheme from the left oblique X-ray photograph of sincipital region, produced during primary research concerning to the place of wound. Arrow/pointer showed the linear break of the parasagittal department of right sincipital bone, which crosses/intersects across the edge zone of photograph. In contrast to the image of suture in the region of crack the internal and external plates of skull are not connected between themselves, in consequence of which spongy substance is exposed.

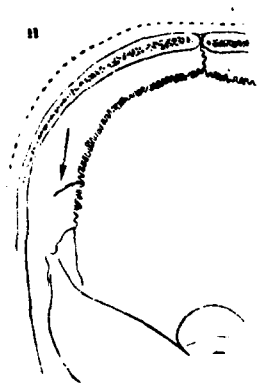


Fig. 66. Tangential fragmentation wound of right sincipital-postcranial region. Anatomical scheme from the posterior X-ray photograph of this region, produced during primary research. Arrow/pointer showed the linear break of skull in a posterior-lower sector of sincipital bone. Break is the short, horizontally arranged/located crack, which attenuates in in lambdoid seam. Distinctly is outlined the "symptom of bifurcation".

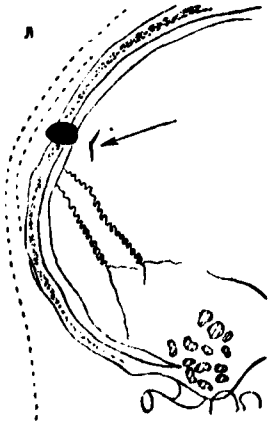
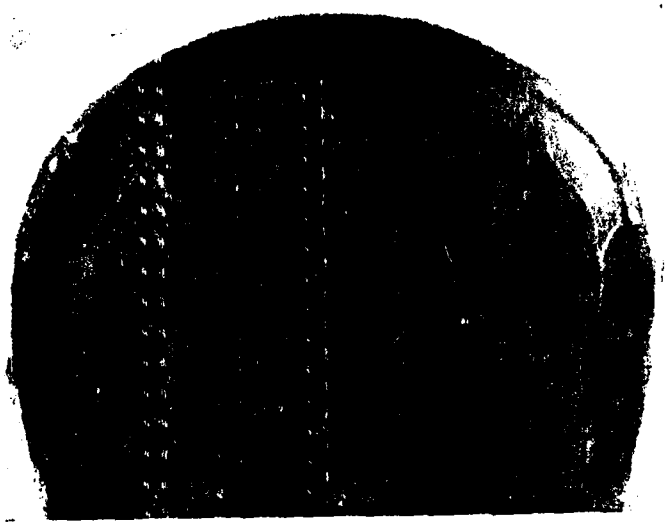


Fig. 67. Penetrating bullet wound of left sincipital-postcranial

region. Anatomical scheme from the left lateral X-ray photograph of this region, produced with the primary of research. Arrow/pointer showed the linear break of skull in the form of the short zigzag crack of a posterior-upper department of sincipital bone. Is well visible the "symptom of transparency". In the soft tissues of skull is arranged/located the bullet which in this X-ray photograph penetrates the edge-forming department of photograph, which is the image of the parasagittal department of right sincipital bone.

Page 279a.



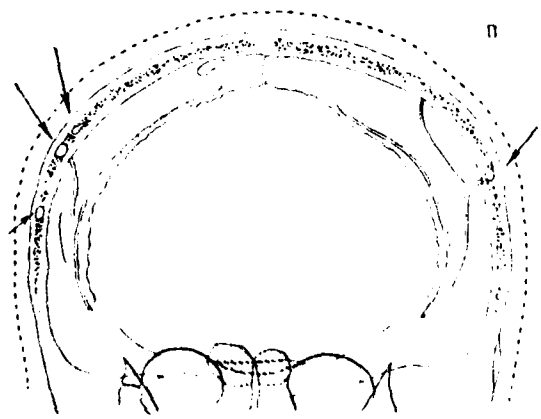
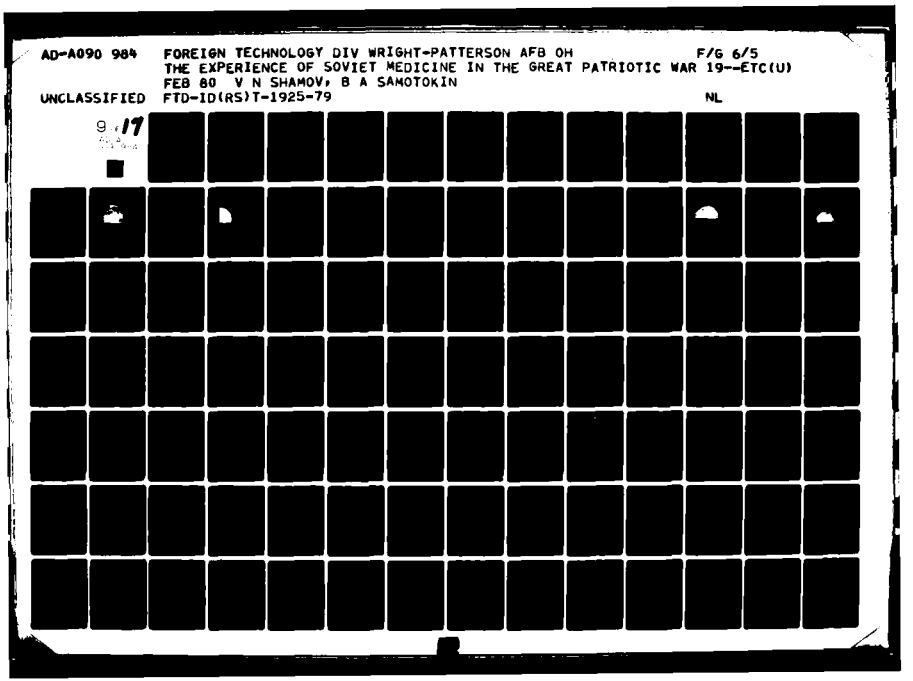


Fig. 68. Tangential fragment wound of sagittal department frontoparietal of region with linear break of left sincipital bone.

Anterior view X-ray phctcgraph of skull, produced during primary research. Is below - anatomical scheme from this X-ray photograph. The violation of the integrity cf bone in X-ray photograph in this projection is not determined. On anatomical scheme pointer/riflemen showed the image of the canals of diplopic veins in the edge-forming zone of photograph.


AD-A090 984
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OH
F/G 6/5
THE EXPERIENCE OF SOVIET MEDICINE IN THE GREAT PATRIOTIC WAR 19--ETC(U)
FEB 80 V N SHAMOV, B A SAMOTOKIN
UNCLASSIFIED
FTD-ID(RS)T-1925-79
NL
9 17


A
098

Page 280.

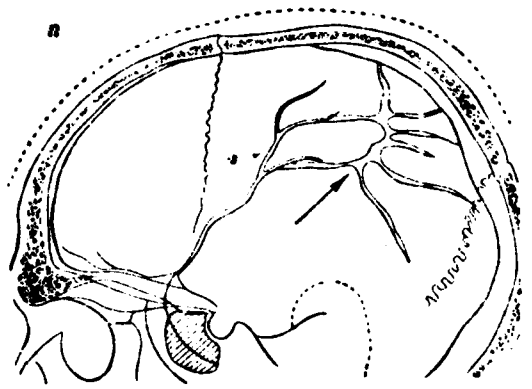


Fig. 69. Anatomical scheme from right lateral X-ray photograph of skull the same of that wounded. The violation of the integrity of bone is not determined also in this projection. Arrow/pointer showed the image of the canals of diploic veins.

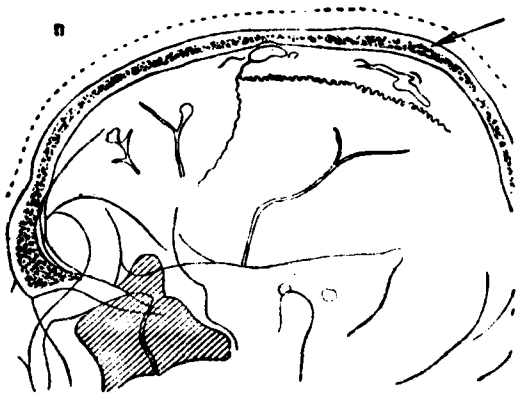


Fig. 70. Anatomical scheme from right oblique X-ray photograph of skull of the same wounded. The violation of the integrity of bone is not detected also in this photograph. Arrow/pointer showed the image of of channel of diplopic vein in edge-formig zone of X-ray photograph.

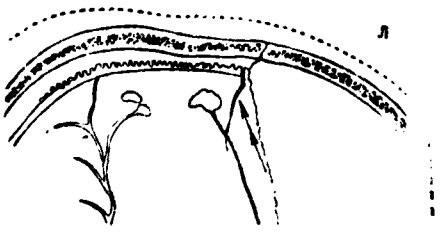


Fig. 71. Anatomical scheme from left oblique X-ray photograph of

frontally sincipital region of the same wounded. By dual arrow/pointer are shown the linear break of skull in the form of short crack, intersecting front- upper sector of left sincipital bone which is arranged/located in the center of this photograph. The break came to light only on one of the 4 photographs in production of which the plane of indidence of the central beam of X-rays coincided with the plane of crack.

Page 281.

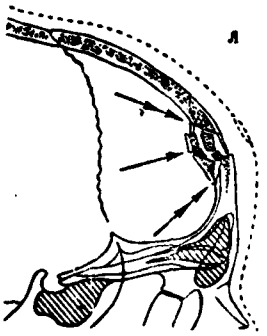


Fig. 72. Tangential bullet wound of frontal region. Anatomical scheme from the left lateral X-ray photograph of this region, produced during primary research concerning to the place of wound. In the edge zone of skull is determined the depressed break of the scale of frontal bone of the type impression. The defect of internal plate is two times more than the damage of external plate. Internal plate cone-shaped caved in into the area of skull and was divided into several scrap. By arrow/pointer is marked the place of the break of internal plate in the region of its greatest sagging into the area of skull. Dual pointer/riflemen noted the break of internal plate on the periphery of the sector of damage.

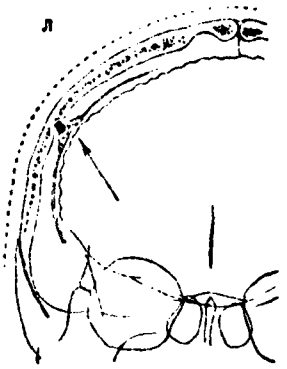


Fig. 73. Nonpenetrating fragmentation wound of left sincipital region. Anatomical scheme from the front/leading survey X-ray photograph of this region, produced during primary research. In the front/leading department of left sincipital bone the rim suture of outer has the depressed break of a skull of the type of depression. From the skull removed one bone scrap, which has the form/species of truncated cone which insignificantly was displaced into the area of skull. This scrap is shown by arrow/pointer. Towards the outside from it in the defect of bone is located small/fine metallic foreign body.

Page 282.

The depressed bullet breaks differ from analogous nonbullet damages

by the presence of the complete separation/section of internal plate from in terms of the external, comparatively small value of the sector of the destruction of bone and in terms of the shallow displacement of bone scrap.

The diameter of the sector of the damage of internal plate with the bullet depressed breaks rarely exceeds 3 cm, and great central displacement is usually equal to 1-1.5 cm and it only rarely achieves 3 cm.

Considerably less frequent with the depressed breaks is formed only one bone scrap, which consists of an entire thickness of bone, which by rear sight is displaced by the depth, which does not exceed 4-5 mm (Fig. 73). This scrap has a form of truncated cone. Such depression breaks are observed also with other forms/species of injuries with bullet wounds and are characterized by only the smaller value of the sector of damage.

The nonpenetrating wound with the depressed break can be diagnosed on the basis only of roentgenological data, if break is related to the type of depression ones (Fig. 73), since in such cases solid cerebral shell, as a rule, is not damaged. The experiment/experience of war showed that the diagnosis of the break of solid cerebral shell becoses doubtless, when with the depressed

break is detected the distinct displacement of bone fragments not only in the center of the sector of destruction, but also by its periphery in the place of march/passage into undamaged/uninjured bone (Fig. 74).

The depressed breaks are observed in all bones of skull arch/summary. With the blind-end and ricocheting wounds the sector of break has subglobose form, with tangents it becomes oval. With blind-end wounds the foreign body most frequently is arranged/located within bone and is satisfied defect in skull (Fig. 74 and 75).

After the primary processing of the wound of skull apropos of the depressed break roentgenologically is detected the ordinary trepanation defect. If this process/operation was not produced, frequently appears the prolonged festering of wound, is formed fistula. Festering is supported by the presence of the infected scrap of the external plate which are inclined to be necrotized, since they have insignificant value and it is completely isolated from internal plate and from periostenum. In contrast to them the scrap of internal plate, as a rule, retain viability and gradually they merge with that surrounding by the departments of bone, because they have sufficiently considerable dimensions and do not lose connection/communication with periostenum.

Therefore with the depressed breaks of the type of impression later several weeks or months after wound roentgenologically are determined necrotic scrap of external plate and scrap of the internal plate, which have the smooth ones of edge and almost completely merged with the surrounding bone (Fig. 76 and 77). X-ray examination usually is conducted for the establishment of the reason, which calls fistula.

After the complete healing of wound roentgenologically is determined the designed defect of external plate and spongy substance and directed to the area of skull prominence on internal plate, formed by its completely consolidated scrap (Fig. 78 and 79). The value of prominence oscillates depending on the depth of the former displacement of scrap of bone. About the complete healing of bone wound testifies the presence of closing plate, which covers/coats spongy substance (Fig. 78 and 79).

Page 283.

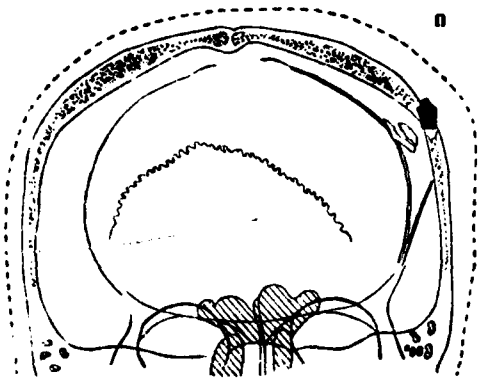


Fig. 74. Blind-end fragmentation wound of right sincipital region. Anatomical scheme from the front/leading survey X-ray photograph of skull, produced during primary research. The image of the region of wound is located in edge zone of photograph. In the center of right sincipital bone is determined the depressed break of a skull of the type of impression. There is displacement of scrap of internal plate into cavity of skull not only in the center of the sector of damage but also on its periphery. This testifies about the presence of the damage of solid cerebral shell. Defect in bone is carried out by metallic foreign body.

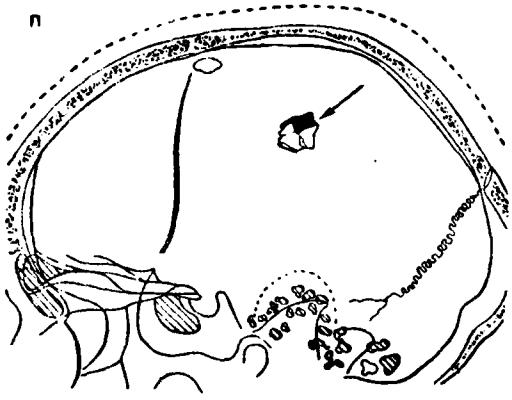
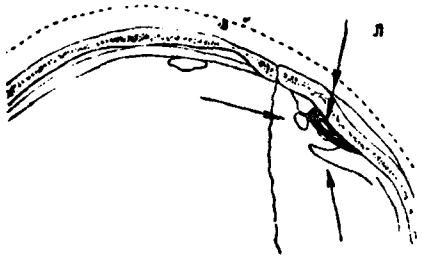


Fig. 75. Anatomical scheme from right lateral X-ray photograph of skull of the same wounded. Break, which is located in the central zone of photograph, is shown by arrow/pointer.

Page 284.



Pig. 76. nompenetrating fragmentation wound of frontoparietal region. Anatomical scheme from the left lateral X-ray photograph of this region, produced 8 months after wound, in the presence of purulent fistula. Immediately after wound from the scft tissues of skull there was removed foreign body the primary surgical processing of bone wound it was not conducted. Hound festered, was formed of fistulas. In X-ray photograph is determined the depressed break of of skull of frontal bone. Pointer/riflemen showed scrap of internal plate, protruding into area, skulls. Scrap of internal plate have smooth ones of edge, but peripheries they unnoticeably ccnvert/transfer into the surrounding bone, merging with it. Defect in external plate and spongy substance has the designed edge. Dual arrow/pointer noted

small/fine necrotic scrap of the external plate which it is located in the defect of skull and they support festering and existence of fistulas.

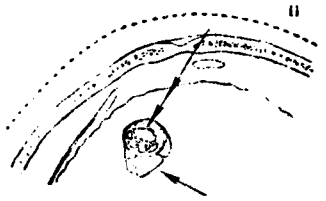


Fig. 77. Anatomical scheme from front/leading X-ray photograph of frontoparietal of region of the same wounded. Is visible closing plate, which was being formed on the edge of defect in bone. Arrow/pointer showed scrap of internal plate. Dual arrow/pointer noted scrap of external plate.

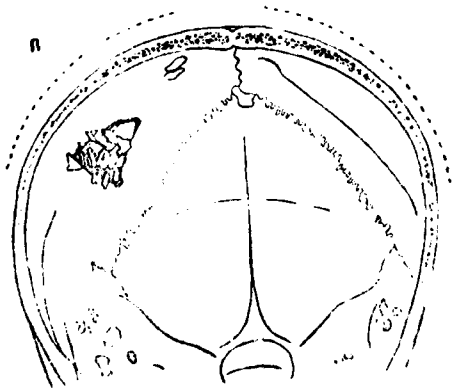


Fig. 80. Ricocheting wound of right sincipital region. Anatomical

scheme from the posterior X-ray photograph of a sincipital-postcranial region, produced during primary research. The place of wound is located in the region of passing the central zone of photograph into intermediate. Toward the rear from the center of right sincipital bone is determined the sector of the breaking up of skull. The image of bone scrap does not exceed the limits of the image of defect in skull.

Page 284a.



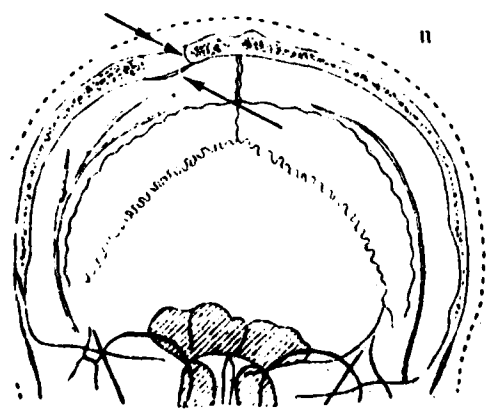


Fig. 78. Tangential fragment wound of left sincipital region. The primary surgical processing of wound was not conducted. In the course

of 3 months after wound there was festering wcund, which was finished by the education of durable scar. Anterior X-ray photograph of skull, produced 9 months after wound. Is below - anatomical scheme from this X-ray photograph. In the edge zone of left sincipital bone is detected healing that depressed break of the type impresssion. On anatomical scheme arrow/pointer showed the internal plate whose scrap merged with the surrounding bone. By dual arrcw/pointer are designated closing plate, that covers of the edge of bone defect. Scrap not no external plate there is.

Page 284b.



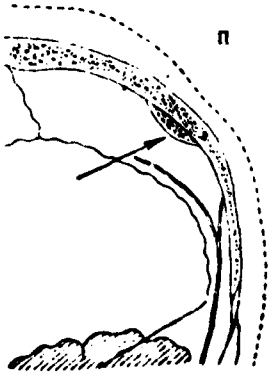


Fig. 79. Tangential fragment wound of right sincipital region. The primary surgical processing of wound was not conducted. Wound healed

through 4 apparitors after wound. Front/leading survey X-ray photograph of the region indicated, produced 14 months after wound. Is below - anatomical scheme from this X-ray photograph. In the center of right sincipital bone is determined completely pressing the depressed break of a skull of the type of depression. On anatomical scheme arrow/pointer showed the bone prominence on the internal surface of skull, which consists of an entire thickness of bone.

Page 285.

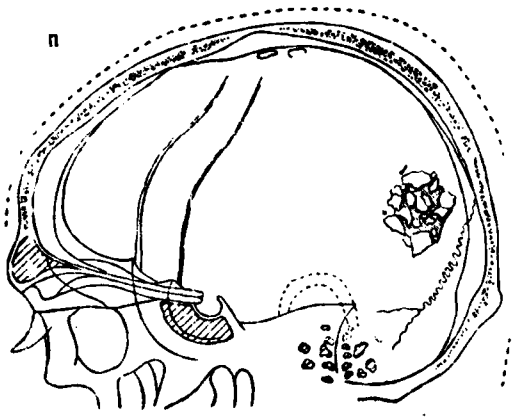


Fig. 81. Anatomical scheme from right lateral X-ray photograph, represented in Fig. 80. The image of bone scrap in this photcgraph also does not exceed the limits of the image cf defect in skull. Consequently, in two X-ray photcgraphs of skull, made into mutually perpendicular planes, the image of bone scrap coincides with defect in skull. This it indicates the insignificance of the displacement of scrap of bone and is the straight/direct symptom of the crushed break of skull.

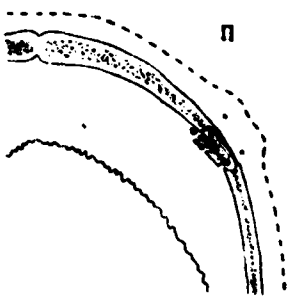


Fig. 82. Nonpenetrating fragmentation wound of right sincipital region. Anatomical scheme from the posterior aiming X-ray photograph of this region, produced during primary research. In the center of sincipital bone is detected the insignificant crushed break whose image is located in of edge zone of photograph. It is outlined well that bone scrap are displaced into the area of skull not more than by 1-2 mm.

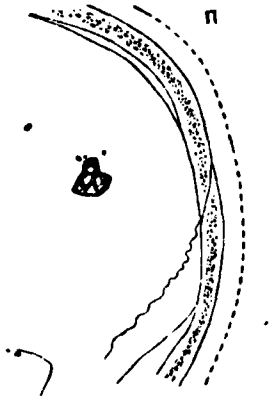


Fig. 83. Anatomical scheme from right lateral X-ray photograph of sincipital-postcranial region of the same wounded. Sector of the break is found in the central zone of photograph. The image of bone scrap does not emerge beyond the limits of the image of defect in of skull.

Page 286.

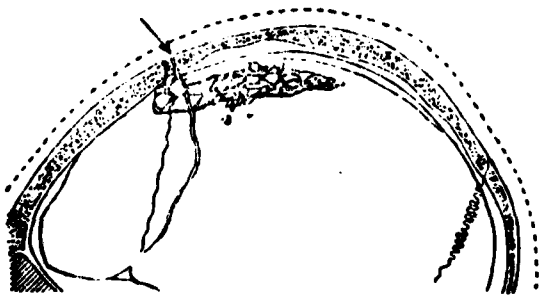


Fig. 84. Tangential bullet wound of right sincipital region. The process/operation of primary processing of wound was not conducted. Anatomical scheme from the right oblique X-ray photograph of skull, produced 3 weeks after wound when the considerable festering of wound is present,. Is detected the parasagittal crushed break of right sincipital bone, which converts in the adjacent sector of the scale of frontal bone. there are multiple small/fine necrotic bone scrap, which support suppuration. Arrow/pointer showed the crown suture which was radiated.

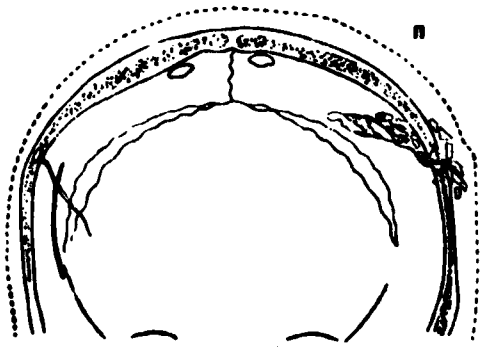


Fig. 87. Tangential bullet wound of right sincipital region. Anatomical scheme from the front/leading survey X-ray photograph of skull, produced during primary research. In front-lower department of right sincipital bone is determined the crushed break, which captures the narrow long sector of skull. The unit of the region of break in this photograph is edge. In this place is detected the distinct displacement of bone scrap towards the outside, it which indicates the break of solid cerebral shell.

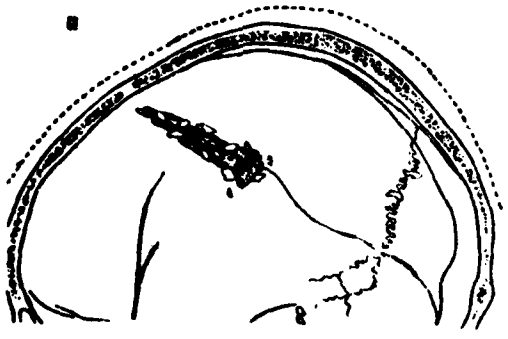


Fig. 88. Anatomical scheme from right lateral X-ray photograph of skull of the same wounded. In this photograph is detected long crack, which exits from the posterior pole of the sector of the breaking up of sincipital bone.

Page 286a.

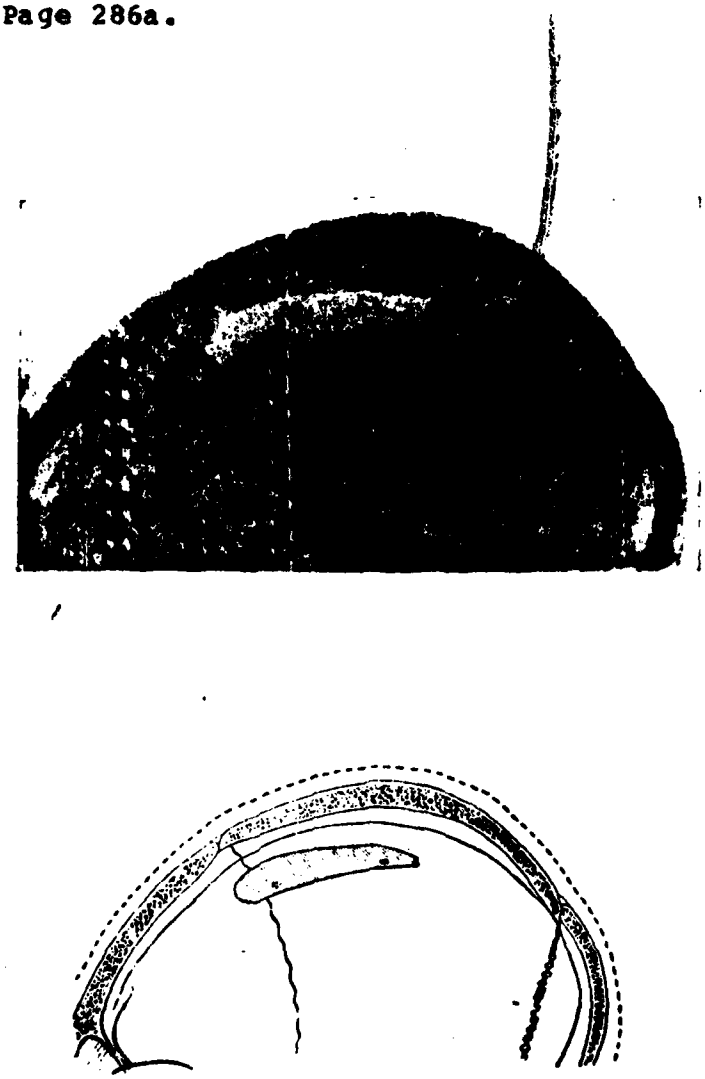


Fig. 85. Right oblique X-ray photograph of skull of the same wounded. X-ray photograph is produced 7 months after the wound when

spontaneously ended suppuration of wound, continuing of 6 1/2 months. Is below - anatomical scheme frcm this X-ray photograph. is revealed the complete healing of bone wound. All bone scrap were resorbed or be secreted. Edge of defect in skull of the cover/roof/pavement with closing plate. The disagreement of rim suture disappeared.

Page 286b.

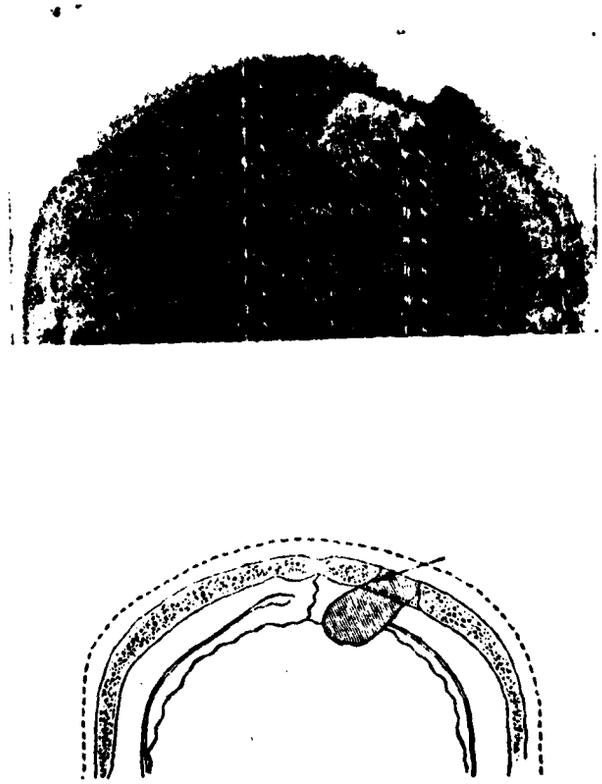


Fig. 86. Front/leading survey X-ray photcgraph of frontoparietal region of the same wounded. X-ray photograph is done simultaneously

with the photograph, represented in Fig. 85. Is below - is anatomical scheme from this X-ray photograph. On the anatomical scheme arrow shows closing plate, which covers the edge of defect in skull and is especially which is distinctly revealed/detected in edge-forming zone of photograph.

Page 287.

The bone scrap, which is separated/liberated from skull, with the depressed breaks of the type of depression ones completely retains viability and gradually it merges with the surrounding departments of bone. Because of this with these breaks, which were not undergoing the process/operation of primary processing, through several months and even years after wound in X-ray photographs is detected flat/plane bone prominence on the internal surface of skull and covered with closing plate depression on its external surface (Fig. 78 and 79).

The crushed breaks usually distinctly are determined in X-ray photographs. They are distinguished on the presence of the sector of the breaking up of bone, which is characterized by multiple small/fine scrap and insignificant displacement of the latter. In both X-ray photographs of the skull, produced in mutually perpendicular projections, the image of the bone scrap, which were being formed with the crushed break, does not exceed the limits of the image of bone defect (Fig. 80 and 81). This is the straight/direct roentgenological symptom of the crushed break, since

it testifies about the insignificant displacement of bone scrap and it makes it possible to distinguish the crushed break of remaining heavier wounds and, first of all, from perforated plumb break. With the latter the image of bone scrap on one of the two X-ray photographs of the skull, produced in mutually perpendicular projections, always proves to be towards the inside from the image of bone defect.

The small displacement of scrap of bone with the crushed breaks even more distinctly is revealed/detected on X-ray photographs, tangents to the region of wound (Fig. 82 and 83).

With the crushed breaks, which are escorted/tracked by the gap of solid cerebral shell, bone scrap under the effect of the swelling cerebral substance are sometimes displaced towards the outside. In such wounded on the basis of the direction of displacement indicated bone scrap is the possiblity of diagnosing the roentgenologically penetrating wound (Fig. 87 and 88).

In all remaining cases with breaks of this type to determine the condition of solid cerebral shell during x-ray examination did not manage.

The crushed breaks are encountered in all bones, which form the

arch/summary of cerebral skull. The zone of damage with these breaks in the majority of the cases is insignificant (Fig. 82). The sector of the decomposition of bone has subglobose form with the ricocheting and blind wounds (Fig. 81 and 82). With tangential wounds the crushed break takes the form of zone (Fig. 84, 85 and 86), which sometimes is expanded on the course of wound canal (Fig. 87 and 88).

With blind wounds the foreign bodies are arranged/located among bone scrap or, it is thinner/less frequent, towards the outside.

After the primary processing of the wound of skull apropos of the crushed break roentgenologically is determined the ordinary trepanation defect. If the process/operation of primary processing was not produced, with breaks of this type invariably/unchangedly appears the festering. The latter is developed as a result of the fact that bone scrap with these wounds never retain viability.

With roentgenological study in such cases are distinctly visible the necrotic and resolved scrap of bone (Fig. 84, 85 and 86).

Clinic.

The experiment/experience of the Great Patriotic War made it possible to study clinic of the uncomplicated nonpenetrating wounds of skull, special feature/peculiarity of their course and dynamics of symptoms.

The clinical manifestations of the uncomplicated nonpenetrating wounds of skull depended, on localization of wound, on the character/nature of damage to bone and on the degree of the damage/defeat of brain.

The distribution of nonpenetrating wounds according to localization is represented in Table 30.

Single nonpenetrating wounds in majority flowed/occurred/lasted more favorably than the multiple or combined; however, multiple multi-fragment wounds skulls were comparatively more easily than single wounds the fragments of shells. The single nonpenetrating wounds of skull were encountered into 61.1o/o, the multiple wounds only of skull - into 7.9c/o and finally the nonpenetrating wounds of skull, which were being escorted/tracked by the wound of other regions of body, into 31.0o/o. Most heavily flowed/occurred/lasted the multiple wounds of skull and chest or stomach. Table 31 shows

character/nature and frequency of the nonpenetrating wounds of skull and other regions of body.

As can be seen from Table 31, most frequently were observed the multiple wounds of skull and extremities.

Table 30. Localization of the nonpenetrating wounds of skull.

(1) Локализация ранений	(2) Частота (в %)
(3) Лобная область	14,5
(4) Теменная область	29,8
(5) Височная область	10,5
(6) Затылочная область	11,7
(7) Две области	29,5
(8) Больше двух областей	4,0

Key: (1). Localization of wounds. (2). Frequency (in o/o). (3). Frontal region. (4). Sincipital region. (5). Temporal region. (6). Postcranial region. (7). Two regions. (8). It is more than two regions.

Table 31. Character/nature and frequency of the combined nonpenetrating wounds of skull.

(1) Характер ранений	(2) Частота (в %)
(3) Множественные ранения черепа и конечностей	13,9
(4) Множественные ранения черепа, лица и шеи	4,9
(5) Множественные ранения черепа и грудной клетки	2,7
(6) Множественные ранения черепа и живота	0,3
(7) Прочие сочетания	9,2

Key: (1). Character/nature of wounds. (2). Frequency (in o/o). (3). Multiple wounds of skull and extremities. (4). Multiple wounds of skull, face and neck. (5). Multiple wounds of skull and chest. (6). Multiple wounds of skull and stomach. (7). Other combinations.

Page 289.

Vital importance in clinic of nonpenetrating wounds had the character/nature of bone damages.

A clinico-roentgenological analysis within the time of the Great Patriotic War made it possible to shade the series/row of special features/peculiarities, characteristic for one or the other group of wounds.

Cracks or linear breaks of bones through occurred into 1.9o/o of cases.

The lots of the wounded of crack were hardly they were expressed, they stretched into 1-2 directions for small elongation/extent. In ancther unit were encountered the extensive cracks, which withdrew to different sides, with multiple failure of the vessels of periosteum, develcpment of extradural hematomas, etc. The wound canal of soft tissues with cracks was usually small. This group on the severity of clinical manifestations approached the closed injury of skull. During the first days after wound was observed bradycardia, general/ccmmcn/total asthenia and prolonged stupor with the subsequent considerable instability.

The focus symptoms of damage to nervous system were noted in such cases where were considerable cracks and subsequent extensive epidural and, what is more, subdural hematomas.

With similar wounds were observed the heavy forms of a contusion-jolt of brain. Cracks, especially in the posterior departments of the arch/summary of skull, were sometimes escorted/tracked by the sub-arachnoidal hemorrhages of different value. The considerable cracks of temporal and postcranial bone sometimes were spread also to the basis of skull, causing the heavy clinical picture: the prolonged loss of consciousness, hemorrhage from external auditory passage, peripheral paralysis of face, the damage of hearing and discharge nerve and frequently tunicary symptoms.

The damage of the external plate of bone was encountered into 12.3o/o of cases. The wounding shell caused on the surface of bone tissue small depressions, sulci, usually for small elongation/extent and predominantly with tangential wounds. The wound canal of soft tissues into some cases corresponded to bone damages, in others - the wound of soft tissues was more extensive. In the absence of the which associates injury damage/defeat of brain, its shells and vessels the damages of cortical layer were most the lungs.

The isolated/insulated damages of internal plate were encountered very rarely. The wound canal of soft tissues during such damages proved to be small and it did not sometimes correspond to the sizes/dimensions of the crushed or scaled internal plate. In many wounded with inlet in 0.5-1 cm the peeling of the internal plate of bone achieved 3-4 cm. The unit of the wounded long time was found in unconscious condition, and already from the first days after injury in them were developed general brain and focus symptoms, which made it necessary to suspect the peeling of internal plate. The data of roentgenological study frequently confirmed this diagnosis, and they were sometimes and sole diagnostic method.

The depressed compression break was observed into 27.9o/o of cases. With this type of break, apparently were confirmed the previous observations of A. P. Krymov about the fact that under the effect of the injury of bone the skulls can be indented vnutr6, and then to rapidly take the initial form.

Page 290.

Solid cerebral shell was not damaged, but in cerebral substance in this case occurred the changes, which sometimes led to heavy condition. With the depressed breaks on the spot of injury usually was detected the depression or deepening. In certain cases of the

depressed breaks, especially in the posterior departments of the arch/summary of the skull, was developed the syndrome of contusion - the jolt of brain, and limber was possible to reveal/detect local symptoms with respect tc the place of injury.

The crushed breaks of the bones of the arch/summary of skull composed the greatest grcup of the nonpenetrating wounds of skull.

The wound canal of soft tissues with the crushed breaks of the bones of the skull almost always had large sizes/dimensions with torn-crushed edges of scft tissues and depended on the force of the wounding shell and localization of injury. The crushed breaks were escorted/tracked by the cracks of the bones of arch/summary and it is considerably thinner/less frequent by the breaks of the basis of skull. It is logical that the course of fragmented of breaks was heavier. The which asscciate wound general brain and local symptoms depended on the depth cf occurrence and disposition of bone fragments in wound canal. It was frequently noted that in cases when bcne fragments or foreign bcdies were arranged/lccated vertically with respect to solid cerebral shell, general brain and meningeal symptoms were developed more intense.

The multiple breaks of the bones of the arch/summary of skull were encountered into 1.5o/o of cases and, as a rule, they

flowed/occurred/lasted heavily, being escorted/tracked by predominantly general brain symptoms.

According to data of the experiment of war, the combination of nonpenetrating wounds with the contusion syndrome was observed into 15.8o/o of cases. Similar combinations were encountered predominantly in wounded with the multiple wounds of skull or during the combination of the injury of the latter with the wound of the organs/controls of ventral or thoracic area.

In clinic of nonpenetrating wounds high value had contusion-jolts of brain which more frequently were encountered with the combined wounds of skull.

The combined wounds of skull were noted into 1.8o/o of cases; almost always clinically they flowed/occurred/lasted heavily, being escorted/tracked by sub-arachnoidal hemorrhage and thinner/less frequent by the break of the basis of the skull. In these cases, besides the damage of face and cculomotor nerve and hearing aid, were encountered the disorders of sensitivity frcm the side of trigeminal cr postcranial nerve. The degree of the develcpment of general brain symptoms depended sometimes not so much on the quite nonpenetrating wound of skull, as from the subsequent ccntusion with the incidence/drop in the wounded or from strike/shock on head by blunt

object/subject.

With the bullet nonpenetrating wounds of skull the loss of consciousness was noted into 80.8o/o of cases and continued from 30 minutes to 2 hours. Considerably thinner/less frequent the lcss of consciousness appeared after brief bright gap/interval, but in these cases subsequently set in heavier condition, since were developed compression phenomena frcm the side of brain.

Sometimes brain concussion caused the heavy clinical picture, which was leading in prcgnostic sense.

In the first period after wound in 65.0o/o of wounded attacked/advanced bradycardia whose degree depended on the severity of injury and associated concussion syndrome.

Page 291.

The delay of pulse was brief and more frequently it was observed with the depressed breaks, the extensive cracks of the arch/summary of skull it is thinner/less frequent with the incomplete breaks of bones. Frequent general brain symptoms were nausea and vomiting. In the majority of the cases vomiting preceded the nausea. Very frequently the vomiting attacked/advanced at the height/altitude of

the attacks/seizures/paroxysms of headaches and thinner/less frequent than vertigoes.

Headaches, vertigoes and noise in ears were also frequent general brain symptoms, were developed follcwing with wound, they were nonpersistent and under the effect of the appropriate mode/conditions and treatment comparatively rapidly they calmed down.

Vegetative disorders in majority did not bear stable character/nature. Predominated stable red dermographism, hyperhydrosis, sharp shift/relief of the stain/staining face and extremital departments of extremities, change in the pilomotor reflexes, Aschner's symptom, the lability of pulse wave, etc.

Tunicary symptoms with the nonpenetrating wounds of skull were observed into 14.0o/o of cases. Among them: Kernig's and Brudzinski's signs - into 5.5o/o, rigidity postcranial of muscles - into 5.2o/o, the combination of those, etc. - into 3.3o/o. Implication cerebral of shells was noted with different types wounds, but it is more frequent with the deep crushed breaks when bone fragments were arranged/located on solid cerebral shell, and with the multiple gaping cracks of arch/summary, which were being descended to the lower department of postcranial region. With the combined wounds of the skull and neck were frequently observed also meningeal symptoms.

Special attention deserved the use/application of lombar punctures with the nonpenetrating wounds of skull. In the case of hypertensional phenomena and subarachnoid hemorrhages lombar punctures were the diagnostic and treating measure. The experiment/experience of neurosurgeons' majority has established that during the appropriate readings the use/application of punctures with the distance/separation of at first small quantities of cerebro-spinal fluid after only 8-12 hours after wound contributed to the more favorable course of process. Lombar punctures were usually conducted daily or in a day/every other day, into dependence on the degree of pathological changes in the cerebro-spinal fluid. In the case of reinforcing the intensity of the blood-containing stain/staining of cerebro-spinal fluid during its taking puncture they ceased.

Changes from the side of eyeground with the nonpenetrating wounds of the skull are noted into 3.0o/o of cases. According to individual authors' data, these changes in initial period were observed into 8.0o/o of cases. Among changes in the eyeground neuritis of optical nerves was encountered into 68.0o/o, stagnant nipples - into 22.0o/o and other changes - into 10.0o/o. Pathological changes in the eyeground predominated on the side of traumatic focus,

moreover it is noticed that neuritides of optical nerves more frequently began with the wounds of the front/leading and anterolateral departments of the arch/summary of skull. Stagnant nipples were usually expressed weakly, more frequently they were encountered on the side of damage/defeat and were developed predominantly after traumas in the posterior departments of the arch/summary of the skull. The experiment/experience of war allowed authors' majority to note the instability of the pathological conditions of eyeground indicated with the uncomplicated nonpenetrating wounds.

An increase in the temperature was observed comparatively frequently at first after injury and gave occasion to assume, especially upon the appearance of blurred meningeal symptoms, the presence of small sub-arachnoidal hemorrhages. Sometimes an increase in the temperature made it necessary to assume the combined wound of the skull and other organs/controls, which frequently was confirmed.

Page 292.

The focus symptoms of the violation of the functions of central nervous system with the nonpenetrating wounds of the skull were encountered into 12.8o/o of cases. In spite of relative rarity, these symptoms in clinic of nonpenetrating wounds they played the

significant role. The development of focus symptoms depended on degree and localization of the damage to the skull and brain. The accounting of the developed symptoms in their dynamics made it possible with large certainty to solve the problem about the diagnosis of complications and about the tactics of therapeutic measures.

The analysis of the caused by wound different disorders of the functions of central nervous system showed that the focus symptoms most frequently were observed with the wounds of sincipital region - into 21.5o/o, then temporal and postcranial region - into 8.5-8.6o/o and thinner/less frequent than the frontal region - into 6.7o/o.

Focus symptoms were encountered more frequently with the depressed and crushed breaks of the bones of the arch/summary of skull. With localization of the break in the sensomotor zone of brain was observed the early manifestation of focus symptoms. Thus, for instance, hemiparesis or hemiplegia were discovered into 10.6o/o, monoparesis or monoplegia - into 4.4o/o.

The staying power/persistency of focus symptoms to more expediently estimate later several days after wound, since neurologic symptoms during the first days depend mainly on the general/common/total reaction of brain to injury, but not from

pathological process in the brain which appears more lately.

During prolonged observation of wounded it became possible to judge about the staying power/persistency of the fallout of functions, and consequently, and about the depth of pathological process in brain.

It should be noted that into the first hours, and sometimes also the days after injury in the unit of the wounded focus symptoms were expressed weakly. Wounded withdrew from action independently, on foot they reached PMP and even MSB, where in them appeared sometimes monoparesis, different disorders of the functions of cranial nerves, etc.

Among the caused by wound violations of the function of central nervous system motor disorders were encountered into 22.0o/o, the disorders of vocal functions - into 1.7o/o, different manifestations of the violations of psychics/psyche - into 0.9o/o.

During the first days after wound tendincus and periosteal reflexes were frequently weakened, later they rose. Such changes in the reflector activity were also nonpersistent.

The disorders of vocal functions passed through certain time.

The frequency of the disorders of speech during the damages of frontal and temporal regions achieved 1.7o/o and it was distributed as follows: engine aphasia - 41.4o/o, total aphasia - 13.0o/o, amnesic aphasia - 8.6o/o, sensory aphasia - 6.7o/o and the combinations of these disorders - 30.3o/o. Evaluation of vocal disorders after nonpenetrating wounds was done usually not right after injury and with large care, since frequently these disorders were the consequence of edema of brain.

Among sensitive disorders (11.9o/o) predominated the violations of crust origin, with respect to damage posterior-sincipital of region (astereognosis, disorder of musculoarticular feeling, hemihypestesia, etc.), and also were observed the phenomena of stimulation in the form of hyperpathia and paresthesia, etc. Changes in the sensitivity were nonpersistent.

Page 293.

With the wound of postcranial region to a certain degree diagnosed the fallout or the limitation of the field of view which was encountered into 1.3o/o. These symptoms appeared early. In many instances they were the consequence of local edema of brain.

Different means of the violations of rumor and vestibular

functions had known diagnostic value. Observation in hospital and otolaryngological research made it possible to differentiate these disorders from the concussion-contusion syndrcme of brain.

Epileptiform fits were noted into 1.3o/o of cases. They frequently appeared at the height/altitude of general brain phenomena, but they were brief and they were escorted/tracked by tonic ones or, it is thinner/less frequent, by clonic spasms. The sudden manifestation of epileptic fits sometimes served also as the sign/criterion of focus damage/defeat.

Detailed neurologic examination/inspection, evaluation of the place of wound, observation of the character/nature of fit, data of x-ray examination, and scmetimes also encephalcgraphy to a certain degree confirmed assumption about the nature of fit.

Mental condition with the nonpenetrating wounds of skull was tightly closely related with the character/nature of wound, its localization, general condition of wounded and special features/peculiarities of his individual. The violations of the neuropsychic sphere were usually nonpersistent and mildly expressed. They became apparent in excitation, euphoria cr, on the contrary, in depression and retardation.

Mental disorders were frequently the consequence of post-traumatic edema and, it is thinner/less frequent, by the focus symptoms, indicating the damage/defeat of frontal or temporal portion.

The violations of psychics/psyche were observed predominantly during the first days after wound and almost always they passed through 7-10 days.

Auxiliary data for studying clinic of the uncomplicated nonpenetrating wounds of skull was the research of the cerebro-spinal fluid and blood. Pathological changes in the blood are discovered into 22.3o/o, in the blocd and the cerebrospinal fluid - into 6.4o/o. These changes were insignificant (small increase in the content of protein, light increase in the quantity of leukocytes and acceleration of ROE). More noticeable pathological manifestations, especially from the side of the blcod, they were noted with the combined wounds.

Only entire complex of the study of clinic of the uncomplicated nonpenetrating wounds of skull made it possible to in proper time establish/install diagnosis and to prescribe the proper treatment.

Treatment of the uncomplicated wounds.

The character/nature of the primary surgical perfecting of the uncomplicated nonpenetrating wounds of skull depends on depth and vastness of wound, type of wound canal and its lccalization. During the damage only of external plate in the form of surface U-shaped depressions or small cuts primary surgical perfecting was different in different regions of skull.

On the arch/summary of skull the surface of the damaged sector was slightly scraped by acute/sharp spoon or were conducted several rotary motions by cutter within the limits of the cortical layer of bone with the subsequent dusting by streptocide and imposition of partial or anechoic sutures, depending on the period, which passed from the moment/torque of wound.

Page 294.

By multiple failure of external plate and porous substance was conducted the trepanation of an entire thickness of bone. The imposition only of cutter aperture frequently led to the development of the pyo-inflammatory process. By linear breaks or cracks the trepanation was conducted into 18.60/o of cases. The experiment/experience of the Great Patriotic War showed that the

reasonable conservatism with these means of wounds itself justified. Perfecting bone wound was shown with the wide gaping crack with the contaminated edges and during the damage of deeper layers of bone tissue, what sometimes indicated its bluish hue. In the majority of the cases, especially with localization of cracks in the front/leading departments of the arch/summary of skull, the neurosurgeon was limited to the scraping out of the surface of crack.

The absence of the visible bone damages with the extensive wounds of soft tissues always did not serve as the proof of the integrity of bone. In the unit of the cases the bluish or light blue hue of external plate indicated the hemorrhage in the porous substance of bone. The percussion of skull caused the perception of pain. The combination of the changed stain/staining of bone tissue, the sickliness of bone with percussion, stable general brain symptoms and pyramidal signs/criteria indicated the damage of deeper layers of bone and served as reading for surgical intervention, even if radiographic research did not detect bone damages. During trepanation usually it was noted the peeling of internal plate, the extensive foci of hemorrhage into porous substance, etc.

In another unit of the wounded of change the stains/stainings of bone tissue were not escorted/tracked by general brain and local symptoms and in the absence of roentgenological changes in the

readings to trepanation it was not. During the isolated/insulated damage of internal plate without noticeable changes in the external surface of bone general brain symptoms appeared usually early and they were stable. In these cases as basic readings for trepanation served these X-ray analyses of skull, permanent and bursting open headaches, nausea, inclination to bradycardia, retardation, and also localization of wound. Primary trepanation with the distance/separation of scrap of the damaged plate provided the favorable course of process.

With the depressed breaks was laid cut aperture, at a distance on 1-1.5 cm from the edges of break, bone bit in the periphery of the place of break, bone fragments raised themselves. With the imposition of cut aperture or piecing of bone on the spot of break appeared the danger of the introduction of the bone fragments depthward of wound. Sometimes bone fragments seemingly tamped the damaged sinuses, in consequence of which the hemorrhage of them stopped. Therefore the extraction of fragments by the depressed breaks was conducted gradually by their raising with the aid of elevator.

With the breaks of bone in the locations of sinus or large/coarse artery the trepanation always began with the imposition of cut aperture out of the projection of these large vessels.

In the places of the withdrawal of the large/coarse gaping cracks with the uneven, spiculate edges of bone defect the bone bit, and to defect they tried to attach semioval form. With the crushed breaks frequently was noted the damage of the external leaflet of solid cerebral shell. The disposition of bone fragments near the vessels of solid cerebral shell made it necessary to extract them carefully. In the majority of the cases piecing of bone was conducted from its defect.

Page 295.

With the multiple breaks of the bones of the arch/summary of skull the character/nature and the periods of the primary perfecting of wounds were determined by the condition of wounded and by the development of the associated symptoms from the side of central nervous system.

The sizes/dimensions of the trepanation aperture depended mainly on the vastness of bone wound. As is known, the insignificant trepanation apertures which preferred sometimes to lay during the first year of war (1.5x1.5 cm or 2x2 cm), did not make it possible to thoroughly inspect entire depth wounds, whereas large trepanation apertures with the extremely insignificant regenerative capability of the bones of the arch/summary of skull unfavorably were reflected

subsequently, limiting the ability to work of victims.

As showed the experiment/experience of war, the trepanation apertures in 3x3 cm or 4x4 cm (with exception of extensive bone damages) in the majority of the cases are completely sufficient for the diagnosis of the associating wound complications.

With the examination/inspection of the bottom of wound special attention turned to the integrity of solid cerebral shell. If on the basis of clinical picture it was possible to suspect growing subdural hematoma, then it was necessary to focus attention on color, stress/voltage and pulsation of solid cerebral shell. At the termination of trepanation was performed the cautious examination/inspection of the bottom of wound by the bent at angle blunt probe, moreover frequently it was possible to extract from under the edges of the trepanation aperture small/fine bone fragments.

The open method of the treatment of bullet wounds was in the last war basic and only in certain cases with nonpenetrating wounds were laid sutures at angles of wound.

In the course of the Great Patriotic War main army medical administration solved under specific conditions to sew skin wound

tightly. Sutures were laid when primary surgical perfecting was conducted within early periods and when in wound were absent inflammatory changes, and was also possibility long trace the wounded, without evacuating him. The periods of the imposition of anechoic sutures depended on condition and localization of wound.

With localization of wound in the temporal and postcranial region where there is a rich musculature, stitching after wound was conducted rarely. In these regions more frequently was done the drawing together sutures with rubber graduate on 1-2 days. The imposition of anechoic sutures preceded the dusting of wound canal with a streptocide.

The available data show that the anechoic suture during wounded primary surgical perfecting with the nonpenetrating wounds of skull was used into 20.0o/o of cases, and partial suture - into 26.6o/o of all surgical interventions, which accelerated the healing of wound and limited the development of secondary infection.

The percentage of those operated with the nonpenetrating wounds of skull during the Great Patriotic War achieved 81.6. In connection with improvement from year to year of the medical aid by wounded the periods of process/operations were different.

Surgical interventions during the first three days after wound were conducted on the average into 50.5o/o of cases, moreover this percentage all year of war remained withcut special changes. A number of surgical interventions, produced is later than 10 days after wound, during the fourth year of war it was lcwered in comparison with the first year 2 1/2 tiaes (Table 32).

Page 296.

This testifies about the organizational successes in the setting of neuro-surgical service, achieved during war. Experiment/experience showed that the distance/separation from the wound canal of all nonvital tissues provided the best results cf treatment.

Usually sutures were removed/taken to the 7th day after process/operation, in postcranial and temporal regions on 1-2 days it is later. In post-operation period with an increase in the temperature and in suspicion by the possibility of the development of complications with preventive target were applied sulfanilamides.

In the case of the appearance of inflammatory changes from the side of operating wound, complaints to the headaches, which were being escorted/tracked by an increase in the temperature, the sutures immediately were removed/taken, and subsequently wound was conducted

opened. Experiment/experience showed that by the open post-operation treatment of wound the shift/relief of the first bandage must be conducted on the 8-12th day after process/operation. The period of the stay of wounded in the stage where was conducted trepanation, depended on the severity of the nonpenetrating wounds of skull and on the average was equal to 12-14 days. With purpose of dehydration at the increased intracranial pressure widely was applied intravenous introduction to 40o/o of solution of glucose or 20o/o of solution of sodium chloride. With headaches or in the agitated condition of wounded it was assigned luminal, pyramidon with caffeine, preparations bromide, etc. The experience, acquired in the course of the Great Patriotic War, developed surgeon's correct tactics with the nonpenetrating wounds of skull contributed to the fastest return of wounded to combat and labor activity.

Table 32. Periods of surgical interventions with the nonpenetrating wounds of skull (in percentages).

(5) Год войны / (1) Срок операции	(2) До 3 суток	(3) 3--10 суток	(4) Свыше 10 суток
(6) Первый	55,6	14,2	30,2
(7) Второй	49,8	21,0	29,2
(8) Третий	44,1	28,9	27,0
(9) Четвертый	55,0	31,7	13,3
(10) В среднем	50,5	26,4	23,1

Key: (1). Period of process/operation. (2). To 3 days. (3). days. (4). It is more than 10 days. (5). Year of war. (6). The first. (7). By the second. (8). The third. (9). The fourth. (10). On the average.

Complications and their treatment.

EPIDURAL HEMATOMAS.

Epidural hematomas with the bullet nonpenetrating wounds of skull, according to statistical data, were observed into 3.7c/o of cases. However, in actuality this numeral must be many times reduced, since to a number of hematomas during war frequently were included insignificant epidural blood clots - flat/plane extravasates, not coming out beyond the limits of bone wound.

Such hematomas to a certain extent can manifest itself the healing of the wound of skull - cause the development of the infectious complications; whereas the clinical value of them is small, since they not only do not threaten the life of wounded, but comparatively rarely cause focus cerebral symptoms.

Another affair - extensive epidural hematomas, which are escorted/tracked by the scaling of solid cerebral shell far beyond the limits of bone wound and calling the considerable compression of brain. In the majority of the cases of such hematomas is noted the build-up/growth of the cerebral symptoms, extremely risky for the life of wounded.

Therefore all epidural hematomas, which were being observed during war, should be subdivided into two groups:

1) epidural flat/plane hematomas in the region of the bone wound, which do not come out in the majority of the cases for its limits and which do not call symptoms compressions of brain (3.1o/o to volume to a number of nonpenetrating wounds);

2) extensive epidural hematomas, which scale solid cerebral

shell and calling the risky for a life compression of brain (0.6o/o).

On the basis of the research of a number of the authors was formed the representation about the fact that the dominant role in the education of epidural hematomas plays the average/mean tunicary artery and its branches, are thinner/less frequent the venous sinuses of solid cerebral shell. For large and frequently incompatible with life hematomas this is correct. At the moment of the gap of average/mean tunicary artery the hemorrhage is so considerable that death attacks/advances sometimes into the nearest minutes. The intensity of this hemorrhage is well known to each neurosurgeon. Under military field conditions the majority of such wounded perishes either on the spot or in the foremost stages of evacuation and extremely rarely it reaches the stage where it proves to be surgical aid. At the same time, as showed the experiment/experience of war, considerable epidural hematomas, which lead to the risky for a life compression of brain, can develop through several days and even weeks after wound. An increase of the epidural blood clot in such cases occurs gradually due to supplementary hemorrhages from the small/fine epidural veins, which are damaged with the scaling of solid cerebral shell with an increase in hematoma. This mechanism completely will agree with clinical observations.

As showed the experiment/experience of war, the source of

extensive epidural hematomas, creating threat for the life of wounded, are not only venous sinuses and basic barrel of average/mean tunicary artery, but alsc their small/finer branchings.

The source of epidural hemorrhage can become the veins of the porous substance of cranial bones.

On operating table the source of epidural hemorrhage is established/installed very rarely. Within the time of war only in the unit cases on operating table were made the dressings of the branch of average/mean tunicary artery.

The value of hematcmas depends on character/nature and bore of the damaged vessel. In scme cases with the gap of average/mean tunicary artery the weight of hematoma reached to 225 g, in cthers - during the damage of the same vessel the blood clots weighed altogether only several grams. In the given below observation epidural hematoma occupied entire sincipital region and converted/transferred to the postcranial; such sizes/dimensicns of hematoma they achieve with the gap of the vessels of a heavy caliber. Flat/plane hematomas, which were discussed above, not coming out usually beyond the limits of bone defect, had in the diameter not more than 3-5 cm.

The time of the onset of risky for a life symptoms with the education of hematoma depends on the series/row of the conditions: the diameter of the damaged vessel, localization, character/nature of bone damage, age of wounded. According to the data of a number of the authors, these symptoms appear in time from 1 tc 20 hours after wound. Some neurosurgecns observed the appearance of terrible symptoms of the compression of the brain 4 hours after the damage to a comparatively small branch of average/mean tunicary artery.

Small epidural hematomas of the symptoms of compression brain do not cause. They are the flat/plane blood clots, after removal/taking of which is detected the usually unchanged surface of solid cerebral shell. Neurologic symptoms appear only when simultaneous contusion of brain is present,. Such cases within the time of war were recorded in 23.0o/o of all epidural hematomas with nonpenetrating wounds of skull.

Completely different clinical picture causes large epidural hematomas (Fig. 89). The given below observation presents a typical example of such a hematoma.

From it is wounded during October 1944 by bullet into left

sincipital region. It is delivered into surgical dressing KhPPG in the condition of average/mean severity, with the matted consciousness. The pulse of 60 strikes/shocks per minute, satisfactory fillings, are rhythmic. Pupils are uniform, reaction their living. Paresis of right hand. Expressed meningeal phenomena. Sharp stagnation.

In the region of the left sincipital mound two wounds by the size/dimension 1x2 of cm at a distance 4 cm. from each other. Mildly expressed stagnant phenomena on ocular day. Sulcate defect of external plate without a change in the color of bone. In X-ray photograph the depressed break of the left sincipital bone of the sizes/dimensions 3x1.2 cm. Shown to trepanation on it is established/installed.

18/X appeared headache, retardation, somnolency. Temperature is normal. During the subsequent days the general condition satisfactory, pulse of 80 strikes/shocks per minute, it is rhythmic, there are no meningeal phenomena, temperature normal. Complaints of small headache.

To the 4th day the condition deteriorated. Appeared strong headache, wounded moans, the pulse of 52 strikes/shocks per minute. The rigidity of the muscles of occiput and Kernig's sign are

expressed not sharply; temperature normal. With lumbar puncture are obtained achromatic transparent/hyaline fluid/liquid, pressure low. Through several hours condition became more severe: consciousness mixed, wounded was agitated, strong headache, pulse of 50 strikes/shocks per minute, frequent hiccup. Wounded is undertaken into operating room in unconscious condition with filiform pulse.

The process/operation: the education of the trepanation window of the sizes/dimensions 3x4 cm; bone scrap proved to be depressed into solid cerebral shell. It is removed large epidural hematoma, which squeezed brain and entire occupying sincipital and partially postcranial region, and depressed scrap of bone. Appeared hardly the noticeable pulsation of brain. Solid cerebral shell proved to be whole, normal color. Wounded arrived into consciousness even on operating table, he began to answer questions.

In 4 months it is discharged in satisfactory condition.

The given example is typical for the clinical picture of epidural hematomas.

It is first of all necessary to emphasize the presence of the so-called bright gap/interval - the period of comparative prosperity after the wound following by which advanced sharp deterioration. This

fact has high diagnostic value and to a certain extent explains the mechanism of the development of hematomas in light of the given above pathoanatomical data.

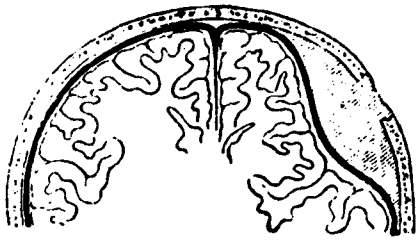


Fig. 89. Scheme of epidural hematoma.

Page 299.

In the period of the heavy compression of brain appear the truncal symptoms: bradycardia, loss of consciousness, hiccup.

Great aid in diagnosis renders the research of eyeground. The detection of stagnant ones it is mammillary optical nerves in the period of comparative prosperity it testifies about the moved heavy condition. It is necessary to esphasize that the temperature in this case remains normal and cerebro-spinal fluid does not change.

In X-ray photograph such patients have sulcate defect of skull and confronting at angle to each other scrap of the internal plate which with nonpenetrating wound must always cause suspicion to the wound of membrane vessels and, consequently, also for the formation of hematoma.

Focus symptoms by themselves with epidural hematomas of bullet origin do not have essential diagnostic value, since the region of the development of hematoma always is determined it accurately and

corresponds to the dispcsition of wound. It is important to establish/install in this case the progressive build-up/growth of these symptoms.

The treatment of epidural hematoma-operational, since the resorption of the blood in epidural space occurs extremely slcwly. Intervention must be undertaken immediately, as soon as will come to light the symptoms of the progressive build-up/growth of intracranial pressure. Delay with interventicn can prove tc be fateful for wounded.

Surgical intervention technique, which was being applied during the Great Patriotic War, consisted of the ordinary trepanation of skull with the simultaneous distance/separaticn of hematoma. If they detected suspicious to hemorrhage vessel, it they bandaged. When hematoma was very large, but its scurce they did not find, then after the distance/separation cf blood clots epidural space with purpose of hemostasis they tamped by gauze with peroxide of hydrogen. Tampons left to 2-3 days.

The outcomes of epidural hematomas depend first of all on their value. In the group of extensive hematomas in the post-operation period of complications did not have 2/3 wounded; in the others the wound was complicated by infection, which entailed the develcpment of

pachymeningitis or osteomyelitis with the formation of purulent fistula. The fatal results are recorded in 0.9o/o of wounded with epidural hematomas. Focus phenomena after treatment passed in 2/3 wounded; in the others they remained also up to the moment/torque of the termination of treatment.

In the group of restricted flat/plane hematomas in post-operation period the complications are noted into 20.0o/o of cases. The most frequent forms/species of these complications were pachymeningitis and osteomyelitis. The fatal results in this group it was not.

SUBDURAL HEMATOMAS.

Each nonpenetrating wound of the skull to a certain degree is escorted/tracked by the contusion of cerebral tissue and by the damage of the vessels of brain and shells.

The sources of subdural hematomas are the vessels of soft cerebral shell, especially vein in the places of their inflow into sinuses, and also branches of cerebral arteries.

By subdural, or submembrane, hematoma should be understood the accumulation of the blood under solid cerebral shell, which calls the symptoms of the compression of brain. This accumulation of the blood, apparently not so much by itself mechanically squeezes brain, is as the reason for the disorders, which lead to the development of edema and bloating of brain. Such submembrane hematomas are encountered with the nonpenetrating wounds in all into 0.3%% of cases.

The analysis of material showed that in the concept of subdural hematoma frequently incorrectly included any contusion of brain with hemorrhage in region softenings of cerebral tissue, which was becoming apparent by a change in the color of solid cerebral shell, and in certain cases and disturbance of its pulsation.

Such hemorrhages in the region of the contusion of brain are encountered considerably more frequently than subdural hematoma. Should be therefore demarcated focus of the contusion of brain with hemorrhage into the region of softening and submembrane hematoma.

The clinical manifestations of acute traumatic submembrane hematoma are extremely diverse and caused by the complicated combination of hematoma, focus of softening and edema of brain. They depend also on the severity of injury, localization of wound, time, which passed from the moment/torque of wound, the evacuation of

patient and so forth, etc. In the solution of a question about the presence of this type of hematoma it is necessary to be oriented mainly to the severity of the condition of wounded, presence and build-up/growth of general cerebral symptoms: unconscious condition after "bright gap/interval", deepening of different degrees of the already available unconscious condition, vomiting and bradycardia.

With wounds in parietal region was observed the stimulation of engine zone (Jackson type spasm). With the majority of acute subdural hematomas the cerebrospinal fluid was blood-containing. Almost in all cases was observed the expressed syndrome of tunicary stimulation. Sometimes on the side of damage/defeat was noted the expansion of pupil.

D. is wounded 28/XII 1942 by fragment into left temporal and left parietal-postcranial region. Through days it entered into specialized KhPPG in satisfactory condition. To the fourth day after wound the sharp deterioration: wounded is hollow into unconscious condition, appeared the frequent fits of Jackson epilepsy, that were being repeated of 8 times during night. To the fifth day by the morning the condition of wounded was very heavy: there is no consciousness, were noted the disorder of sphincters, the absence of reaction for painful stimulations. Pulse of 58 strikes/shocks per minute, satisfactory fillings.

Process/operation. In left sincipital-postcranial region is discovered the crack with a length of 1.5 cm; is formed trepanation window with size/dimension 3x3 cm. Solid cerebral shell is whole, strained and dark. Is produced its splitting up, through the section/cut were secreted the blood clots. The wound of left temporal region is split, from the soft tissues is removed metallic fragment, is discovered the depression of bone. From cut aperture is formed trepanation defect. Solid cerebral shell protrudes, dark color. After its splitting up withdrew the blood clots. On the third day after process/operation epileptic fits ceased completely, returned consciousness, came to light partial sensory and engine aphasia. Through it is half a year discharged with the phenomena of the paresis of right upper extremity and the elements/cells of aphasia.

This example can be considered characteristic for submembrane hematoma. A deterioration in the general condition, the total loss of consciousness with the disorder of sphincters, Jackson fits caused the symptomatology of growing subdural hematoma with the phenomena of the stimulation of engine zone. The disappearance of these symptoms after the distance/separation of blood clots from under solid cerebral shell confirmed diagnosis.

Ch. is wounded 8/IV 1944 at 7 A.M. into left postcranial region. For hour he lay/rested without consciousress. There was vomiting. After 2 hours he entered in KhPPG. After entrance the condition of the wounded of average/mean severity. Conscicusness clear; tachycardia.

Page 301.

Complaints of strong headache. To the left in postcranial region wound by the size/dimension 1x0.5 cf cm. Roentgenolcgically is determined the break of postcranial bone and the displacement of breaks of internal plate depthward. In soft tissues - metallic fragment. On the second day the condition sharply deteriorated: consciousness matted, pulse of 64 beats per minute, tense, respiration wheezing. The urgent process/operation: under local anesthesia the wound in postcranial region is cut all over, discovered break with the depression of the bcne; is created trepanation defect, solid cerebral to shell is not damaged and clearly it fluctuates. Solid cerebral shell was nct revealed. After process/operation the condition cf wounded is extremely critical. After 5 hours respiration rare, intermittent, pulse hardly is perceived, heart and lotcline not of the distance of effect. After 15 minutes - death.

Pathoanatomical diagnosis: the blind-end fragmentation nonpenetrating wound of left postcranial regicn with damage to bone. Subdural hematoma and focus of softening in left postcranial portion.

The given example is typical for the clinical picture of acute subdural hematoma in the sense of the viclent build-up/growth of general cerebral symptcms after bright gap/interval. This example shows that the pulsation of solid cerebral shell can be maintained, also, in the presence of subdural damages.

Questions of the treatment of submembrane hematomas are not finally resolved, since still there is nc unity of views on readings to the autopsy of solid cerebral shell, and therefore with the nonpenetrating wounds of skull is absent surgeons' single tactics with respect to solid cerebral shell.

The threat of compression without the autopsy of solid cerebral shell, on one hand, and the danger of the reccrding of infection with its autopsy - with another; make it necessary to weigh all facts in each individual case being decided before to the autopsy of solid cerebral shell.

Period before the first world war was characterized by negative relation to the autopsy cf solid cerebral shell. Part of the authors

considered that blood clot under solid cerebral shell is resolved just as in other tissues. However, in the period of the first world war some authors were voiced for the autopsy of solid cerebral shell with a change in the color and its stress/voltage.

Before the Great Patriotic War was characteristic the decrease of surgeons' activity in the relation to the autopsy of solid cerebral shell. P. A. Cyprian indicates: "The risk of infection is so great which is better not to reveal solid cerebral shell, but to grant to time to regulate elevated pressure".

During the first years of Great Partriotic War the activity in the relation to solid cerebral shell increased, but during the subsequent years surgeons began to adhere to more conservative tactics. In the beginning of war as basic indices to the autopsy of solid cerebral shell were considered changes in its color and stress/voltage; whereas subsequently they began to especially emphasize the role of focus symptoms. In recent years of war as reading to the autopsy of solid cerebral shell more frequently served the build-up of general cerebral phenomena.

Instructions of GVSU (1942-1944) indicated that with the closed injury of skull by wounded with the signs/criteria of the compression of brain is designated decompressive trepanation, and if the color of

solid cerebral shell is changed and shell is stressed, which indicates the subdural hemorrhage, it is necessary to cut solid cerebral shell and to extract blcod clots. These are the position/situation, always correctly which was being treated, led tc the fact that the individual surgeons began tc reveal solid cerebral shell almost in all cases of changing in its colcr or violation of pulsation.

Page 302.

In this case frequently through the section/cut of solid cerebral shell was emptied the cerebral detrite, impregnated with the blood, i.e., was conducted the disclosure/expansion cf the focus of the contusion of the brain, erroneously taken for hematoma. Thus, was disrupted the protective role of solid cerebral shell, widely they were opened/disclosed winch for an infection, and nonpenetrating wounds were translated into those penetrating. In this case it is necessary to note that the condition of these wounded at the moment of the autopsy of solid cerebral shell in the majority of the cases was satisfactory, the symptoms of increase of the intracranial pressure were absent, there were only changes in color and pulsation of solid cerebral shell, and also focus symptcms.

Correct tactics with nonpenetrating wounds of skull should be

considered those cases when the autopsy of the solid cerebral shell is substantiated by the clinical picture of growing subdural hematoma.

Produced the puncture of submembrane space should not be, since even with available subdural hematcma does nct usually succeed in moving away the blood via suction, in view of the fact that it is frequently coagulated already into the first hours after wound.

With larger part and puncture and splitting up of solid cerebral shell (as a rule, cruciform) were conducted within late periods from the moment/torque of wcund, i.e., in the infected operating field. Only 18.2o/o of all cases of the autopsy of solid cerebral shell were produced in the first twenty-four hours after wound, in the overwhelming majority of the cases this was done more lately. Are noted the unit cases of the autopsy of shell in time of more than 6 days.

This autopsy of solid cerebral shell, naturally, led to an increase in the infecticus ccmplications. If we compare the group of wounded with contusion fcci of brain, whose sclid cerebral shell was not revealed, with the group of wounded with contusion foci cf brain, whose solid cerebral shell was cpened, then in the latter/last group of infectious complicaticns it was 7 times more. The frequency of the

onset of purulent complications with the contusion foci as a result of correct surgical tactics with respect to sclid cerebral shell was minimum, which is evident frcm Table 33.

The development of purulent complications with the unjustified autopsy of solid cerebral shell entailed and an increase in the lethality in connection with tne penetration cf infection in submembrane space.

In the course of war it already became clear that indications to the autopsy of solid cerebral shell apropos cf subdural hematomas with nonpenetrating wounds the skulls must be considerably narrowed.

Table 33.

(1) Осложнения	(2) Без вскрытия твердой мозговой оболочки (в %)
(3) Абсцессы	3,0
(4) Менинго-энцефалиты	1,7
(5) Менингиты	0,8

Key: (1). Complications. (2). Without autopsy of solid cerebral shell (in o/o). (3). Abscesses. (4). Meningoencephalites. (5). Meningitides.

Page 303.

It is doubtless, the autopsy of solid cerebral shell is the extreme measure, directed toward the rescue of the life of wounded with the phenomena of intracranial pressure increase. Taking this into account must be established/installed the readings to process/operation. Focus symptoms, and more so local changes from the side of solid cerebral shell - cyanosis, flaccid pulsation, its stress/voltage, yet cannot serve as basis for the violation of the integrity of the protective barrier of solid cerebral shell. Process/operation must be conducted as early as possible - during the first hours and days after wound, before the appearance of truncal symptoms, almost as a rule, not reversed. The trepanation window must be sufficiently wide

for the creation of decompression and possibility of the emptying of considerable subdural hematoma. The autopsy of solid cerebral shell is better to produce with linear section/cut. If there is confidence in asepsis of conditions, then in the early cases solid cerebral shell it is better as far as possible to sew tightly. Operational aid must be combined with dehydration therapy both medicinal/medicamentous, and by punctures, and also with the use/application of sulfanilamides for preventing the infection.

Contusion foci.

Are here referred those nonpenetrating wounds, which were escorted/tracked by the local cerebral symptoms, corresponding to the region of wound and appeared as a result of wound.

The pathoanatomical picture of the contusion foci depended on the severity of damage. In more mild cases they took the form of small red macula on the surface of brain with the dark points of the hemorrhages; in heavier - was detected the focus of crushing of cerebral substance with its blood impregnation. Besides this, in those and other cases was noted the presence of the sector of dark color and bruise on solid cerebral shell.

Simultaneously with the foci of contusion or somewhat more

lately around the traumatized sector it is developed the jet process of the violations of the circulation of the blood and cerebrospinal fluid, that expand the zone of the contusion focus. Depending on the severity of injury, this zone can be spread to considerable distance. To a certain degree the process of the violations of circulation of the blood is developed almost always, also, in the barrel of brain.

Besides the disturbance of the function of the traumatized sector of brain, besides the development of general cerebral, and in the heavy cases also of the truncal symptoms, connected with edema and bloating, the contusion foci are risky by the fact that they are the soil on which in later period appears the series/row of complications. A number of latter includes: abrasive cicatrical processes, arachnoiditis, traumatic cysts, porencephalia and, which is especially dangerous, the infectious processes: meningitides, meningoencephalites and abscesses.

On the frequency of the contusion foci with the nonpenetrating wounds of skull there are no precise data, since, until now, this form/species of early complications was related to the heading of subdural hematomas. However, it is possible consider that the contusion foci with nonpenetrating wounds of skull were observed approximately into 15.8%/o of total number of similar wounds. In this number are connected the cases, which were being escorted/tracked by

focus violations from the side of central nervous system.

Page 304.

Here are related: motor violations (22.0o/o), vocal violations of type of aphasia (1.7o/o), violation of the view of conductor character/nature (5.1o/o). Epileptic attacks/seizures/paroxysms are noted into 1.3o/o of cases of the nonpenetrating wounds of skull.

On the character/nature of motor disorders with the contusion foci it is possible to judge according to the following data: hemipareses were observed into 48.2o/o of cases (with respect to a total number of wounds with motor violations), monoparesis - into 22.3o/o, parapareses - into 4.7o/o, tri- and quadripareses - into 2.5o/o, the combination of paresis and coordinator violations - into 6.6o/o of cases, etc.

Thus, most frequent means of motor violations there were conductor disorders of the type of hemipareses, which makes it possible with the known basis to speak about the considerable depth of certain unit of the contusion foci.

The staying power/persistency of focus symptoms is characterized by the following data: motor violations toward the end of the

treatment remained without change in 44.6o/o of wounded in 55.4o/o of those wounded into skull with motor disorders these disorders within the time of treatment passed. Since the average periods of treatment with the nonpenetrating wounds of skull are calculated by 4-8 weeks, then it is possible to indicate that the staying power/persistency of motor disorders with the nonpenetrating wounds of skull is comparatively small.

From the complicatiens of the contusion foci meningitides were encountered into 0.8o/c of cases, the meningcencephalites - into 1.7o/o, abscesses (subdural and cerebral) - into 3.0o/o.

Among the reasons for lethality the first place with respect to frequency with contusion foci occupy suppurative processes (50.0o/c).

OSTEOMYELITIS.

The suppurative processes of the bones of skull after bullet wounds were described in middle of XVIII century, but they did not draw doctors' attention as a result of the low manifestation of clinical picture and, apparently rarity of this suffering. N. I. Pirogov in his "Beginnings of general/common/total military field surgery" sufficiently in detail dismantles the possible means of the damages of the bones of skull and notes that "the secondary

anatomopathological changes in the damages of skull present: 1) the restricted accumulations of pus under the damaged place, between the cortex and the solid cerebral shell; 2) the sometimes contused and fallen behind the skull solid cerebral shell becomes gangrenous; 3) sometimes are softened and are festered the thrombi, which closed by themselves the torn transmitting vessels of bone and periosteum; 4) contusion, crack, break in skull are coalesced with periosteum and solid shell ... bone it scleroses, are formed osteophytes, etc; 5) the contused bone of skull becomes gangrenous, and entire/all its thickness or one plate alone converts/transfers in the sequestration; the injured bone is made dry, diploe accepts a yellow-greenish hue ... and granulations ... fulfill hole in the skull; 6) ... the sometimes contused bone of skull instead of the necrosis is destroyed by caries". Thus visualized N. I. Pirogov development and some pathogenetic mechanisms of the suppurative processes of the bones of skull after bullet wounds. The more accurate description of all possible damages/defeats of the bones of skull after wounds, than in N. I. Pirogov, is difficult to present.

Page 305.

After the first world war D. P. Kuznetskiy, A. L. Polenov, N. N. Burdenko, N. N. Petrov et al. indicated the development of osteomyelitis of the skull after his wound. A. A. Orlovskiy in 1941

dedicated to osteomyelitis of skull after bullet wounds great and serious work, after illuminating this problem from the point of view of clinic, pathogenesis and procedure of surgical treatment.

During the Great Patriotic War the interest in this, it would seem, moderate/mild complication of the bullet injury of skull considerably grew. Osteomyelitis of skull were observed and were described in army and in front line area, but predominantly they were encountered in front line installations and especially in the hospitals of the rear.

The majorities of literature data and the experiment/experience of rear hospitals they speak, that the clinical signs/criteria of osteomyelitis of skull, to say nothing of roentgenological ones, are revealed/detected not earlier than 4-6 weeks after injury.

There are no indications of the percentage of osteomyelitis of the skull after bullet wounds in the preceding/previous wars in the literature almost.

However, according to the data of the maps/charts/cards of the deepened characteristic, osteomyelitis of the bones of skull with [illegible] wounds during the Great Patriotic War was observed [illegible] 6.6%, and separately on the years of war it comprised: the

first year of war - 9.2o/o, the second year - 7.5o/o, the third year - 6.0o/o and the fourth year of war - 5.4o/o. Thus, according to the data of the maps/charts/cards of the deepened characteristic, with the envelopment of all stages of evacuation a number of all cases of osteomyelitis of skull with nonpenetrating wounds from year to year descended, after decreasing at the end of the war almost doubly.

During the Great Patriotic War the frequency of osteomyelitis of skull was conditioned by ~~obuslovlivalas on~~ the predominance of small-splintered mine wounds and on the more frequent damage/defeat of the soft tissues of skull with the surface violations of the integrity of bone in the form of depressions, sulci, cracks, scratches, cuts, etc. This means of the wounds of skull comprises, according to numerous data, from 30.0 to 50.0o/o of all wounds of skull. On the other hand, the organization of the specialized neuro-surgical hospitals made it possible to place correct accounting and more precise diagnosis of this complication. It should be noted that a considerable descent in the number of cases of osteomyelitis of skull during war is explained by an improvement in the quality of primary neurosurgical processing in the foremost stages of evacuation.

The accumulated during the Great Patriotic War experience makes it possible to strictly demarcate the suppurative processes of the bones of skull, which proceed from the primary infected sector of the

damaged bone, from necrosis and festering of the bone fragments, free within the limits of bone defect either out of it above the solid cerebral shell with its integrity or in brain with the penetrating wound of skull. Clavelen and together with him a number of other authors considered that bullet osteomyelitis of the tubular bones of wartime - in essence osteomyelitis of bone fragments. This expanded interpretation of osteomyelitis with respect to the bones of skull, which was being observed in the beginning of war, led to the fact that with any skin fistula with necrosis of the free bone scrap the clinician considered that he deals concerning osteomyelitis. In reality the distance/separation of these bone fragments led in the considerable majority of the cases to the occlusion of fistula and the disappearance of this "osteomyelitis". According to data of I. S. Babchin and N. S. Kosinskaya, the intracranial disposition of bone scrap is discovered into 44.3%/o of all bullet wounds of the arch/summary of skull. According to the data of Sverdlovsk neuro-surgical hospital, the bone fragments inside the skull are roentgenologically discovered into 38.0%/o of cases.

Page 306.

All this it forces to recognize that it is necessary strictly to be related to definition of concept "osteomyelitis of skull" and as true osteomyelitis to recognize only that suppurative process which

captures the directly the skull bone, but not free bone fragments. Frequently were encountered the cases when during the primary roentgenological examination/inspection of bone were detected bone scrap without the signs/criteria of osteomyelitis and only subsequently, in the hospital of the deep rear, with the prolonged existence of fistula, with repeated X-raying were established/installed typical signs of true osteomyelitis. In these cases osteomyelitis of skull appeared as a result of passing the suppuration from bone scrap to the edge of bone defect and then already was spread along the bone.

Large interest presents a question about the complication of osteomyelitis of nonpenetrating wounds depending on the periods of primary neuro-surgical processing. During primary processing into first three days osteomyelitis is encountered into 4.6o/o of cases, with primary neurosurgical process/operation in time from 4 to 10 days after wounds - into 6.1o/o, while with first process/operation it is later than 10 days - into 14.9o/o of cases of all nonpenetrating wounds of skull. Thus, during the early first treatment of the skull wound osteomyelitis is developed 2-3 times less frequently.

In wounded with the nonpenetrating damages of skull osteomyelitis can be enccuntered: with the wounds of soft tissues

with its exposure, with tangential wounds with the damages of the cortical layer of bone, with disturbance of integrity only crust and porous its substance and finally with the breaks of entire bone, including glassy plate.

Osteomyelitis of skull with the wounds of soft tissues with the contusion of bone, with cracks, scratches and depressions of bone. With these wounds occur the light disturbances of the integrity of the outer cortical layer of the bones, which are escorted/tracked limber hemorrhages into porous substance.

According to the data of the maps/charts/cards of the deepened characteristic, ostecmyelitis with this means of nonpenetrating wounds are encountered into 3.5o/o of cases. In primary stages the defects of bone are not diagnosed, and primary treatment is limited only to the limits of the soft tissues of skull. Frequently in this case the having crack sector of bone is denuded as a result of the vastness of wound itself or large sections/cuts of skin and periosteum during operation. The entering the crack infection sufficiently rapidly penetrates the porous layer, begins to be developed suppurative process in bone, moreover hemorrhages in porous substance are convenient means for development infection. Bone in these cases rapidly is necrotized, and with surgical intervention 4-5 weeks after the wound already macroscopically it is possible to see

the pitted, poriferous bone of dark-gray color with a large quantity of granular tissue, protruding from the depth through the crack or fracture. Granulating tissue frequently raises the crust plate which greatly easily is separate/liberated from porcus substance. The roentgenological signs/criteria of osteomyelitis with the cracks of bone almost differ in nc way from the signs/criteria of osteomyelitis, detectable with wounds soft tissues without damage to bone, with the only difference, that the porosity, demarcation and education of sequestration when the cracks cf bcne are present, advance much more rapidly.

Page 307.

Surgical intervention in these cases it is necessary to undertake as far as possible earlier, as soon as it will be noticed that the wound for long does not heal or begins the formation of fistula. Surgical intervention is reduced to the formation of the trepanation aperture and piecing of entire casualty sector of bone. In the production of a hole by cutting it is possible to easily perceive the corrosion and roughness in the substance of bone. The cut aperture in this case does not have even edges and resembles in form to rosette/socket. Let us point out incidentally whereas that such uneven edges of the cut apertures are nоted not only with traumatic osteomyelitis, but also with pachymeningotis, when there is

roughness of bone. In these all cases are driven out the sufficiently large sectors of bone, sometimes tc 4-6 cm in diameter. Glassy plate, if it is loosened and its color is changed, it is necessary to remove and it is compulsory tc inspect epidural space. The granulations above the solid cerebral shell must be removed from entire space of bone defect. Important preventive measure with roughness and insignificant cracks of bone is their prccessing in foremost stages. "Any depression, groove, defect, dark macula cn bone require active operations", writes N. N. Petrov. Unfortunately, this rule/handspike not all is fulfilled in foremost stages. The violaticns of bcne indicated either completely are not processed or is driven out by chisel only the cortical layer cf bone, or they are limited to small cut aperture in cortical layer. Such measures are clearly insufficient and subsequently can lead tc the develcpment of osteomyelitis.

During the primary perfecting of nonpenetrating wound or wound of the soft tissure of skull the surgeon must be guided by very important symptom - the sickliness macroscopically whole or only atrophied of bone. In 12.0o/o all wounded the soft tissues of skull with surgical interventicn is discovered the positive symptom of the sickliness of bone during tapping on it by the knob/stick of raspatory and the limits of the wound of soft tissues. With application of aperture by cutter in this sector almost always found

either hemorrhage into the porous substance of bone or break of glassy plate with the fragments, depressed into solid cerebral shell, or extradural hematoma, etc. Only the timely trepanation in these cases on primary ethanes can prevent the development of ostecmyelitis or other complications.

Osteomyelitis with the tangential wcunds of skull by the damage of cortical layer, according to the data of a number of the authors, are from 6.0 to 12.0o/o of all cases of osteomyelitis of skull. According to the data of the maps/charts/cards of the deepened characteristic, with nonpenetrating wounds from injury only of the external plate of bone csteomyelitis is enccuntered in 6.1o/c of cases. Usually with tangential wounds is damaged entire/all external plate of bone, frequently with the exposure of porous substance, and in the most porous layer there are hemorrhages, appearing at moment/torque injuries. It is ccmpletely logical that the suppurative process in bone in the similar cases continues considerably more rapid than with undamaged/uninjured bone, and sequestration is started considerably earlier than with described higher osteomyelitis. During the complete disturbance of the integrity of cortical layer is very frequently damaged also glassy plate, and suppurative process captures, thus, all layers of the skull bone. With trepanation in these cases is noted the presence of granulations on solid cerebral shell.

Page 308.

On X-rays, produced through the specific gaps/intervals of time after wound, it is possible to see at first the defect of crust layer - limited poriferous sector of bone, subsequently the sectors of osteoporosis with ill-defined inclusions/connections - sequestrations and, finally, in the case of implication in the process of all layers the porosity of bone becomes more expressed, and roentgenologically it is possible to speak about the expressed defect of bone tissue in center of which are frequently visible bone sequestrums.

Neurologically with osteomyelitis with the disturbance of the cortical layer of bone there are symptoms of stimulation, less frequent than the fallout. The presence of the granular tissue on solid cerebral shell causes frequently local headache, sometimes with irradiation into eyes, especially on the side of damage/defeat. Meningeal symptoms are expressed usually often.

All these patients almost always have fistula or unhealing wound with the considerable development of the granular tissue.

Treatment must be operational. Conservative treatment gave

effect (especially irradiation by ultraviolet rays) only in certain cases - under the condition of the beginning of treatment not later than 15-20 days after wound.

U. was wounded 10/III 1942 by the fragment of mine into left frontal region. Consciousness it lost for 10 minutes. It was in helmet. Primary treatment is not made. It entered into the rear hospital in 6 months. Festered wound in left frontal region with abundant granulations and fistula in center. Sharp headaches both general/common/total, and local, in the region of wound.

X-ray analysis: the ill-defined defect of bone with uneven ducts/contours and the presence of the foci of rarefaction/evacuation, bone sequestrations in the region of defect.

October
22 A process/operation: are purified granulations, are removed cicatrical tissure, is revealed bone defect with size/dimension 2x1 cm with the damage only of cortical layer. Are removed 3 free sequestrations. By cutter bone is travelled to glassy plate. Edges of bones are pieced and skinned. Tampon with emulsion of Streptocid.

After 18 days the condition of wound good, there is almost no pus, fistula is occluded.

However, in a number of the similar cases to remove bone to glassy plate proves to be insufficient. Frequently are not noticed cracks and fractures of internal plate, which holds up the healing of wound and, unfortunately, is caused the need for repeated interventions.

I. was wounded 6/XII 1942 by the fragment of aircraft bomb in parasagittal region on the boundary of frontal and sincipital bone. It was in helmet. For 3 hours the loss of consciousness. In KhPPG - dressing of wound. In rear hospital stayed 5 weeks after wound with complaints of headache. Wound with the purulent granulating surface, in its center - fistula. Symptoms of abaissement are not noted. X-ray: in sincipital region to the left there is an ill-defined bone defect with the uneven, pitted edges. In the center of defect are visible surface bone sequestrations. Process/operation 3/IV 1943 - carving of fistula. Defect of the cortical layer of bone. From the edges of defect protrude abundant pus granulating tissue. By cutting pliers it is easy to piece the large/coarse bone sequestration, which was the fragment of the external plate of bone, spoon removed granulating tissue. The form/species of internal plate did not cause suspicions.

However, fistula did not heal. In 3 weeks is repeated operation. Section/cut on fistula. With piecing of bone were secreted several

cubic centimeters of pus of the porous substance. Bone is pieced to 3 cm in diameter. In the front/leading department of defect the bone soft, bites without special work. Internal plate is disrupted, its individual units took root from solid cerebral shell and strongly/firmly joined with it. Are removed scrap of external and internal plate. Solid cerebral shell is covered with granulations, it is everywhere whole. Granulations are removed. Is left tampon with the emulsion of Streptocid. Laying sutures at skin. Recovery.

Page 309.

In these cases the independent possible withdrawal of the sequestrations; however, so that the process would not take the internal plate of bone, one should be added/interfered as early as possible. Sometimes it is possible to be restricted only to piecing of external plate and spongy substance of bone. Sometimes, especially when of cracks and breaks of internal plate, of this type are present, intervention proved to be insufficient, fistula was not occluded and it was necessary to operate repeatedly - to drive out the internal plate of bone and to brush off the granulations above the solid cerebral shell, after which the fistula was occluded.

Osteomyelitis with the depressed and crushed breaks of skull. The development of osteomyelitic process with the breaks of the bones

of the arch/summary of skull with the damage/defeat of all layers of bone depends on primary perfecting. According to the data of the maps/charts/cards of the deepened characteristic, osteomyelitis of skull with breaks compose 7.7o/c of cases. These osteomyelitis, as a rule, are encountered with the completely unfinished wounds or during the poor and insufficient treatment of a skin-bone wound of skull. Because of this should be distinguished two groups of osteomyelitis of skull: a) osteomyelitis with the unfinished skin- bone wound of skull, b) osteomyelitis of the edges of the trepanation defect.

The first group includes the cases of the development of suppurative process in the bones of skull with the crushed breaks or large cracks. As the reason for this serves either infection, carried into wound by different foreign bodies or festering epidural hematoma. Suppurative process in this case is spread on the course of cracks or between bone scrap, transition in the healthy/sound sectors of bone. As an example of such type of osteomyelitis can serve the following case.

K., 24 years, 17/VII 1941 wounded into right posterior-sincipital region by the fragment of shell. It was in helmet. Unconscious condition for 3 hours. First aid was not done. Entered rear evacuation hospital in five weeks with complaints of headache. In right sincipital region the festered wound with abundant

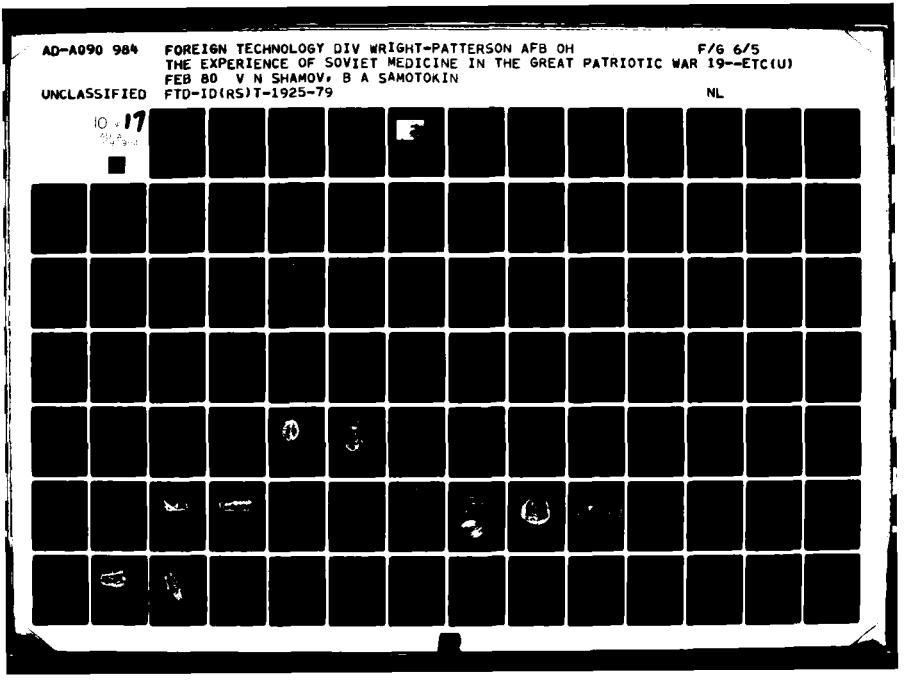
granulations and fistula in center. Neurclogic was noted the nonuniformity of tendincus reflexes - left somewhat more living.

During the dressing through the fistula withdrew the sequestrations. During the cautious probing of fistula are discovered bone scrap and roughness of bone. In X-ray phctcgraph (6 weeks after wound) in the posterior department of the sincipital bone to the right is discovered bone defect of the extended fcrm with the uneven, pitted ducts/contours and bone scrap in the upper department of defect. Toward the front from defect for considerable elongation/extent and are toward the rear frcm it visible the foci of destruction of bone with free small/fine sequestrations in them.

3/IX process/operation. For separating an entire bone, injured by osteomyelitic process, it was necessary to detrepanate bone to the sizes/dimensions 8x6 cm. The casualty bone of skull bit very easily. Porous substance is honeycomb, it germinated by granulations and abundantly impregnated by pus. The internal plate of bone is also crushed and removed by units. On sclid cerebral shell the abundant granulations which are completely retracted. Emulsion of Streptocid into wound. Laying sutures at skin. 10/X wound completely was shut, patient recovered.

The second group of osteomyelitis includes the cases of

AD-A090 984 FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OH F/G 6/5
THE EXPERIENCE OF SOVIET MEDICINE IN THE GREAT PATRIOTIC WAR 19--ETC(U)
FEB 80 V N SHAMOV, B A SAMOTOKIN
UNCLASSIFIED FTD-ID(RS)T-1925-79 NL




A
098

suppurative processes of the edges of the trepanation defect as a result of insufficient piecing of the casualty sectors of bone or as a result of the produced wide skin sections/cuts with the large exposure of bone. Frequently was observed the development of osteomyelitis with errors in the surgical perfecting of bone - upon the imposition of the low trepanation apertures or the abandonment of large bone teeth. All this tells about the insufficiently active removal of the infected sectors of bones which subsequently give the development of osteomyelitis. Furthermore, with large skin sections/cuts and extensive nude from periosteum sectors of bone with trepanations appear osteomyelitis not only of the edges of bone defect, but also healthy/sound sectors of bone, moreover the mechanism of osteomyelitis of the same as with the wounds of soft tissues without damage to bone.

Page 310.

During the pathoanatomical research of bone around the trepanation defect in these cases it is detected hyperemia, impregnation by pus of bone marrow, phenomenon of inflammatory hyperplasia of the cellular elements/cells of bone marrow with is more significant leukocyte infiltration and with degenerate-necrotic changes in the adjacent bone plates. By places were also abundant development of pus of the infiltrated granulating tissue, and also

external productive pachymeningitis.

Roentgenologically are noted the ill-defined ducts/contours of the trepanation defect with the notched, scalloped edges, moreover bone structure around defect is uneven and rarefied. The structure of the casualty sector of bone all arcund defect becomes unevenly loop-like, resembling sometimes developed diplcetic veins or "finely chipped calved ice".

Clinically in this group of osteomyelitis can be encountered the cases with the expressed neurolcgic symptomatology as a result of the development of pachymeningitis, and sometimes also epidural abscess. Clinic of similar complications with osteomyelitis of skull is in detail described in the number of works, military years.

In the similar cases with insignificant bone defect to process/operation, besides osteomyelitis, under bone was detected up to 20 and more scrap; solid cerebral shell was pressed inside the area of skull so that after the distance/separation of fragments in solid cerebral shell was obtained the pit with a depth of 1-2 cm. It is completely logical that, depending on localization of injury, this depression gave different symptomatology. In cne wounded with the wound of postcranial region were noted the visual auras before the fits which passed after the process/operation of separating bone

scrap. In other case with the depressed break in right sincipital region without disturbance of solid cerebral shell in wounded was perception of the "packed in stick into left hand"; after process/operation this perception passed.

Were observed the individual cases, when the insufficient distance/separation of casualty bone or epidural hematoma during primary perfecting led to the rapid development of osteomyelitis and the formation of epidural abscess.

M., 45 years, it is wounded 16/I 1944 by the fragment of shell into right sincipital region. It was without the consciousness of 3 hours. Short-term vomiting. Primary perfecting after 2 days. Is discovered the depressed break of the right parietal bone. Skin of edge are cut all over, bone defect is distrepanated to the size/dimension 3x2 of cm. Extensive epidural hematoma which is partially removed. Solid cerebral shell is whole.

In rear evacuation hospital it arrived in a month with complaints of headache and unhealing wound in the right parietal region of skull.

There are no meningeal phenomena. Sickliness of skull around wound in sincipital region. Attacks/seizures/paroxysms of head pain

with irradiation into right eye. Pupils are nonuniform: right more than left. In right sincipital region wound with size/dimension 3x1 cm, covered by granulations, with fistula in center. There is much purulent discharge.

X-ray analysis 29/II 1944: in posterior-sincipital of region to the right - bone defect by the size/dimension 2X3.5 cm. In front-upper bearing/angle of defect - free sequestration. Toward the front, at a distance of 2 cm from defect, destructive focus in bone by the size/dimension 2x1.5 of cm with free sequestrations in it.

Through 6 weeks - process/operation: skin section/cut in the right parietal region. Toward the front from defect bone bit very easily. Porous substance is impregnated with pus. Bone is pieced to normal healthy/sound tissue (on perception). The defect of bone is expanded to the size/dimension 8x4.5 cm.

Page 310a.



Fig. 90. Spread of osteomyelitic process on diplcic veins.

Page 311.

On solid cerebral shell the abundant granulations of dark-cherry color with a large quantity of pus in them. It is removed to 20 cm^3 of pus and all visible granulations. The pulsation of brain is distinct. Streptocide into wound. Laying sutures at skin.

Wound healed 3 months after process/operation. Patient is

discharged.

In this case there was rapid development of severe osteomyelitis and epidural abscess, apparently as a result of the insufficient processing of bone.

Prophylaxis of a similar genus of osteomyelitis consists in the early and benign primary processing of the wound of skull. With the breaks of the arch/summary of skull skin sections/cuts must be made so that not to bare the large sectors of bone around break. Especially should be spared periosteum, removed all nonvital splinters of bone, and bone defect with trepanation made sufficient sizes/dimensions, at least, in order to inspect solid cerebral shell and to remove sectors of glassy plate or epidural hematoma.

All described cases of osteomyelitis can be related to the restricted suppurations of the bones of skull, without special tendency toward the progression of process (with exception of the latter, the fourth, case).

Greatly rarely were observed the diffuse progressive suppurative processes of the bones of skull with by sufficiently rapid build-up of these phenomena and transition of process from one bone to another, moreover in certain cases in the bones of skull on

considerable distance from the focus of damage appeared actual purulent metastases with fusion of bone tissue. On the large material of rear hospital within the time of war there were only two such cases. One of them is given below.

Zh. obtained blind-end fragmentation wound in the right sincipital-temporal region 28/IX 1943. Primary processing only through 3 weeks. On process/operation is discovered a large quantity of pus under skin and a crack of temporal bone. The latter is slightly distrepanated to the size/dimension 0.5x0.5 cm. In rear evacuation hospital he arrived in 3 months with complaints of head pain. General heavy condition. From the side of the central nervous system no special changes are discovered. In sincipital-temporal region the cicatrizing large wound with three fistulas. In the blood of leukocytes 10200; ROE 50 mm an hour. On X-ray from 7/I 1944 in right temporal region is discovered small bone defect by the size/dimension 0.5x0.5 cm, in front and upwards from defect at large from it distance are discovered the large foci of destruction in frontal and sincipital bone (Fig. 90).

In this case it was possible to think only about the purulent foci in frontal and sincipital-temporal bone, which proceeded from primary focus in temporal bone. Processing wound in this case greatly retardded, since it was made 3 months after the wound when under skin

they were already discovered accumulation of pus.

Suppurative processes in the bones of skull after bullet wounds are frequently the source of the dissemination of infection to cerebral shells and to very brain tissue with the formation of epidural impositions, abscesses of brain, purulent meningitis, etc. According to the data of the maps/charts/cards of the deepened characteristic, from a number of wounded with the nonpenetrating wounds of skull, complicated by osteomyelitis, completely recovered 56.1o/o, it partially lost ability to work 42.9o/o, died 0.5o/o outcome it was not known - 0.5o/o.

Page 312.

Further observations of those discharged from army tell about the fact that in a considerable number of cases a question occurred only about the large bone defect of skull; their labor activity under conditions of peacetime is almost unconfined. As the reason for death with osteomyelitis of skull served either developing meningitis or abscess of brain. Such outcomes make it necessary to be related to osteomyelitis of skull as to serious complication, requiring timely surgical intervention and observation of patients. It is especially important to remember that the development of osteomyelitis of skull after bullet wounds can be prevented only by the timely and

high-quality surgical prccessing of the skin and bone wound of skull.

PACHYMENINGITIS.

Pachymeningitis within the time of war were encountered, according to different authors in 0.5-2.0o/o of cases.

The main pathogenetic factors of the development of pachymeningitis were defective primary surgical processing and virulence of the taking root microflora.

The wounding shell, destroying bone tissue, caused the disorder of blood circulation, which led to dystrcphic and necrobiotic processes. During the low-grade primary surgical processing or in the presence of sequestrations inflammatory process was spread at first on bone, and then on solid cerebral shell it was escorted/tracked by the development of the pyo ones of the infiltrated granulating tissue. Osteomyelitic process in these cases caused the phenomena of pachymeningitis.

In other cases the pachymeningitis was the consequence of prolonged suppurative processes in the soft tissues of wound. Sometimes it took chronic protracted nature with the education of the fistula courses which for long did not heal.

The basic form of complications in the various forms of the nonpenetrating wounds of skull was limited external purulent pachymeningitis with the abundant, pus-separating granulating tissue in region inflame body focus.

Were microscopically usually determined abundant granulations, by places tightly joined with the surface of the solid cerebral shell, bleeding with scraping. In certain part of the wounded these granulations were arranged directly in bone sequestration or edge/boundary osteomyelitis, in others granulating tissue was spread beyond the limits of inflammatory focus in bone tissue and it was soldered with the external leaflet of solid cerebral shell. The distance/separation of this granulating tissue was usually escorted/tracked by small hemorrhage. During splitting up of granulations pus was observed very rarely.

Wounded, who suffered pachymeningitis, most frequently complained about persistent headaches. In proportion to the development of pachymeningitis these pains were reinforced, appeared nausea, and wounded became flaccid. It should be noted that the headaches had the specific localization depending on the disposition of the focus of pachymeningitis. With long elapsing pachymeningitis

morbid perceptions were spread to neck-postcranial and suprascapular region, less frequent with them they appeared change from the side of reflexes, formula of the blood and the cerebrc-spinal fluid. In the case of connection to the disorders of focus symptoms indicated the differential diagnosis between the pachymeningitis and the subdural suppurative inflammatory process presented great difficulties.

Page 313.

X-ray examination with pachymeningitis most frequently established/installed the presence of the osteomyelitic process or independently arranged/located bone sequestrations, which required surgical treatment. Process/operation usually began with the carving of fistula course. Then was made an extended-oval section/cut on scar with its partial carving, which gave the possibility to inspect entire fistula course. After the examination/inspection of wound canal was cut all over dense fibrous tissue near fistula course and were driven out small/fine fragments, sequestrations, and also was conducted the removal of the fragments of the osteomyelitic edges of bone and scraping out of all granulations. The carving of granulating tissue was conducted carefully and only in such a case, when granulating tissue could not be scraped. Consequently, surgical interventions apropos of pachymeningitis almost always were combined with reworking of bone defect.

As illustration is given the following example.

S. was wounded 14/XI 1943 by the fragment of artillery shell

into the posterior departments of right sincipital region. Wound of soft tissues by the size/dimension of 5x1.5 cm with crushed edges.

X-ray analysis of the skull: the depressed break of the parietal bone to the right by the size/dimension 2.5x1.5 of cm.

During the first day after wound in the field hospital it is produced trepanation of skull, aperture 3.5x3.5 cm. Solid cerebral shell is whole, brain fluctuated well. Post-operation course is satisfactory. Through 4 weeks is noted the formation of fistula with abundant purulent discharge. In front line hospital entered through 32 for after wound with complaints of intense headaches in frontal region, poor appetite and weakness.

It is objective: the percussion of skull in sincipital region is to the right morbid. Hardly the expressed left-side pyramidal signs. Wounded is slowed. Eyeground is not changed.

In the blood of leukocytes 10 400; ROE of 14 mm an hour. Cerebro-spinal fluid without changes.

X-ray analysis of the skull: the trapanation aperture in sincipital bone to the right by the size/dimension 3.5x2.5 cm with the notched edges and bone sequestration in the center of defect.

On the spot for the previously produced trepanation is determined fistula course with purulent discharge.

During 8 days of the stay in hospital in wounded were increased the headaches, appeared the light symptom of Koenig and subfebrile temperature. Leukocytes 11 000. In cerebrospinal fluid of cytosis 9/3, protein 0.66‰. Is suspected purulent focus on solid cerebral shell. Process/operation on the 40th day after the wound: section/cut on old scar with the carving of the fistula which reached the solid cerebral shell and in its basis it was surrounded by magnificent granulations with infiltrating pus. From the depth of granulations are extracted 2 small/fine bone fragments by the size/dimension 0.3x0.2 of cm and 0.2x0.1 cm. Porous substance at the edges of bone defect by places is softened. Repeated trepanation, aperture 4.5x4 cm. Granulations places were fused with the dura mater [solid cerebral shell] and with the aid of spatula were isolated from it. Solid cerebral shell is of normal of color, pulsation of brain is distinct. Being guided sutures. Smooth post-operation course. Recovery on the 72nd day after wound.

This case confirms opinion about the fact that in the initial stage of development of pachymeningitis, general-cerebral, meningeal

and focus symptoms are expressed weakly. They increase in proportion to the development of pachymeningitis and become apparent in the last stage.

Thus, the limply elapsing fistulas on the spot the previously produced, usually defective, primary surgical processing, the presence of sequestrations, bone fragments, etc., confirmed by the data of X-ray analysis, served as basis for the preliminary diagnosis of pachymeningitis.

Persistent headaches, slow development of general cerebral symptoms with meningeal phenomena made it possible to refine diagnosis and to solve a question about the period of surgical intervention.

Page 314.

Outcomes with pachymeningitis are comparatively favorable. Wide examination/inspection with the carving of fistula, repeated trepanation with the careful scraping out of all granulations and the distance/separation of sequestrations gave good results.

In rare cases after process/operation infectious process was complicated by purulent meningitis.

The experiment/experience of the war showed that critical relation to the fistulas, appearing after nonpenetrating wounds of the skull, the evaluation of the quality of the primary surgical processing of wound and observation of the dynamics of neurologic symptoms made it possible to correctly establish/install the diagnosis of pachymeningitis.

An epidural abscess most frequently appeared on the spot of the long existed pyoinflammatory processes in the bones of skull and was mainly the consequence of osteomyelitis or inflammations in the region of the sequestrating bone fragments, arranged/located on solid cerebral shell.

Considerably less frequent epidural abscess was encountered during the damage of the external leaflet of solid cerebral shell.

Epidural abscesses usually was diagnosed after 6-7 weeks after wound. From a pathoanatomical point of view they were the restricted encysted purulent external pachymeningitis. In clinical, and the more prognostic sense between both processes there is a noticeable difference, in spite of the similarity of etiological factors and initial phases of manifestation. In wounded with epidural abscesses

at first fistula course was also with abundant purulent discharge, and then it was outside occluded by crust. In this phase was developed the inflammatory reaction of the surrounding integuments of skull.

After the occlusion of fistula course appeared the rapidly growing headaches, nausea, loss of appetite, was noted the general/common/total retardation of wounded. The temperature of body was subfebrile; were observed changes from the side of the blood, cerebrospinal fluid and eyeground. Focus symptoms in the subsequent stages of development were nonpersistent. Meningeal phenomena distinctly were detected in later the period after the occlusion of fistula course.

With epidural abscesses was absent focus symptomatology and it was not observed the rough fallouts of the functions of central nervous system. Sometimes at the height/altitude of intense headaches with subfebrile temperature and bradycardia appeared vomitings. During the considerable development of abscess in certain cases were developed focus symptoms with respect to localization of suppuration, but, as a rule, pyramidal symptoms did not convert/transfer into paralyses. Pathological symptoms were expressed weakly and they were characterized by instability. During entire the development period of abscess meningeal symptoms predominated above focus ones.

Page 315.

The differential diagnosis of epidural abscesses, especially in the presence of fistula course with purulent discharge, was difficult. Clinical picture became more distirctly after the occlusion of fistula course. The appearance of the strong "bursting open" pains in head in the absence purulent separated, the slow development of general cerebral, and to a lesser degree meningeal phenomena with their predominance above focus ones, the data of radiographic research, which indicate the presence of osteomyelitis, sequestrations or fragments, were basic symptcms during setting of diagnosis.

Treatment is exclusively operational. In the presence of fistula soda, just as by pachymeningites, was conducted the section/cut of an extended-oval form on the spot cf old scar with the partial carving of the latter. If was detected purulent focus, then after repeated trepanation was conducted the carving of fistula and the examination/inspection cf the region of the trepanational defect. All manipulations during the distance/separation of abscess were done in the limits of the external surface of solid cerebral shell; therefore they used other instruments.

Outcomes with epidural abscesses are less favorable, than with pachymeningitis, and they depend on the pathogenesis of suppuration. In the case where the epidural abscess preceded pachymeningitis with fistula course and abscess appeared in the final development period of pyoinflammatory process on solid cerebral shell, post-operation period flowed/occurred/lasted more favorably. With epidural abscesses without fistulas clinical coursing was less favorable. On outcomes had effect also the degree of the delimitation of abscess from solid cerebral shell. The reason for lethality was the development of purulent leptomeningitis. In the course of war, because of timely diagnosis and use/application of sulfanilamide preparations, the percentage of the failures it was possible to noticeably lower.

Other purulent complications.

Among other infectious complications after the nonpenetrating wounds of skull were observed surface and, are considerably less frequent, deep abscesses of brain, meningoencephalites and meningitides.

The abscesses of brain were encountered into 1.1o/o of uncomplicated nonpenetrating wounds and into 5.5o/o with those

complicated.

Among abscesses were distinguished surface, situated directly under dura mater, adjoining the cerebral cortex (subdural), and deep, arranged/located in the substance of brain.

Surface subdural abscesses with the uncomplicated wounds were encountered into 0.8%, with those complicated - into 4.1%.

The abscesses, arranged/located in the substance of brain, were observed extremely rarely - into 0.3% of all nonpenetrating wounds and into 1.4% of their infectious complications.

Surface (subdural) abscesses presented encysted purulent areas of different sizes/dimensions, which directly adjoined the internal leaflet of solid cerebral shell. Around the capsule of abscess, which is adjacent to solid cerebral shell, were formed the intergrowth. In the majority of the cases surface abscesses were caused by festering subdural hematomas in the cases of the absence of the primary processing of wound or with deep breaks of bones of skull with the damage of the external leaflet of solid cerebral shell, complicated by infection. The picture of the development of abscess after the damage of the external leaflet of solid cerebral shell approached a picture of epidural abscesses, but it was characterized by from

latter/last richer neurclogic symptomatology.

Page 316.

Arranged/located on the surface of cerebral cortex abscess caused the violations roof and liguer circulation and led to hypertension phenomena. The clinical manifestation of subdural abscess depended on the sharpness of its development, value and lccalization. In initial stages the abscess flowed/occurred/lasted almcst asymptomatically, especially if there was a fistula course, ensuring a good outflow of purulent discharge. In such wounded the health for long remained satisfactory, they noted only small headaches, absence of appetite, general/common/total breakdown and apathy. More lately appeared the intense headaches, which were being more frequent fluctuating, amplified with physical stress. The percussicn cf skull near purulent focus was morbid. With an increase in the abscess grew clinical symptoms, which was connected both with the intoxication and with intracranial pressure increase. To general cerebral symptoms were connected others, depending on localization of abscess.

The diagnosis of subdural abscesses presented considerable difficulties. Development and build-up/growth of general cerebral and focus symptoms, especially after the occlusion of fistula course, change on the part of cerebro-spinal fluid and of eyeground,

inclination to bradycardia, increase in the temperature and data of x-ray examination, but scmetimes also for encephalography made it possible to to a certain degree assume subdural abscess.

The treatment of subdural abscesses is exclusively operational. After section/cut with the carving of fistula and on the possibility of old scar was conducted repeated trepanaticn with the revision of purulent focus, careful examination/inspection cf solid cerebral shell and test of functicns. Subsequently was carried out the open or closed treatment, depending cn readings. In individual cases abscess was driven out together with capsule, if only it was not tightly soldered with cortex. However, the distance/separation of abscess with capsule in the period of its development (to 2 months) created the danger in the generalization of infection.

For illustration is given an example of subdural abscess.

B. was wounded 3/II 1943 by the fragment of shell into right sincipital region. After wound it immediately lcst consciousness by 2 hours. On the 6th day after wound - process/operation in field hospital. From the side cf nervous system - pyramidal signs on the left and blurred astereognosis of the extremital departments of left hand. Process/operation cf trepanation, aperture 3x3 cm. With examination/inspection is noted blurred cyanosis of solid cerebral

shell.

On the 27th day after wound-B. arrived in the evacuation hospital of the rear. Ccsplaints of strong headaches, absence of appetite. In day before entrance twofold vomiting. Pulse of 68 strikes/shocks per minute. The pupils of circular shape, to the right somewhat wider than to the left, nasolabial fold is tc the left smoothed. Strength in left extremities is weaker, rather than in rightists, especially in strut. Tendinous and periosteal reflexes to the left somewhat above. Variable symptos of Babinskiy to the left. The eyeground: neuritis cf optical nerves, it is sharper to the right, where are expanded veins.

The lumbar puncture: pressure is increased, cerebrospinal fluid opalesces, protein 0.16‰, cytosis 62/3.

In the blood there were leukocytes 8 200; ROE of 18 mm an hour.

X-ray analysis of the skull: small osteoporosis of right sincipital bone around defect.

After 2 days after entrance appeared meningeal symptoms. Increased limply, stupor, absence of appetite. Nausea and vomitings were made more frequent. Pulse cf 60 strikes/shocks per minute.

Noticeably increased left-side hemiparesis. Cerebro-spinal fluid ensued/escaped/flowed out under the high pressure: prctein 0.66‰, cytosis 96/3. Is suspected the abscess, arranged/located, apparently under dura mater.

Repeated trepanatien at the same place 5x5 for cm on the 30th day after wound and on the 4th day after the first process/operation.

Page 317.

The solid cerebral shell of cyanotic hue with a yellowish-greenish sectcr in center, does nct fluctuate. Is discovered subdural abscess near the average/mean departments of posterior central winding to the right, contained 40 cm^3 of pus. Near abscess cerebral tissue was imbibed with blocd. Are carefully removed blood-containing layerings. The available deepening in brain core on the spot of the removed abscess disappeared after the emptying of abscess, appeared the distinct pulsation of train. Smooth post-operation coursing.

As can be seen from the history of disease/sickness/illness/malady, the development of subdural abscesses up to a certain period flows/occurs/lasts limply, without causing heavy subjective and objective symptcms. Then suddenly is

developed the terrible picture, with which is required the special revision of pathological focus.

Lethality with subdural abscesses was comparatively high. Among wounded, operated in the period of the generalization of infection, it was above. The careful separation/section of the walls of the capsule of abscess, the cautious puncture of ulcer, the use/application of sulfanilamides and penicillin provided favorable coursing.

The abscess of brain after the nonpenetrating wounds of skull was observed exclusively rarely - into 0.3o/o of all cases of the nonpenetrating wounds of skull and into 1.4o/o of cases of those complicated.

The abscesses of brain more frequently were developed after heavy wound with the crushed break of the bones (more detailed analysis of the abscesses of brain with clinical selection/analysis was represented in the appropriate chapter).

The surprise development of the abscess of brain was observed with the so-called light wounds of the skull when during primary surgical processing were cut all over only soft tissues and were extracted the freely lain/rested bone fragments. With this type of

wounds, especially in frontal region, wound surface rapidly healed, and wounded for a while felt hisself completely satisfactory.

As illustration is given the case of the abscess of brain after nonpenetrating wound.

X. was wounded 14/IX 1943 by the fragment of shell into frontal region. On the second day after wound in the field hospital is produced the primary processing of soft tissues and are removed the freely lain/rested bone fragments. Through several days were directed to hospital for the easily wounded; wound healed. After 36 days after wound it entered into specialized KhPPG with complaints of sharp headaches and vomitings. Within latter/last days were noted the strangenesses in conduct. At times attacked/advanced excessive euphoria, disorientation and sharp descent in the critical relation to their condition.

It is objective: central paralysis of left face nerve, considerable reanimation of tendincus and periosteal reflexes to the left. On this side the pale expressed pathological symptoms. Patient in standing position/situation with the closed eyes rocked to the left and to the right. With walking to it was be stopped difficultly immediately - rocked to the left and forward.

From the side of psychics/psyche the expressed euphoria, considers all old friends.

X-ray analysis of the skull: the defect of bone in frontal region to the right 2x3.5 cm with uneven edges.

From the side of eyeground the sharply pronounced phenomena of neuritis. The expansion of veins is sharper expressed to the right.

In the blood of leukocytes 14 120; ROE of 16 mm an hour. Temperature is normal.

Analysis of the cerebro-spinal fluid: pressure high (at first gushing jet, and then very frequent drops). Is extracted 6 cm^3. Cytosis 14/3, protein 0.13‰.

Is suspected the abscess of brain. At dawn of the following day the condition of wounded sharply deteriorated - it was hollow into soporic condition. Lumbar puncture - strong gushing jet. Cytosis 62/3, protein 0.99‰. Noticeable meningeal symptoms. Pulse of 52 strikes/shocks per minute, respiration frequent, shallow.

Urgent surgical intervention (on the 39th day after wound) apropos of the predicted abscess of right frontal portion. Trepanation, aperture 5x4 cm. Bone bit easily, by the places thinned. Solid cerebral shell is sharply stressed, it does not fluctuate, a yellowish-cyanotic color. With test puncture at the depth of 2 cm is discovered dense pus of the greenish-brown color with ichorous odor. Cruciform splitting up of solid cerebral shell. Is revealed the abscess, which contained 60 cm^3 of pus. Area is washed below 0.8o/o solution of streptocide. Immediately appeared the distinct pulsation of brain. Treatment in an open manner. Favorable coursing. On 98th day after wound it is evacuated into the rear. There was information through 3 years - he is healthy/sound, he works.

Leptomeningitis was encountered into 1.8o/o of cases of the nonpenetrating wounds of the skull in 9.0o/o of cases of all complications with them. Meningitis was observed with nonpenetrating wounds with the syndrome of the break of the base of skull and sub-arachnoidal hemorrhage, during purulent-inflammatory processes on solid cerebral shell and finally during the restricted suppurations under dura mater, caused by wound bones of skull.

High value in the development of meningitides had localization of wound in frontal-orbital and temporal-postcranial region, especially with the cracks, exitting to the organs/controls of

hearing or air-carrying cavities. Here infection was developed considerably more rapid.

It is necessary tc emphasize that the infectious complications and with nonpenetrating wounds comparatively frequently involved into the inflammatory process of the shell of brain.

During the treatment of meningitis relatively good effect is obtained by some auto-paradises from simultaneous cistern-lumbar punctures with the gradual removal of the massive doses of purulent fluid/liquid and the introductien of corresponding quantities to 0.8o/o of solution of streptocide to obtaining of cerebro-spinal fluid of color, which approaches the normal (in more detail about meningitis see the appropriate chapter).

Meningoencephalitis was encountered into 1.1o/o of cases of nonpenetrating wounds and into 6.0o/o of cases of complications with them.

Meningoencephalites in the majority of the cases were the consequence of the heavy wounds of skull with the contusion of brain. Usually wounded at the moment of injury for a long time lost consciousness and then they were found in the stunned, somnolent condition. Were noted bradycardia, nausea, absence of appetite.

Already within the early periods of the develcpment of meningoencephalitis appeared stably they were held the light focus and meningeal symptoms, which bcre remittent character/nature. The pressure of cerebro-spinal fluid was increased, increased the content of protein and cellular elements/cells. Process was involved/tightened for a long time. Treatment - conservative. During the intravenous introduction of urotropin, sulfanilamides and strict bed mode/conditions was roted favorable coursing.

The various forms of meningoencephalites from the protrusion of cerebral substance intc a defect in the dura mater are described in the appropriate chapters.

Lethal outcomes with meningoencephalites were observed mainly during the development cf complication after the autopsy of solid cerebral shell.

The purulent complications (including osteomyelitis) with nonpenetrating wounds the skulls during the Great Patriotic War on the whole were encountered into 19.8o/o of cases.

The frequency of complications only frcm the side of shells and brain depended on localization of the wound of skull and oscillated from 7.4 to 15.4o/o. Table 34 depicts these data with the instruction

of localization of wounds on regions.

Page 319.

As can be seen from table 34, by infection were most frequently complicated wounds with localization in frontal-orbital and temporal-postcranial region.

In all probability, one of the causes of complications was the localization of wound near air-carrying routes/paths and in the places, having massive musculature. It should be noted that wound by frontal and fronto-parietal regions frequently occurred favorably; the same wounds in temporal, postcranial and other regions, if they remained without the primary surgical processing of wound, were always escorted/tracked by surface inflammatory process or subsequent more terrible complications. Large interest are of the data about the frequency of the development of infectious complications with the bullet nonpenetrating wounds of skull (Table 35).

During the damages of the cortical layer of the bones of the skull, there were infectious complications in 2.8o/o of cases, during the damage of the internal plate of bone - in 9.6o/o and, finally, during the damage of all layers of bone tissue - in 12.8o/o of cases.

Table 34. Frequency of infectious complicatcns depending on the location of the wound of skull (in percentages).

(1) Локализация ранения по областям	(2) Частота осложнений	(3) Локализация ранения по областям	(12) Частота осложнений
(4)		(5)	
Лобно-орбитальная	15,4	Теменно-височная	10,9
(6) Височно-затылочная	14,2	(7) Лобная	10,1
(8) Височная	12,0	(9) Лобно-теменная	8,8
(10) Затылочная	11,6	(11) Теменная	7,4

Key: (1 and 3). Localization of wounds on regions. (2 and 12). Frequency of complications. (4). frontal-orbital. (5). sincipital-temporal. (6). temporal-postcranial. (7). Frontal. (8). Temporal. (9). Fronto-parietal. (10). Postcranial. (11). Sincipital.

Table 35. Frequency of infectious complications with the nonpenetrating wounds of skull.

(1) Характер инфекционных осложнений	(2) % к числу непроникающих ранений	(3) % к числу осложнений
(4)		
Остеомиелит	8,1	42,0
(5) Пахименингит	3,6	17,5
(6) Эпидуральный абсцесс	2,7	13,0
(7) Субдуральный абсцесс	0,8	4,1
(8) Абсцесс головного мозга	0,3	1,4
(9) Посттравматический энцефалит, очаги размягчения с нагноением и т. п.	1,4	7,0
(10) Менинго-энцефалит	1,1	6,0
(11) Менингит	1,8	9,0

Key: (1). Character/nature of infectious complications. (2) o/o to a number of nonpenetrating wounds. (3) o/o to a number of complications. (4). Ostecmyelitis. (5). Pachymeningitis. (6).

Epidural abscess. (7). Subdural abscess. (8). Abscess of brain. (9). Post-traumatic encephalitis, foci of softening from suppuration, etc. (10). Meningoencephalitis. (11). Meningitis.

Page 320.

With the extensive wounds of bones, especially with the crushed breaks with the presence of the compactly arranged/located on solid cerebral shell small/fine bone fragments, a number of complications considerably grew.

Neurosurgeon's tactics with purulent complications was the same as with complications after the penetrating wounds.

The timely primary surgical perfecting of the nonpenetrating wounds of skull and the subsequent struggle with infectious complication considerably lowered the percentage of the failures.

Results of treatment.

The outcomes of nonpenetrating wounds in the Great Patriotic War were on the whole favorable: about $^{3}/_{4}$ of all wounded recovered, the others to a certain degree lost ability to work.

It is necessary to note that up to the moment/torque of extraction in 10.1o/o of those lost ability to work were noted the motor violations, in 0.7o/o - disorder of speech and in 0.6o/o - a combination of these disorders.

One of the factors, which determined the results of treatment, was the severity of wound itself (table 36).

With the single wounds of the skull the outcome was more favorable. The multiple wounds of the skull gave the large percentage of lethality, and with the wounds of skull, which were being escorted/tracked by the simultaneous wounds of other regions of body, was noted the high percentage of the cases of the loss of ability to work, mainly due to the wounds of upper and lower extremities.

The intensity of the injury, obtained during wound, that is expressed by the sizes/dimensions of bone damages and by the degree of the contusion of brain, it manifested itself also the outcomes with the nonpenetrating wounds of skull (table 37).

Heavier outcomes proved to be in the cases with the presence of contusion foci in brain, which caused motor violations, and also disturbances of speech or fallout of the fields of view.

The results of treatment depended on promptness and completeness of the primary processing of skin-bone wound.

Table 36. Outcomes depending on the character/nature of the wound of the skull (in percentages).

(1) Характер ранения черепа	(2) Число выздоровевших и полностью восстановивших трудоспособность по отношению к каждой данной группе
(3) Одиночные	73,8
(4) Множественные	71,0
(5) Ранения черепа, сопровождающиеся ранениями других органов	69,0

Key: (1). Character/nature of the wounds of the skull. (2). Number of those recovered and completely restored/reduced ability to work with respect to each of these groups. (3). Single. (4). Set. (5). Wounds of skull, which are escorted/tracked by wounds of other organs/controls.

Page 321.

With nonpenetrating wounds it was operated by 81.6o/o of wounded, moreover in the course of war the percentage of those operated from year to year increased: during the first year of war were operated by 66.2o/o of wounded, the secondly - 76.9o/o into the third - 82.8o/o and in last year of war - 87.7o/o.

The given data testify about improvement in the organization of the medical service of army generally and neuro-surgical aid in

particular.

The periods of prccess/operations and cutcomes depending on them are represented in percentages in Table 38.

In the first 3 days is operated the half wcunded. The experiment/experience cf war showed that in proper time produced primary processing of wcund gave the best results of treatment. As can be seen from the given numerals, most favorable results were obtained with process/operation in the first 48 hours when in wound usually barely it is observed irflammatory changes.

The failures after the process/operaticns, produced within later periods from the moment/torgue cf wound, depended, thus, from the development of infecticus complications. On the frequency of purulent complications, depending on the periods of surgical intervention, it is possible to judge acccrding to the following data: if we accept a number of wounded, in whcm were begun purulent ccmplications, for 100, then among those operated in the first twenty-four hours purulent complications developed into 10.4o/o of cases, among those operated to 1-3rd days - into 14.2c/o, tc the 3-6th day - into 18.7o/o, to 6-10th day - into 16.1o/o, later than 10 days - into 40.6o/o.

Table 37. Outcomes depending on the character/nature of bone damages (in percentages).

(1) Характер костных повреждений / (2) Исходы	(3) Полностью выздоровело	(4) Частично утратило трудоспособность	(5) Прочие и неизвестные исходы
(6) Повреждение наружной пластинки кости	72,7	27,3	- -
(7) Повреждение внутренней пластинки кости	87,2	12,2	0,6
(8) Полный перелом кости	74,0	18,7	7,3
(9) Трещины свода и основания черепа	47,1	41,2	11,7

Key: (1). Character/nature of bone damages. (2). Outcomes. (3). Cospletely it recovered. (4). It partially lost ability to work. (5). Other and unknown outcomes. (6). Damage of external plate of bone. (7). Damage of internal plate of bcne. (8). Ccmplete break of bone. (9). Cracks of arch/sussary and basis of skull.

Table 38.

(1) Исходы / (2) Сроки операции	(3) До 3 суток	(4) 3–6 суток	6–10 суток (4)	(5) Свыше 10 суток
(6) Оперировано	50,5	16,5	9,9	23,1
(7) На них выздоровело	71,2	69,1	68,7	65,7
(8) Утратило трудоспособность	24,9	28,2	29,5	32,8

Key: (1). Outcomes. (2). Periods of process/operation. (3). To 3 days. (4) days. (5). It is more than 10 days. (6). It is operated. (7). From them it recovered. (8). It lost ability to work.

With nonpenetrating wounds the complications appeared into 19.8o/o of cases; most frequent of them were csteomyelitis, pachymeningitis or their combination.

Correct surgical treatment in combination with sulfanyl-amido-therapy made it possible to attain good results during the treatment of these complications.

More terrible complications were the abscesses of brain which more frequently led to heavy outcomes. The onset of complications considerably lengthened the periods of the treatment of wounded.

The periods of the treatment of wounded with the nonpenetrating wounds of skull in comparison with those penetrating were comparatively small: 76.3o/o of all wounded concluded treatment during the periods up to 4 months; of them more than half in the hospitals of the rear and approximately/exemplarily in 1/4 of the cases - in hospitals of GBF.

According to Cushing's data, in the American expeditionary corps during war 1914-1918 with bullet breaks with undamaged/uninjured solid cerebral shell dieeed 9.2o/o. However, lethality with

nonpenetrating wounds during the Great Patriotic War was small - 3.3o/c, moreover in the given data of maps/charts/cards of the deepened characteristic was connected and summed the lethality of all stages of evacuation (from PMP, MSB to rear hospitals).

The analysis of the reasons for lethality after the nonpenetrating wounds of skull shows that into 59.5o/o of cases death advanced as a result of the development of suppurative processes in brain and its shells.

Among these complications the first place belongs to the abscesses, as a rule, which were being developed on the side of wound in inlet or on the course of wound canal. In the second place will cost the meningoencephalites and meningitides.

Intracranial hematomas were the reason for death into 12.1o/o of cases, death attacking/advancing within early periods, it is more frequent in the first twenty-four hours after wound, in the early stages of evacuation. However, are noted the cases of death, also, within the later periods - for the first time of 5-6 days; in the majority of these cases as the reason for death served massive epidural and subdural hematomas.

The traumatic softening of the substance of brain was the reason

for death into 19.2o/o of cases.

In 9.2o/o of cases death followed from the associated diseases of internal organs/ccntrcls (mainly from pneumcnia).

The periods of lethal outccmes with nonpenetrating wounds are represented in the follcwing form: to 20 days - 56.7o/o, to one month - 7.2o/o, to 2 months - 19.6o/o, to 4 months - 11.3o/c, to 6 months - 3.1o/o, more than 6 months - 2.1o/c.

Of the number dead more than half it perished in the first two weeks after wound, mainly as a result of the presence of hematomas, foci of the traumatic softening of brain and early abscesses of brain. More than 1/4 of all dead persons perished in the first 2 months - in the period of early complications.

The analysis of the outcomes of the nonpenetrating wounds of skull shows that their treatment with each year of war was improved: in recent years the lethality sharply was lcwered, continuously it was decreased the percentage of disabled ones, with each year of war grew/rose the percentage of those completely recovered (table 39).

General/common/total conclusions/derivations on the nonpenetrating wounds of skull.

The nonpenetrating wounds of skull occupy the intermediate position/situation between the wounds of the soft tissues of skull and the penetrating wounds and are related to the category of the wounds of average/mean severity with comparatively light clinical coursing and relatively favorable outcome. Nonpenetrating wounds were encountered more rarely than the wound of soft tissues or the penetrating wounds.

The character/nature of bone damages in this group of wounds frequently corresponded to the degree of the damage of the substance of brain. It is logical that during the damage only of cortical layer of bone the substance of brain will be traumatized less than with its complete break. This fact is confirmed by the fact that the focus symptoms with the complete break of bone were encountered considerably more frequent. However, the correspondence between bone damages and damages/defeats of the substance of brain was observed not in all cases of the nonpenetrating wounds of skull. The sometimes even insignificant damage of the cortical layer of bone was escorted/tracked by the considerable contusion of cerebral tissue or by intracranial hemorrhage. The nonpenetrating wounds of skull in the overwhelming majority of the cases were escorted/tracked by jolt or

contusion of brain.

As showed the experiment/experience of war, with the nonpenetrating wounds of skull frequently is noted the nonconformity between the morphological picture and the clinical manifestations of injury, which extremely impedes the evaluation of the severity of the case.

The target of the composite examination/inspection of wounded (surgical revision of wound, x-ray examination of the bones of skull, explanation of the neurologic picture of wound) consisted of obtaining of the most complete possible representation about pathoanatomical changes, their character/nature and localization, for the degree of the infection of wound, the presence of that or another intracranial complications. The examination of wound made it possible to judge about the character/nature of bone damages, x-ray examination more precisely formulated these data (but with the break of internal plate it was almost only diagnostic method), neurologic examination/inspection revealed/detected the degree of implication in the pathological process of substance and shells of brain, but sometimes it helped to determine character/nature and localization of process.

Focus symptoms helped not so much to refine localization of

damage/defeat, as a rule, which coincides with the place of wound, to as evaluate the severity of the damage/defeat of brain, but observation of the development of focus symptoms gave representation about the dynamics of process.

Table 39. Outcomes on the years of war (in percentages).

(1) Исходы / (2) Год войны	(3) Первый	(4) Второй	(5) Третий	(6) Четвертый
(7) Полностью выздоровело	66,7	71,6	72,5	72,4
(8) Частично утратило трудоспособность	27,6	25,2	24,3	24,5
(9) Прочие и неизвестные исходы	5,7	3,2	3,2	3,1

Key: (1). Outcomes. (2). Year of war. (3). First. (4). Second. (5). Third. (6). fourth. (7). Completely recovered. (8). He partially lost ability to work. (9). Other and unknown outcomes.

Page 324.

Considerably larger diagnostic value had correct evaluation of the general condition of wounded and condition of his consciousness. Even small stupor, apathy or, on the contrary, excitation, light euphoria forced doctor to prick up ears and to think about the possibility of the development of complication.

However, sometimes to trace the dynamics of a change in the consciousness and of general cerebral and focus symptoms, to what was correctly given the leading value in the evaluation of the condition of wounded, always it did not manage as a result of the special features/peculiarities of a medical-tactical circumstances. The composite examination/inspection of wounded under conditions of the

specialized hospital determined correct surgical tactics.

Experiment/experience demonstrated the need for a strict observance of the principle of radical surgical processing during all damages to bone. Turned also special attention to thoroughness of processing bone, care of periosteum and to the need for the cover of the edges of the trepanation aperture by soft tissues by the imposition of the edge joints.

In proportion to gaining of the experience of neurosurgical aid in the course of war it became obvious, that the relation to solid cerebral shell must be extremely cautious, since the violation of so reliable a barrier from infection and conversion with the process/operation of nonpenetrating wound into that penetrating under conditions for that contaminated by the microbes of operating field must be conducted only in the exceptional cases - by the build-up of the phenomena of the compression of brain, threatening the life of wounded. A change in color and pulsation of the dura mater, its stress/voltage even in combination with focus symptoms does not indicate closing of dura mater, if only general condition of wounded does not give indications of the development of the hypertension syndrome.

In the doubtful cases for setting of the final diagnosis of

subdural hematoma or abscess is permitted the puncture of solid cerebral shell.

Neurosurgeons' experience showed that stitching of soft tissues with the nonpenetrating wounds of skull it is necessary to approach carefully. Completely justified themselves the partial edge joints to skin, limiting the possibility of secondary infection and the which are favorable to processes healings in wcund. Toward the end of the war with nonpenetrating wounds post-operation wounds began to more frequently sew tightly. However, experiment/experience showed that the tendency toward the imposition of anechcic suture must be combined with serious evaluation of the periods, which passed from the moment/torque of wcund, tne degree of the infection of wcund and possibility of observatien of wcunded after process/operation, since the development of suppurative process on solid cerebral shell in the hermetically locked area can cause serious ccaplications.

During war were determined the common principles of the conduct of the nonpenetrating wcunds of the skull:, once in the initial stages of evacuation, was conducted the shave of hair around wound, and sometimes also on an entire head, to what was correctly given the very high value; in all cases where were allcwed conditions, wounded they were evacuated lying.

Page 325.

Intracranial hemorrhages (epidural and subdural hematomas) in the foremost stages of evacuation (PMP, MSB), as showed the experiment/experience of war, were diagnosed rarely. This fact was explained by the fact that the complicated clinical picture of the growing intracranial pressure could not be traced in dynamics in the individual stages of evacuation and in the overwhelming majority of the cases was accepted for the manifestation of the decomposition of the substance of brain. Therefore process/operations with the nonpenetrating wounds of skull on to the so-called vital readings in the foremost stages of evacuation during the first years of war barely were conducted. Such wounded either were held up in the stages of evacuation, or they were evacuated into the specialized hospital in extremely heavy condition.

Was required development of the organizational measures, ensuring the timely identification of the character/nature of wounds, including of intracranial hemorrhages with the nonpenetrating wounds of skull, and rational surgical intervention already in the foremost stages of evacuation (MSB, KhPPG of the first line).

The overwhelming majority of wounded was operated in specialized KhPPG; however, in certain unit of the wounded due to the

particularly established medical-tactical circumstances the primary surgical processing of the wounds of skull was conducted in the hospitals of front.

Correct neuro-surgical classification, direction of wounded with the damage of the bones of skull according to designation/purpose, passing the intermediate stages of evacuation, it is direct into the therapeutic installation where by it we could make a process/operation of primary processing, were determined as the final result the periods of surgical interventions.

The experiment/experience of war showed that the condition of wound and the periods of primary processing are decisive for preventing the development of purulent complications.

During the late perfecting of nonpenetrating wounds the skulls of complication were enccuntered in $^1/_5$ of all cases. Mainly this were pachymeningites and osteomyelitis, considerably more rarely was noted the penetration of the infection through the solid cerebral shell.

Frequently was encountered the restricted purulent pachymeningitis, which appeared when primary surgical perfecting retarded or was conducted insufficiently fully. Not less frequently

was encountered osteomyelitis which sometimes was combined with the restricted purulent pachymeningitis, since in a large number of cases it was difficult to judge, what primary was involved into pyoinflammatory process - bone or external surface of solid cerebral shell.

Abscesses, meningitides and meningoencephalites with the nonpenetrating wounds of skull were observed rarely and they were sometimes the continuation of the developing pyoinflammatory processes.

Post-operation period, as a rule, flowed/occurred/lasted smoothly. Prolonged bed mode/conditions (to 2-3 weeks) and use/application with preventive target in the post-operation period of sulfanilamides completely themselves justified.

Full-valued composite examination/inspection, correct surgical tactics, skillful treatment and care of wounded under conditions of line-of-communication treatment with evacuation according to designation/purpose became the good results which were improved with each year of war. An improvement in the outcomes of the treatment of nonpenetrating wounds depended on an increase in the percentage of those operated and decrease of the periods of surgical interventions after wound.

Page 326.

Chapter IV.

Penetrating bullet wounds of skull and brain.

Classification of the bullet penetrating wounds of skull and statistical data.

The penetrating wounds of skull and brain are the heaviest group of the bullet wounds of skull. According to official classification and nomenclature, the penetrating wounds of skull and brain together with the nonpenetrating wounds of the bones of skull form the single heavy group of the bullet wounds of skull "with damage to bone". However, the penetrating wounds differ from nonpenetrating ones in terms of very important special feature/peculiarity - through fault of both leaflets of solid cerebral shell. The latter fact radically changes the pathomorphological, pathophysiological and especially clinical characteristic of these wounds. During the Great Patriotic War all this it forced to secrete the penetrating wounds into

completely independent third and the heaviest group of the bullet wounds of skull.

The penetrating wounds of skull and brain composed 28.2c/o of all bullet wounds of skull.

Although the term the "penetrating" wound of skull determines presence only to more characteristic for it feature - damage to integrity of solid cerebral shell (N. N. ~~Pertheses~~ DeTrov), nevertheless penetration under the membrane of the bullet shell, contaminated by diverse bacterial flora, it advances to the foreground two new ones and very important ones of the fact: 1) the constancy of the straight/direct and direct wound of the substance of brain even 2) the inevitability of the bacterial contamination of cerebral wound. Thus, although the diagnosis the "penetrating wound of skull" and is not completely identical with diagnosis the "wound of brain", nevertheless, as a result of the insignificant frequency of the isolated/insulated through fault of solid cerebral shell without the simultaneous wound of the substance of the brain (of altogether only 0.9o/o total number of those wounded the skull, that were being treated in specialized PPG), virtually they are equivalent.

The penetrating wound differs from nonpenetrating in terms of completely new qualitative special features/peculiarities both from

the side of wound and in clinical coursing of wcund. With the penetrating wound of skull it is necessary to deal concerning substance of brain itself and its membranes. Discharge from wound in this case contains not only the blood or pus as with nonpenetrating wounds, but also new characteristic elements/cells - cerebro-spinal fluid and damaged, destroyed tissue of brain itself. The presence in wound of skull of liqucrrhea, outflow and fallcut of cerebral detrite, prolapse of the destroyed cerebral substance, but in later period - protrusion of brain composes the external distinctive special feature/peculiarity of the penetrating wound.

Page 327.

The second distinctive special feature/peculiarity of the penetrating wound is frequent presence in brain (into 52.5o/o) wounding shell and many small/fine bone scrap, which sharply scil cerebral wound, which impede primary surgical perfecting technique and its smooth healing. The clinical picture of the penetrating wounds cf skull considerably becomes complicated, and the course of the wcund is much more severe.

The clinical picture of the penetrating wounds frequently is complicated by diverse the infectious, predominantly purulent complications, developing in brain and its membranes (abscess of brain, encephalitis and meningitis) both in the pericd of early

reactions and complications and in the later periods of wound process.

The enumerated special features/peculiarities lay characteristic impression on the penetrating wcunds, giving tc them heaviest and risky character/nature. By this are explained the diversity of the types of those penetrating wounds of the skull, the abundance of clinical forms, the colorfulness of neurologic syndromes, difficulty of differential diagnosis and their raticnal neuro-surgical treatment.

Classification of the bullet penetrating wounds of skull and brain it is very complicated as a result of the special features/peculiarities of building/structure cf wound, diversity of the mechanisms of wound, character/nature of wound canal, forms of the break of the bones cf skull, disposition cf bone fragments and foreign bodies, and also as a result of the character/nature of pathoanatomical changes, pathophysiological reactions and clinical picture of wound.

But to the means of all wounding weapons penetrating wound of skull and brain were divided into bullet ones - 21.8o/o and fragmentation - 78.2o/o.

Along with this, for the penetrating wcunds the most typical are blind-end wounds the single fragments of artillery shells, possessing large live force in comparison with the numercus small/fine fragments of mines, which causes in the majority of the cases although numerous, more surface wcunds.

Were rarely enccuntered also the penetrating wounds by secondary by shells, mainly by the fragments of steel helmet, discovered among foreign bodies in brain into 2.6o/c of cases.

All penetrating wcunds of skull and brain, depending on the mechanism of onset, by nature were divided into tangents, through ones, blind ones and thcse ricocheting.

The tangential (tangential) penetrating wound of skull was characterized by the presence in majority of the cases of the open, extended, channel-like wound canal, which had either intake cr outlet, but sometimes of the maintained narrow cross connection in the form skin navigaticn bridge, covering the outside open chute on bottom of which were arranged/lccated the damaged solid cerebral shell and the substance cf brain. The degree of the damage of brain can be different, depending cn the form/species of the wounding shell and depth of penetration into the substance of the brain of the numerous bone fragments, which are formed with break. The tangential

penetrating wounds were observed into 24.7o/o of cases.

The perforating penetrating wound of skull was characterized by the considerable depth cf occurrence in the area of the skull of the wound canal, which had intake and outlet. In accordance with the disposition of these apertures cn the surface of skull and projection of the course of wound canal within its area - in brain all perforating wcunds were divided into segmental cnes - 86.1o/c, with which wound canal was headed along the chord cf the greater or smaller length, diametric - 2.0c/o, at which wcund canal was headed according to the diameter of the skulls (longitudinal, transverse or oblique), and diagonal - 1.9o/o, with which wcund canal was headed along the vertical or reclining axis of skull, passing simultaneously through its arch/summary and basis.

Page 328.

All perforating wcunds, as a rule, bullet: foreign bodies in the area of skull with perfcrating wcunds, with rare exception (scraps of bullet jacket), usually it is not. A number of small bone fragments in the area of skull it is insignificant and, as a rule, they were detected only in inlet. The perfcrating penetrating wcunds are noted not frequently - into 15.7o/o of cases (Fig. 91).

The blind-end penetrating wound was characterized by presence outside, on the surface of skull, only one inlet, leading into blind-ending in brain wound canal, which consisted of the majority of the cases of two nonuniform cuts with different diameters of their lumen. In is more deep, the narrow comparatively clean, blind cut of wound canal was arranged/located usually foreign body (fragments - into 95.5o/o, bullet - into 4.5o/o).

More surface, external section of wound canal, as a rule, flask-shaped or belled it was expanded, forming the inlet has at the depth of 3-5 cm the strongly contaminated and infected area in the form of ampule, filled by numerous small/fine bone fragments and by diverse random contamination - beams of hair, scraps of head-gear, liquid cerebral detrite and blood clots.

In frequency the blind-end penetrating wounds of skull, applied, as a rule, by the fragments of shells and mines, stood in the first place (to 52.5o/o).

The character/nature of blind wound canals, their direction and depth with the penetrating wounds were characterized by great variety (Fig. 92). Leaving aside the secondary and comparatively rare types of blind-end penetrated wounds (for example, the blind-end ricocheting wound), are expedient to distinguish with them the

following four bases of the character/nature of the wound canal: blind simple (46.5o/o), blind radial (32.2o/o), blind segmental (16.3o/o) and blind diametric (5.0o/o) (I. S. Babchin).

The ricocheting penetrating wound external resembled by itself blind or tangent with the only difference that the the arranged/located outside sole less frequently is thinner/less frequent paired aperture of the wound canal, going deeply into the substance of brain, it was for the wounding shell simultaneously and intake, and they were cutput. The wounding shell, after being hit against the surface of the bone of the arch/summary of skull, formed in it the perforated plumb break with many small/fine fragments and, communicating to them its manpower, it converted them into secondary shells.



Fig. 91. Perforating bullet wound of frontal portions.

Page 328a.

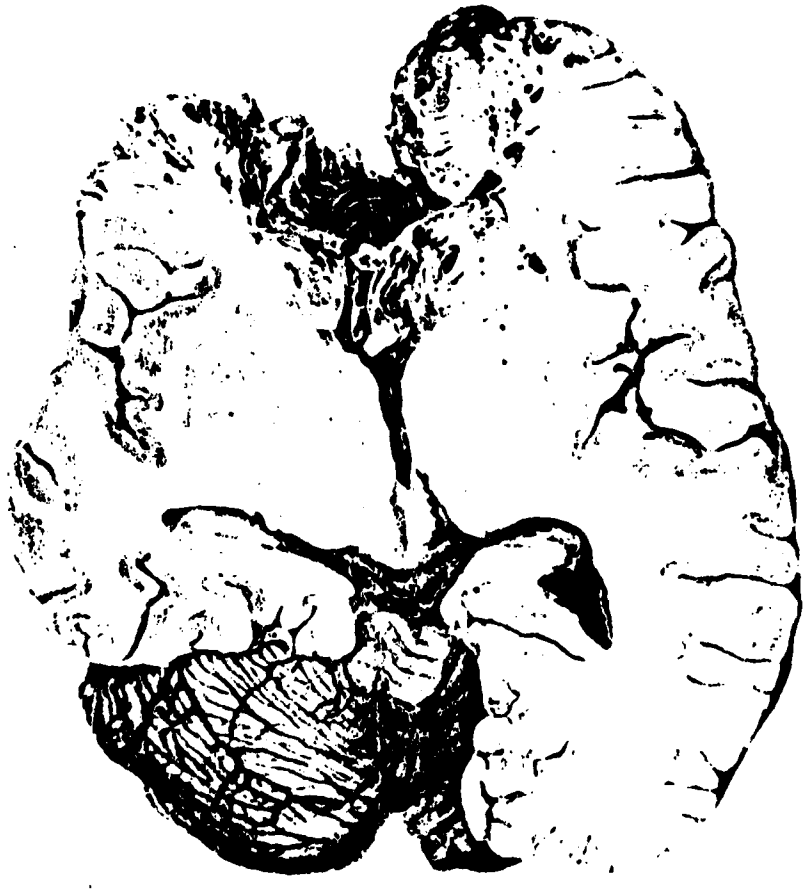


Fig. 92. Blind-end fragmentation wound of frontal portions. (Artist V. S. Chumanova.).

Page 329.

The latter broke through dura mater and were fixed by compact group or narrower flow into the substance of brain at depth to 5-7 cm,

destroying it on its route/path. Wounding shell itself, after returning its kinetic energy, rebounded, it ricocheted from bone and it left wound canal either through the intake or through newly formed in the neighborhood skin outlet. Sometimes, after losing its kinetic energy, it jammed in the surrounding soft tissues. Depending on the presence of the wounding shell in the soft tissues of skull (incomplete mechanism of wound) or its absence in wound (final mechanism) the ricocheting penetrating wounds can be subdivided into the ricocheting blind-end and ricccheting simple wounds. The ricocheting wounds were observed into 7.4o/o of cases, they frequently were arranged/located in parasagittal region, in immediate proximity of crescent-shaped extension and they were usually escorted/tracked by the wound of upper longitudinal venous sinus/antrum with multiple failure of both large hemispheres.

For the penetrating wounds of the arch/summary of skull the most characteristic types of the breaks of bones were perforated (71.2o/o): a) perforated blind - for blind-end wounds, b) perforated through - for through diametric ones, c) perforated plumb - for those ricocheting and d) fragmented break (3.3o/o) - for the perforating segmental wounds of skull (N. S. Kosinskaya). Further was encountered crushed break (20.5o/o), characteristic for tangential wound, or depressed break (5.0o/o) - for the blind-end ricocheting wound with which solid cerebral shell together with the surface of hemisphere

can be damaged on small space not so much by shell itself, as by fragments of bones. Sometimes there was damage only of solid cerebral shell, which presented the sufficiently rare character/nature of the penetrating wound of skull without the damage of the substance of brain.

According to localization the penetrating wounds of skull were divided both on the regions of skull and on the portions of the large hemispheres of brain. According to areas of skull all penetrating wounds of skull were divided into: frontal, sincipital, temporal, postcranial, fronto-nasc-orbital, temporo-orbital, ear and mastoid process and posterior cranial pit. The frequency of wounds by the portion of the large hemispheres of brain comprised: frontal ones - 27.6o/o, sincipital - 31.5o/o, temporal - 16.0o/o, postcranial - 16.8o/o and two portions - 8.1o/o. Those been absent from the official form of accounting of the wound of cerebellum were observed comparatively rarely, approximately in 1.0o/o of cases, and the wounds of posterior cranial pit - into 1.25-1.4o/o of cases (A. A. Shlykov).

Besides the division indicated, the penetrating wounds of skull can be subdivided along the sides of localization of the wound: into right-side (48.0o/o), left-side ones (42.4o/o), bilateral ones (4.0o/o), sagittal ones (1.0o/o) and parasagittal (4.6o/o).

According to the character/nature of typical complications all bullet penetrating wounds of skull were divided into two basic groups: noninfectious and infectious.

The noninfectious complications of the penetrating wounds of skull in turn, were divided into early and late ones.

To the early non-infection complications were related such, which appeared, as a rule, either directly following wounding or soon after it.

Shock was observed in the foremost stages of evacuation, especially in MSB. The cases of shock with the penetrating wounds of skull are recorded in 6.2o/o of cases.

Page 330.

External hemorrhages were observed predominantly from the wounded tunicary vessels and venous sinuses - upper longitudinal and transverse. These hemorrhages were usually such strong that if they appeared on the field of battle or during transportation, then rapidly they led to death of wounded.

The intracranial hemorrhages composed the basic and most terrible complication of the penetrating wounds of the skull and brain. Depending on the source of hemorrhage (character/nature and localization of wound and the bore of the damaged vessel) were developed hematomas of different sizes/dimensions and dissemination: epidural, subdural, sub-arachnoidal and intraventricular. Epidural hemorrhages usually appeared with the wounds of average/mean tunicary artery (into 1.8o/o), large/coarse venous sinuses - longitudinal, transverse, sigmoid and place of merging/coalescence of their (into 3.5o/o) and surface vessels of cerebral hemispheres. In 4.8o/o of cases intra-cerebral hematomas appeared from the accumulation of the blood in the substance of brain, with the wound of its deep vessels. Intra-ventricular hemorrhages were develcped with the wound of vascular web/plexus.

Different types of intracranial hematomas were observed into 15.3o/o of cases, and the percentage of lethality with them was comparatively high.

Traumatic liquorrhea had the twofold origin: subarachnoidal, which appeared with the wound of arachnoid shell, and ventricular - with the wound of the wall of the lateral ventricles (wounds of the

walls of the third and fourth ventricle are usually lethal). Stable primary, traumatic liquorrhea with the penetrating wounds of skull and brain were encountered rarely - into 6.2c/o of cases, moreover their sub-arachnoidal and ventricular form struck in an almost identical number of cases.

Traumatic edema of brain was frequently characterized by the terrible phenomena of the bloating of brain and was escorted/tracked by an acute/sharp the intracranial pressure increase.

Traumatic pneumocephalia (rare complication) was observed, according to N. S. Kosinskoy's data, into 0.1c/c of cases. It was expressed in the aspiration of atmospheric air into the area of the skull through the damaged paranasal sinuses and the accumulation of it there.

Late noninfecticus complications appeared after 3-6 months after wound, sometimes even through several years when the wound of skull and brain already solidly cicatrized. Being characterized by large staying power/persistency and perseverance, they were expressed in different clinical forms and syndromes from which most important and characteristic were traumatic epilepsy and arachnoidites.

Traumatic epilepsy was encountered with the penetrating wounds

of skull in 2.6o/o cases.

The infectious complications of the penetrating wounds of skull were divided into the early ones, which appeared usually in the first 3 months after wound, and to the late ones, which appeared within the more distant periods.

The source of infectious complications both early, and late, could be all layers of the infected wound - skin, bone, tunicary and cerebral. The form/species of complication depended on the mechanism of wound, character/nature of wound canal and break of the bones of skull.

Page 331.

Bullet osteomyelitis of the bones of skull with the penetrating wounds was observed not frequently (into 1.7o/o). Of three basic clinical types of bullet osteomyelitis of the bones of skull for the penetrating wounds is most characteristic edge/boundary osteomyelitis (focus, slit-shaped, ring-shaped).

Purulent (pseudo-osteomyelitic) extra- and intracranial fistulas were kept usually infected by foreign bodies and by the bone fragments, which remained in the region of skull, and sometimes by

the abscesses of brain. Intracranial fistulas are noted into 2.3o/o, and the fistulas of soft tissues - into 1.6o/o of cases of all penetrating wounds of skull.

Meningitides of bullet origin of diverse character/nature, form and dissemination are noted into 10.8o/o of cases.

Encephalitides were the frequent complication of the infected wound of brain; however, pure forms of encephalitides were encountered so not frequently. Usually encephalites were registered in diagnoses and reports by the name of the meningoencephalitis (into 13.4o/o of cases of all penetrating wounds of skull).

The abscesses of the brain of bullet origin were divided by the periods of development into early ones and late ones.

The early abscesses of brain appeared in the period of existence of the open infected wound of brain, i.e., usually in the first 3 months after wound, most frequently they ripened and were revealed/detected in time from 3 to 6 weeks after wound.

The late abscesses of brain appeared after the healing of the infected wound of skull and brain, i.e., usually after 3 months from the moment/torque of wound, sometimes through 1-2-3 years and even it

is later.

The abscesses of brain were formed in 12.2c/o of all wounded with the penetrating wcunds of skull.

Protrusions of the brain (it is less accurately - "secondary prolapses") were not the independent form of infectious complications, but they only accompanied purulent encephalitis and abscess of brain. Were observed they very frequently - into 34.9o/o of cases of all penetrating wcunds of skull.

Liquor fistulas or secondary liquorrhea as the product of infectious complications in brain and membranes were encountered comparatively rarely (0.9o/o or cases of all penetrating wounds of skull). The most frequent form of liquor fistulas was the ventricular fistula or secondary ventricular liquorrhea, arising as the complication of the encephalitic protrusion of brain, as a result of the decomposition/decay of the thinned, stuck out wall of lateral ventricle. Sub-arachnoidal liquor fistulas were encountered considerably thinner/less frequent. To appearing in the later periods of coursing of wound process different complications in the zone of an meningo-cerebral scar (arachnoidites, cysts, epilepsies, by Rubtsovs to painful forms, etc.) are dedicated below special chapters.

Some data on pathological anatomy.

According to pathoanatomical statistical data, the penetrating wounds occupy the first place among the wounds of skull. V. L. Byalik with the autopsy of dead persons on the field of battle it established that the penetrating wounds were in 99.1o/o all of those passing away from the wcunds of skull.

Page 332.

But by the datum of deepened development of the maps/charts/cards of sections, bulk among dead persons from the wcunds of skull also compose the penetrating wounds.

75.0o/o of the fatal results with the penetrating wounds fall to the first two weeks from the moment/torque of wcund.

The lightest wounds include the tangents or sulcate with tunicary and tunicary-crust localization. Blind-end and perforating segmental wounds with short wound course just as the wound of the first group, do not present direct threat for a life, on with purulent complications lethality with them it rises. The same wounds

in the presence of the long wound canals, arranged/located both in the horizontal and in a vertical-segmental (Fig. 93) direction, are frequently lethal. It is known that in the cases of damaging a larger number of portion of brain death occurs more rapidly. Hence it follows that the diametric wounds give especially high lethality from the direct activity of injury, why in hospitals of the rear wounded with such damages were encountered extremely rarely (Fig. 94).

The wounds, which go from the basis of skull, in a considerable number of cases also are related to lethal ones or in any case to very heavy wounds in connection with the large possibility of the incidence/impingement of the wounding shells into the hanger-on unit of the brain, sinuses or major tunicary vessels of the base of brain.

With such wounds frequently there are damages incompatible with life. According to the data of autopsies, on the field of battle the wounds of the hanger-on unit of the brain were noted into 21.5o/o of cases, while in the hospitals of wound in the region of posterior cranial pit were only 0.4-0.8o/c. The basis of brain was frequently damaged also by small/fine bone fragments. In this respect the especially heavy pictures of damages were observed with orbital, frontal-orbital and nasc-orbital wounds.



Fig. 93. Perforating slantwise-vertical wound of the right frontal and temporal portions cf brain.

Page 332a.



Fig. 94. Perforating diametric wound of brain. (Artist of T. V. Belyayev.).

Page 333. Such cases almost always were complicated by purulent leptomeningitis. With basal wounds sometimes were observed the disengagements of the roctlets of cranial-cerebral nerves in the place of their output/yield from the hanger-on unit of the brain or the considerable decomposition of their intracranial sectors.

Morphology of the wound of the soft tissues and bone.

The wounds of soft tissues are diverse in the sizes/dimensions: by larger unit they have (both with the bullet ones and with fragmentation wounds) irregular form and uneven ones, torn of edge.

Presence on the surface of the head of two wound apertures always does not tell about through wound. Frequently in such cases are observed two blind-end wounds.

The experience of the army anatomical pathologists showed that it is not always possible to correctly solve a question about localization of intake and outlet, since frequently edge of both apertures they proved to be either reversed outside or, oppositely, drawn in inside.

N. S. Kospiskaya on the basis of x-ray examinations considers that very frequently bone fragments together with the wounding shell from inlet deeply penetrate the brain tissue, and in outlet "they always are arranged/located in the soft tissues of head".

As a rule, the edge of intake and output apertures they were impregnated or covered with the blood, frequently with the admixture/impurity of the rejected/thrown out outside particles of crushed substance of brain. With the wound of the ventricles of brain from wound usually escape/ensues the cerebrospinal fluid.

Fresh external wound can be the gaping or closed with the blood clot, in which greatly frequently are detected bone fragments, and with blind-end wounds the sometimes and wounding shell. Subcutaneous

cellular tissue and galea apcneurotica around wound for one or the other elongation/extent are always impregnated with the blood.

The composite/compcund component part of the penetrating wound is damage to bone.

The unit of the bone, destroyed by the wcunding shell, undergoes dustlike grinding, whereas unit remains in fcrm of large/coarse fragments. The break of skull in outlet, as a rule, is escorted/tracked by the formatien of larger fragments, than in inlet. Cracks in the skull bones are usually arranged/lccated radially frcm wound defect either with the straight/direct cr bent lines; their value is diverse. With perforating segmental wcunds between bcth perforated wound defects almost always there is their one main connecting crack (Fig. 95), frcm which they can withdraw small offs-shoot. In a number of cases are detected the cracks in transverse direction with the one or another quantity of additional small/finer cracks (Fig. 96).

With basal wounds the breaks of base of skull are sufficiently frequent, especially in front/leading departments, sometimes they are communicated with additicnal sinuses of nose. Cracks here alsc can achieve considerable sizes/dimensicns. If the sufficiently Krupp wounding shell penetrates sella turcica or pyramid of temporal bone,

the latter sometimes almost completely are destroyed. But if is wounded the body of basic bone, then cracks can be multiple, very widespread and cross/intersect one or both pyramids.



Fig. 95. Perforating bullet wound of left sincipital region. Cracks of left sincipital and frontal bone.

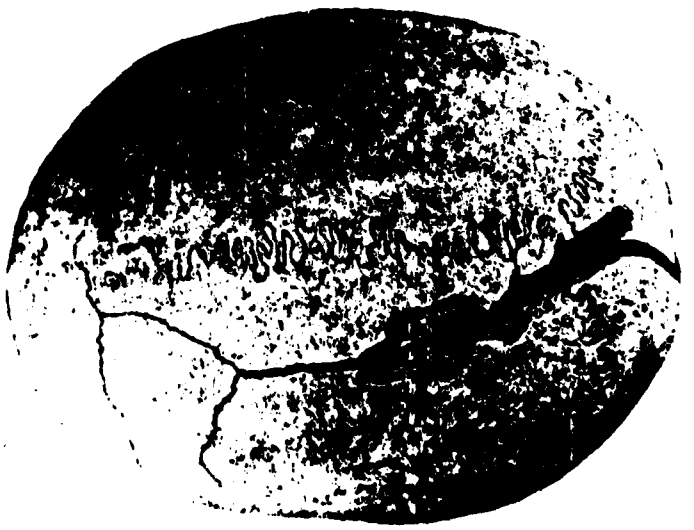


Fig. 96. Sulcate bullet wound of left sincipital and postcranial region. Cracks of the left sincipital and left half of the scale of postcranial bone.

Page 334a.

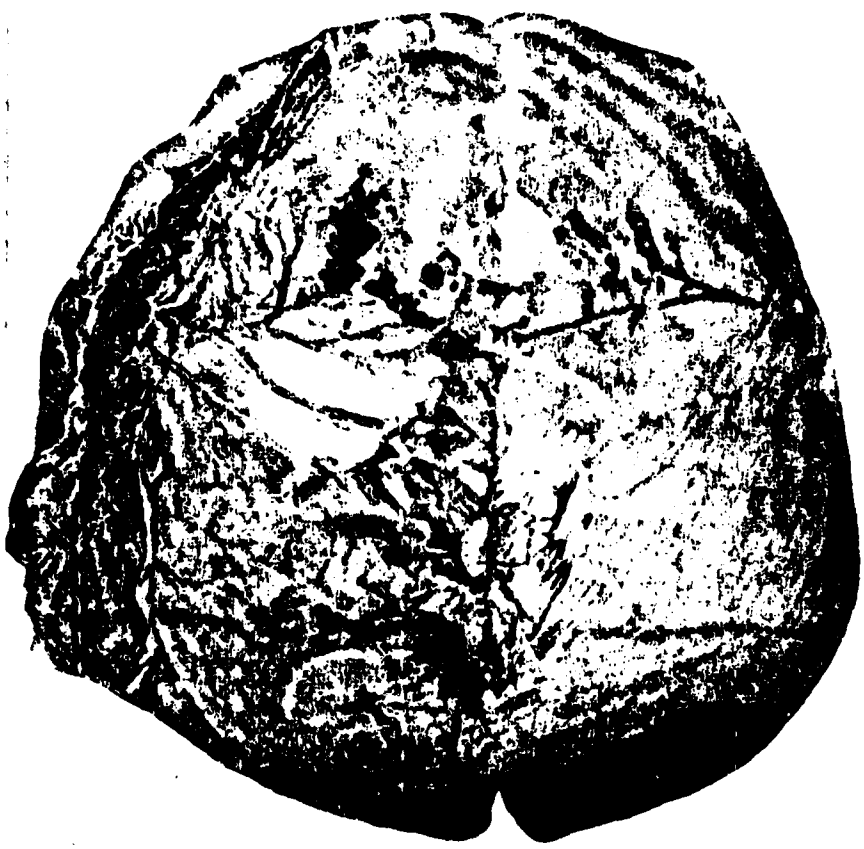


Fig. 97. Tangential bullet wound of left hemisphere. Extensive defect of solid cerebral shell. (Artist V. V. Vorotilcva.).

Page 334b.

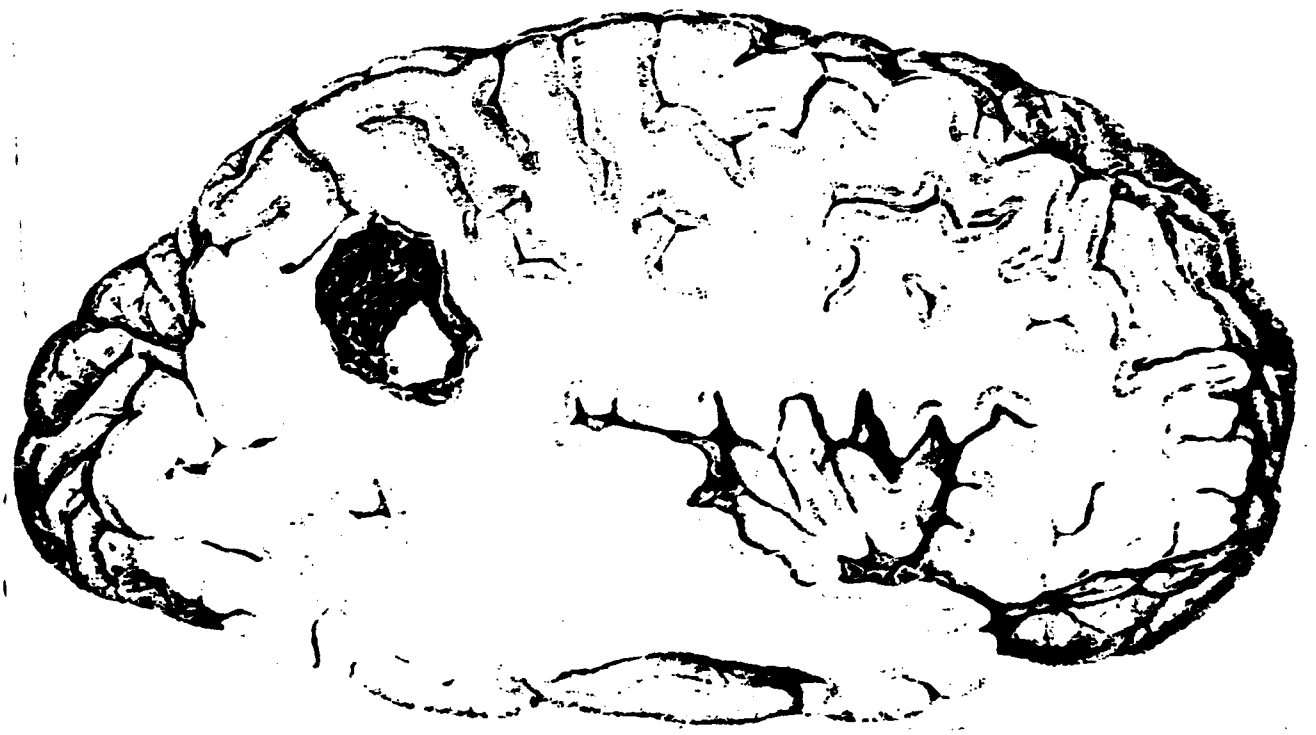


Fig. 98. Blind-end wound of postcranial portion with introduction of metallic and bone fragments into brain tissue. (Artist of T. V. Belyayev.).

Page 335.

Wound of solid cerebral shell.

The sizes/dimensions of the defect of solid cerebral shell in a number of cases corresponds to the size/dimension of the wounding shell. Large sizes/dimensions the defects of solid shell achieve upon the extensive destruction of head or with the sulcate (tangents) wounds when they are spread on 10 cm and more (Fig. 97).

With the wounds of solid cerebral shell frequently appear subtunical hematomas. Forms and volume of hematomas are diverse, moreover volume of hematomas it changes in dependence on the growing or repeated hemorrhages. By these phenomena is explained the characteristic picture of their laminar nonuniform staining (layer of darker and brighter red *color*) which is noted both with process/operations and with autopsies.

Unremoved/uneliminated massive hematomas undergo organization. With purulent complications subdural hematomas are at first covered/coated with fibrinogenous-purulent impositions, then they

undergo deeper changes, up to their purulent melting; sometimes such festering hematomas convert/transfer into abscesses. Subtunical hematomas sometimes led to death for the first time days after wound. In the presence even comparatively small hemorrhages, under conditions of the considerable disorders of blood circulation and water metabolism/exchange can advance the sharply developing intracranial pressure increase, which brings in a number of cases to death. The greatest lethality from subdural hematomas was observed in the specialized hospitals of army.

Wounds of the substance of brain.

Frequently is noted nonconformity between the sizes/dimensions of the external wound of head and wound of the substance of brain. Is explained this phenomenon by the following three facts:

first, the substance of brain is soft medium with large amount of liquid; therefore under the specific manpower the wounding shell can cause the extremely extensive decomposition of the substance of brain as a result of the hydrodynamic activity;

in the second place, simultaneously with the metallic wounding shell almost always in the substance of brain they strike the bone fragments, which are additional factor in the mechanism of the

decomposition of the substance of brain (Fig. 98);

thirdly, soft shells contain a large quantity of elastic fibers, thanks to which with injury occurs the considerable disagreement of the torn sectors of soft shell.

With blind-end wounds even by small/fine fragments wound canal frequently has a form of truncated cone with the basis, arranged/located on inlet. Similar patterns are observed also with the blind wounds of head with the perforating wound of large cerebral hemispheres. With the gradual decrease of the force of the wounding shell gradually is decreased the degree of the decomposition of the substance of brain.

Wound canals with perforating wounds both according to the diameter and in form can be extremely diverse. Sometimes they are the slit-shaped canal, which does not change its form on everything of the elongations/extents; and the same time can know how the place wound canals, in diameter achieving 3-4 cm and by places considerably narrowing.

Page 336.

Intake and outlets on the surface of brain with perforating wounds

frequently have an identical value and a form, resembling truncated cone on the spot of entrance and output/yield of wounding shell (Fig. 99).

Healing of the penetrating wounds by primary tension occurs rarely. The usually uncomplicated wounds heal via secondary tension. Through 4-5 weeks wound defects with the penetrating wounds frequently macroscopically completely are occluded.

The wound canals, passing through cerebral ventricles, have a series/row of special features/peculiarities. The bullet damages of ventricles are related to heavy and frequently lethal wounds. Most frequently such wounded perish on the field of battle, rarely striking into the hospitals of the rear. According to the data of autopsies, on the field of battle the wounds of ventricles are encountered into 33.7o/o of cases. In the front line specialized evacuation hospital they are discovered only in 8.4o/o of dead persons from the wounds of skull, in the hospitals of the deep rear such wounds are observed still thinner/less frequent. The damages of ventricles can be observed with the wound of any unit of brain. Front/leading of the genus of lateral ventricles are destroyed predominantly with the wounds of frontal portion, posterior - with the wounds of postcranial portion and the mixed wounds of postcranial and sincipital portion (Fig. 100); the damages of lower crescents

most frequently are enccuntered with the wound of a lower-temporal region and region of the mastoid extension (it is more frequent with blind-end and tangential wounds). The third ventricle, as a rule, is damaged with the perforating segmental (transventricular wounds; the more rarely wounding shell penetrates its area with deep parasagittal wounds with the damage of calloused body.



Fig. 99. Perforating diametric wound of the parietal lobes of brain.

Page 336a.

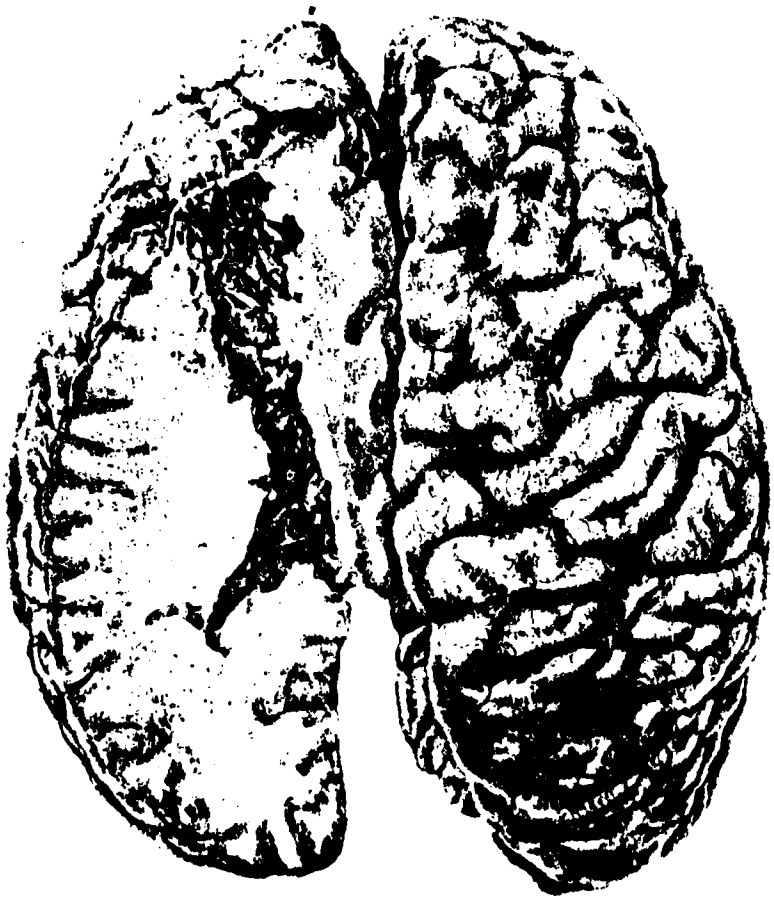


Fig. 100. Straight/direct wound of ventricle of brain (artist T. V. Belyayev).

Page 337.

Finally, it is necessary to note the picture of the decomposition of

the walls of lateral ventricles, which appears far from through wound canals. Apropos of the mechanism of these decomposition are voiced two assumptions: 1) either during the passage of the wounding shell occurs deflection to side from the main trend of small/fine metallic or bone fragments, in consequence of which is destroyed the wall of the area of ventricle or 2) or occurs the sharp displacement of brain tissue during the jerk/impulse which undergoes the head brain at the moment of the penetration of the wounding shell and simultaneous liquor jerk/impulse from ventricle. Here, thus, plays large role the force of shell. This is confirmed by the fact that this type of supplementary damages of the substance of brain are discovered only with the perforating wounds of the head when the force of the wounding shell is most great.

With the bullet wounds of cerebral ventricles greatly frequently is created direct threat for the life of wounded. Extensive hemorrhages into ventricles can occur both upon the decomposition of vascular webes/plexi and from the damaged cerebral vessels, mainly from average/mean cerebral artery and its branches. The presence of the considerable quantities of the blood in one of the ventricles greatly rapidly entails its dissemination all over system of intra-cerebral areas and output/yield into subarachnoid space. Tamponade of ventricles with the sub-arachnoidal dissemination of the blood usually rapidly leads to death. A similar genus of wounded they

perished either on the field of battle or in the foremost stages of evacuation. In the specialized hospitals of army, front and deep rear in the predominant majority of such wounded were observed only blind wounds with the presence of the damage of one genus or center section of one lateral ventricle and considerably thinner/less frequent than damages they were large.

When patients survived, in the region of the wound of one or the other department of ventricle was formed the scar tissue, which frequently changed lumen and deformed the area of the ventricle; in accordance with this appeared conditions for the development of secondary hydrocephalus.

Infectious complications.

Infectious complications with the penetrating wounds of skull gave the considerable percentage of the cases of death. According to the data of the development of the maps/charts/cards of sections, the basic forms/species of infectious complications in dead persons from the wounds of skull were distributed as follows: secondary purulent leptomeningitis and encephalitis - 41.5o/o, abscesses - 32.5o/o, primary purulent leptomeningitis - 16.9o/o, anaerobic infection - 2.5o/o, other - 6.6o/o.

Most frequently were encountered secondary purulent leptomeningitides and encephalitides, which complicated local suppurations in the substance of brain. In this case in 15.2o/o of cases the spilled purulent inflammation of shells and substance of brain appeared on the scil of festering wound canal. Already on the 3-4th day purulent inflammation with this type complications converts/transfers the demarcation zone of the region of wound and is spread on large hemispheres and manger-on unit of the brain, as a result of which appears spilled purulent encephalitis. The suppuration, frequently accompanied by sufficiently considerable sub-arachnoidal hemorrhages, can be developed simultaneously also in the soft shells of brain.

Page 338.

Thus, the extended character/nature of the purulent inflammatory changes - [~~ILLEGIBLE IN ORIGINAL DOCUMENT~~] gives the picture of purulent leptomeningo-encephalitis.

With the wound of ventricles festering wound canal sometimes transition into periventricular purulent encephalitis. The inflammatory [ILLEGIBLE IN ORIGINAL DOCUMENT] usually precedes acute/sharp hydrocephalus, frequently limited only by the damaged region. At first is noted sharp [ILLEGIBLE IN ORIGINAL DOCUMENT] of

subependymal vessels, which is escorted/tracked by the focus [ILLEGIBLE IN ORIGINAL DOCUMENT] and grain size of ependyma. But already on the 3-5th day after the wound one can see extensive fibrinogenous and fibrinogenous-purulent impositions on the walls of ventricles and vascular webes/plexi in the form of easily removable films (ependymitis). Frequently as a result of the immediate vicinity of pia mater is developed purulent leptomeningitis, primarily of basal localization. In a number of cases the suppuration is spread to ventricles from the surrounding departments of brain. This occurs, for example, when into ventricles burst open deeply positioned abscesses. Observations show that the suppurations can convert/transfer into the internal departments of ventricles also from the region of the dissemination of the spilled purulent encephalitis.

Abscesses of brain. The abscesses of brain with penetrating wounds in the therapeutic installations of army area during the Great Patriotic War were enccuntered not more frequent than in 7.5o/o of cases. In front line therapeutic installations this percentage doubles (I. A. Krivorotcv). According to the data of the deepened development of vivisections, abscesses were encountered into 32.5o/o of cases, of them in 19.0o/o of cases was stated/established death from the secondary purulent leptomeningitis.

The abcesses, arranged/located closely tc cortex, frequently flow/occur/last with the phenomena of restricted nonpurulent leptomeningitis. The formation of early abcesses frequently concludes already at the end of the third week. On [ILLEGIBLE IN ORIGINAL DOCUMENT] in this period they are represented in the form of area, filled with pus, have the well expressed walls, around which frequently can see small/fine hemorrhages (microscopic building/structure of the wall [ILLEGIBLE IN ORIGINAL DOCUMENT] is in detail described the substances of general/common/total unit). With the benign course of atcess tne changes attack/advance mainly due to strengthening of the capsule: walls become thicker and denser in connection with growth of fibrous and glial tissue. Late abscesses most frequently develop from the festering granulomas of foreign bodies or considerably thinner/less frequent with metastatical route/path. Lethal outcomes with abcesses attack/advance, first of all, from the autopsy of abcess in the area of the ventricle of the brain, in consequence of which, as has already been indicated, are developed periventricular purulent encephalitis and basilar leptomeningitis.

In other cases occurs purulent leptomeningitis on fistula of brain.

Primary purulent leptomeningitides with penetrating wounds of

skull were encountered considerably thinner/less frequent than secondary leptomeningo-encephalitides, and they composed 16.9o/o.

In the anatomical picture of primary traumatic leptomeningitides always focuses attention the localization of pus in soft shells and partly in the internal surface of dura mater, primarily on the convex parts of the large hemispheres of brain. Pus usually is arranged/located on the side of wound and it is thinner/less frequent on opposite side sometimes on the basal surface of brain.

Page 339.

In some cases predominates diffuse impregnation by pus of soft shells, in others pus is arranged/located with the scattered foci, mainly around individual vessels. During microscopic examination in the exudate between the filaments of fibrin they are detected, as a rule, vast leukocyte accumulations with considerable quantities of the lymphocytes; frequently they are encountered infiltrates in vascular walls. The diversity of histological pictures is supplemented also by the fact that in a number of cases already the early periods purulent inflammation penetrates the cerebral cortex.

Anaerobic infection during war was rare, but extremely terrible infectious complication of the wounds of the brain. According to the

data of the development of the maps/charts/cards of sections, anaerobic infection complicated 2.5o/o of cases of the penetrating wounds of skull. The specific gravity/weight of the cases of anaerobic infection on different authors' sectional material is dissimilar. V. S. Klyachko found anaerobic infection in 10.0o/o of all cases of the wounds of skull and brain; N. S. Chistovich on material of KhPPG revealed/detected anaerobic infection in 7.4o/o of all cases of death from the penetrating wounds of skull. In one of the combat process/operations in the strongly contaminated locality anaerobic infection, according to N. S. Chistovich's data, was the reason of death 30o/o of wounded, dead persons from the penetrating wounds of skull.

To the given literary data one should be related with care. D. A. Arapov (1942) with large basis indicates that "the damages/defeats of brain by anaerobic infection are very rare and always reliable". The diagnosis of the anaerobic infection of brain must not be placed only on the basis of the data of bacteriological research. Necessary conditions must be the presence of the corresponding clinical and morphological picture. In connection with the fact that the early developing posthumous changes in the substance of brain sometimes resemble the picture of anaerobic infection, the reliable diagnosis of anaerobic infection it is possible to place only with the early ones of autopsy - 2-4 hours after death.

The cases of anaerobic infection were observed in acute/sharp period or in the beginning of the period of early reactions and complications.

The soft tissues of head in the region of the wound, complicated by anaerobic infection, are edematic, sometimes pierced by gas, muscles of greyish colcr. Solid cerebral shell is stressed, its tissue crimson painted as a result of impregnation by the decomposing blood. The damaged hemisphere of brain is found in the condition of sharp bloating. The tissue, casualty by anaercbic infection, is molten, impregnated with the decomposing blccd, without sharp boundary it converts/transfers into the invariable/unchanged substance of brain. In a number of cases in the substance of brain were gas bubbles; by many authors was noted the presence of putrefactive odor.

Histologically in the place of the damage of brain were discovered the large/coarse foci of necrotic and degenerate changes in the ganglionic cells of cortex. Was observed the weakly expressed leukocyte reaction and the appearance of a small quantity of histiocytes. In tissue was detected a vast quantity of gram-positive bacilli - the causative agents of anaerobic infection. Process was

spread in the periphery of wound on perivascular and liquor-bearing routes/paths. In perivascular spaces was detected the presence of the protein mass and issuing from blood (increased permeability of the walls of vessels). Was observed a small quantity of astrocytes, in many of them were noted destructive changes.

Page 340.

Thus, in the sharply elapsing cases morphologically was detected the picture of the diffuse encephalitis of the anaerobic etiology with flaccid frontier reaction and almost complete absence of macrophage reaction.

In other complications, which compose 6.6%, are connected the cases of suppuration of wound canal, which were complicated by secondary edema of brain (4.4%).

Clinic of the penetrating wounds.

The clinical course of the penetrating wounds of skull depends on

[ILLEGIBLE IN ORIGINAL DOCUMENT]

the condition of wound, general somatic and surgical condition of wounded.

The combination of observed with these wounds syndromes can be divided into the following three groups: total somatic group, tunicary group and cerebral group. In the latter is included common brain and the focus group of symptoms.

General/common/total somatic syndromes expressed the general/common/total reaction of the organism of the wounded to bullet injury. To them it is related shock, collapse and some other heavy general conditions, which were being frequently observed among those wounded the skull in the foremost stages of evacuation.

Tunicary syndrome was observed in 47.1o/o case of the penetrating wounds of skull.

So high frequency of meningeal symptoms should be to large degree explained by early infectious complications and, more rarely, by acute/sharp traumatic hemorrhages into cerebral shells and on tunicary space. On a portion of the wounds of tunicary vessels together with hemorrhages into cerebral shells it was necessary 21.6o/o of all penetrating wounds of skull.

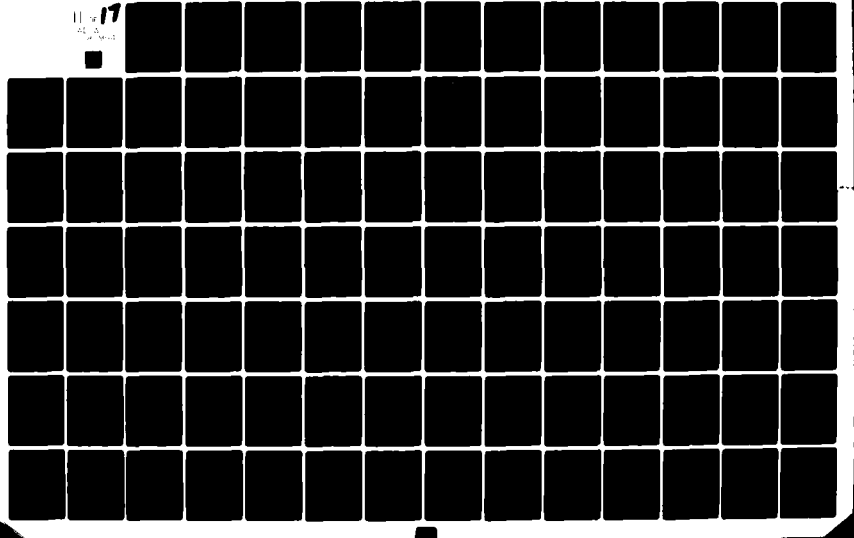
Characteristic for sub-arachnoidal hemorrhages pseudomeningitis symptom complex was expressed usually in the form of an increase in the temperature, which reached 38-39°, in the presence of tunicary symptoms - rigidity of postcranial muscles, Kernig's sign, Brudzinki's sign, and their combination.

According to the data of the maps/charts/cards of the deepened characteristic, with those penetrating of the wound of skull from tunicary symptoms the rigidity of postcranial muscles was observed in 5.8o/o of cases, the Kernig and Brudzinski signs - in 6.6o/o of cases and combination by these of symptoms - in 34.7o/o of cases.

The expressed tunicary symptoms most frequently were encountered with extensive tangential and perforating segmental wounds of skull of the escorted/tracked by damage on the large space cerebral shells and surface departments of the hemispheres of brain with their numerous vessels. These symptoms not only made the general condition worse of wounded, but complicated the clinical picture of the penetrating wound skulls, making especially difficult the differential diagnosis between acute/sharp subtunical hemorrhage as one of the frequent and severe traumatic complications of these wounds (12.9o/o) and acute purulent meningitis which was encountered approximately so/such unit (10.8o/o) and flowed/occurred/lasted with

AD-A090 984 FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OH F/G 6/5
THE EXPERIENCE OF SOVIET MEDICINE IN THE GREAT PATRIOTIC WAR 19--ETC(U)
FEB 80 V N SHAMOV, B A SAMOTOKIN

UNCLASSIFIED FTD-ID(RS)T-1925-79 NL




A
098

the same by basic tunicary symptoms and by high temperature. Sub-arachnoidal hemorrhages had a tendency toward festering, causing the development of the heavy form of bullet purulent meningitis.

Page 341.

Cerebral syndromes were basic in the clinical picture of the penetrating wounds of skull. They usually were expressed in the combinations of different groups of the so-called common brain and focus syndromes.

The special features/peculiarities of cerebral syndromes with the penetrating wounds of skull, in contrast to other forms of the damage of skull, consisted: 1) in smaller manifestation and constancy of common brain symptoms and predominance of the focus ones; 2) in the diversity of focus symptoms which depended on the direction of wound canal in the substance of the brain; 3) in instability and dynamicity of the majority of symptoms after wound with their tendency during the favorable course of wound toward the gradual and even complete disappearance or, on the contrary, in the case of the development of early complications, to rapid reinforcing of those existing and build-up/growth of new ones and finally 4) in frequent nonconformity between the appearance of wound, on one hand, and the severity of cerebral symptoms and by the general view of wounded - on

the other hand.

Common brain symptcms characterized both the general/common/total and local reaction of brain to its damage and were expressed usually in the form of the violations of the series/row of the vital functions of organism, connected predominantly with temporary/time circulatory violations and changes in the intracranial pressure, it is more frequent toward an increase in the latter.

The most objective indicatcrs of the condition of intracranial pressure gave the measurements of lumbar, more rarely - ventricular pressure. Another indicator was condition and appearance of the wound of brain. So, the presence of strong outflow, fallout or protrusion of brain, and also its stagnant stain/staining and absence of pulsation were the convincing signs/criteria of the increased intracranial pressure. The absence of the enumerated phenomena spoke against this increase. The presence of stable and abundant liquores, especially ventricular, with the wound of the wall of lateral ventricle or with its pycnecrotic perforation with the strong pulsation of the dropping rather dry brain and its shells testified usually about the lowered/reduced intracranial pressure.

Together with the straight/direct methods of determining the

intracranial pressure indicated, was considered the series/row of the indirect signs/criteria of the common brain symptoms, characteristic of the intracranial pressure increase. They include: the disorder of consciousness, headaches and vomitings, disorder of respiration and ingestions, changes in the pulse and blood pressures, cerebral hyperthermy, changes in the fundus of the eye - stagnant papilla, general/common/total spasms, paralysis of sphincters, etc.

The disorder of consciousness was the important diagnostic sign/criterion of the severity of wound and degree of the manifestation of the general/common/total reaction of brain to the transferred wound. Frequently wounded even with heavy wound did not lose consciousness either it was darkened shallow, also, on and to short period, or finally wounded retained sufficiently clear consciousness for several hours after wound, and then fell into a deep unconscious condition.

Thus, for instance, was observed the case of the heavy blind-end fragmentation wound of fronto-orbital region, after which the wounded, without having lost consciousness, arrived on the motorcycle from area of Pulkovo heights/altitudes into hospital into Leningrad, after making in vehicle of approximately 20 km. After descending from motorcycle, it independently was into receiving rest and it was hospitalized. Outcome - recovery.

Page 342.

The degree of the disorder of consciousness oscillated over wide limits - from light short-term stupefaction tc greater or smaller the degree of somnolence, soporic and comatose condition, moreover 3.8o/o of wounded with the penetrating wounds of skull consciousness in no way lost. Representation about the frequency cf different changes in the consciousness with the bullet penetrating wounds of skull during the Great Patriotic War give the following data: lost consciousness after the wound (moreover subsequently consciousness it was not disrupted) by 48.7o/o cf wounded; it lost consciousness after bright gap/interval 1.2o/o of wounded; it lost consciousness after the wound (moreover subsequently the condition of consciousness in these wounded was changed) by 18.8o/o; the condition cf consciousness it changed under the effect of the complications (although with wound consciousness it was not disrupted) in 8.1o/o of wounded; the violation of psychics/psyche it was noted in 1.1o/o; the violation of the consciousness combined with a short-term change in the psychics/psyche for the duration of unit or entire period of treatment in 18.3o/o of wounded.

Are interesting observations of the late loss of consciousness,

which advanced after the bright gap/interval (such cases are noted only into 1.2o/o of penetrating wounds of skull), and also above a change of the consciousness in the future.

As is known, the function of consciousness, inherent in the cerebral cortex is subordinate in of the regulator mechanisms, placed in the trunk unit of the brain, in particular, on the day of the fourth and third cerebral ventricle. Therefore according to the degree of the loss of ccnsciousness it is possible approximately to judge about character/nature and degree of the disorders of these vital zones of brain in each individual case. Thus, for instance, deep comatose condition in which the wounded is for many hours from the moment/torque of wound, is the prognostically terrible symptom, which frequently testifies about hopeless condition. A deep loss of consciousness in combination with other hanger-on symptoms - disorder of respiration, ingestion, immobility of pupils, paralysis of oculomotor nerves and sphincters - sometimes serves as the proof of the direct damage of deep trunk and paraventricular parts of brain. The presence of the soporic or somnolent condition, which developed immediately after wound, is, on the contrary, prognostically more favorable symptom. This symptom testifies that the circulatory disorders in deep trunk departments of large hemispheres, the occurring on soil violations of blood and liquor circulation, vascular stasis or jet edema of brain, are usually reversed.

Finally, the late loss of consciousness after bright time interval indicates the progressive increase of intracranial hemorrhage or edema and bloating of brain with implication in the process of brain stem.

Headaches. About headaches complained far not all wounded with the penetrating damages skulls. Complete absence of complaints of headaches when the heavy wounds of the brain sometimes were quite remarkable.

The diffuse bursting open headaches are characteristic for the uniform stress/voltage of an entire solid cerebral shell with the intracranial pressure increase as a result of hemorrhage, edema, suppurative processes or dropsy of brain. The presence of such headaches was the sign/criterion of the hypertension syndrome.

Page 343.

Less intense and diffuse headaches are characteristic for the hypotension syndrome which was observed usually in the presence of stable and abundant ventricular liquorrhea, especially when liquorrhea was escorted/tracked by retraction - by collapse of large

hemispheres, ventricles and cerebral shells, by unusual dryness of the latter, or by expressed meningeal symptoms and by absence of cerebrospinal fluid/liquid with lumbar puncture ("dry puncture").

The restricted local headaches were observed very frequently during compression by hematoma, foreign bodies and bone fragments of the small sector of the surface of solid cerebral shell, in area of its large rich innervated vessels, mainly the branches of average/mean tunicary artery.

The irradiating at a distance headaches were most frequently the result of stimulating (wound, compression, inflammation, cicatrization) of venous sinuses and cerebellar drift, innervated by the circular branch of the first branch of trigeminal nerve (Arnoldov nerve). The stimulation of Arnoldov of nerve in essence caused the syndrome of cerebellar drift, which is expressed in permanent pains at a distance in the region of orbits, eyeballs and eyebrows, that are escorted/tracked by lacrimation.

Vomiting was observed with the penetrating wounds of skull far not constantly and considerably thinner/less frequent than during the closed damages. Noticeably larger value acquired vomiting with the severe intracranial complications, especially infectious character/nature. Struggle with vomitings was very difficult;

frequent vomitings led tc sharp attrition of wounded.

The disorders of respiration, ingestion and sucking reflex belong to the group of the gravest bulbar symptoms, which testify about the massiveness of the damage/defeat of brain. The heavy disorders of the respiration (sharp respiratory/breathing arrhythmia, shortness of breath and Cheyne-Stokes respiratiсn), accompanying, as a rule, a deep soporose cr comatose condition, are noted in 23.0o/o of revealed cases of hanger-on symptoms with the penetrating wounds skulls. Only urgent process/operation and energetic therapeutic actions made it possible to sometimes take some wounded away from heavy, almost hopeless condition.

Immeasurably more badly was matter concerning other bulbar symptoms in the form of reflectcr disorder of the ingestion when wounded, who was being found in the conditicn of coma, could not swallow that brought to it the drinking; was possible in this case the loss of the sucking reflex, allowing for patient even in unconscious condition to automatically capture by jaws the spout of drinking bowl. The discrder of ingestion was observed into 5.7o/o of all cases of hanger-on symptoms with the penetrating wounds. The position/situation of such wounded was extremely heavy and limber led to lethal outcomes.

Bradycardia - typical bulbar symptom of the stimulation of the hanger-on centers of the vagus nerve, it appeared predominantly under the effect of a sharp the intracranial pressure increase. The pathological delay of the pulse (from 60 strikes/shocks per minute it is below), as a rule, it was escorted/tracked by a simultaneous arterial pressure increase. The frequency increase of pulse and its weakening testified about the massiveness of the damages of brain and were the sign/criterion of moved paralysis of heart activity. Delay and stress/voltage of pulse testified about the development of the threatening intracranial complications (hemorrhage, edema or abcess of brain), which were being escorted/tracked by a sharp intracranial pressure increase.

Page 344.

In the similar cases the delay of pulse sometimes achieved 50-40 and even 35 strikes/shocks per minute. However, in the presence of the extensive defects of skull with prolapse or protrusion of the brain of bradycardia either it was not completely or it was insignificant.

According to the data of the maps/charts/cards of the deepened characteristic, hanger-on symptoms with the drooping wounds of skull are noted in 27.2o/o of cases. Among these symptoms bradycardia was

observed in 52.0o/o of all cases of hanger-cn symptoms, the disorder of respiration - in 23o/o, the discrder of ingestion - in 7.5o/o and the cosbination of these disorders - in 17.5o/o of cases.

The hyperthermy of cerebral origin was cbserved with the penetrating wounds, complicated by sub-arachncidal or ventricular hemorrhage, and it achieved in heavy cases of 39-40° and it is above, being escorted/tracked by other hanger-on and tunicary symptoms.

Changes in the fundus of the eye (hyperemia, stagnation and edema of retina and it is papilla of optical nerve) testified usually about development in the area of the skull of the inflammatory, stagnant and edematic hypertensive processes, being the characteristic satellites of these processes with the heavy wounds of skull. Hyperemia it is mammillary optical nerve it characterized usually inflammatory process in cerebral shells, especially on the basis of brain. Stagnant papilla were the sign/criterion of the growing of intracranial hemorrhage or ripening abcess of brain. Edema of the papilla of optical nerve testified about the progressive development of acute jet edema of brain. However, the decompressive effect of extensive defect in the bones of skull frequently annihilated pathological intracranial hypertension as the accompanied by it stagnant and edematic changes in the fundus of the eye. By this fact, together

with the insufficiently wide use of ophthalmoscopy upon the examination/inspection of those wounded into skull during the Great Patriotic War, and is explained the fact that among the revealed different violations the views in the wounded (37.6o/o) of change from the side of the fundus of the eye were detected very rarely (5.7o/o).

The experiment/experience of the Great Patriotic War confirms the experiment/experience of peacetime: by analogy with other common brain symptoms the absence of changes on the fundus of the eye yet does not mean that in this case there are no intracranial ccmplications. And only the presence of these symptoms, particularly stagnant papilla must always attract attention tc complications indicated above.

Focus symptoms with the penetrating wounds of skull, as it is said above, were characterized by great variety and depended on localization and character/nature of wound, depth and vastness of damages, character/nature of the associating wound traumatic complications finally from the special features/peculiarities of early and late infecticus complications.

In the initial period of wound when the massive damage of brain is present, the majority of focus symptoms was difficult to reveal/detect in view of the sharply pronounced common brain phenomena. In proportion to the decrease of the latter focus symptoms

gradually came to the fore and most vividly they were secreted in that period when to wounded returned consciousness and disappeared hanger-on phenomena. During the Great Patriotic War was deeply studied the series/row of the symptom complexes of the damages of different departments of brain. So, within the time of war was for the first time developed the symptom complex so called parasagittal wounds. Is studied and detailed also the group of basal and parabasal wounds, as a rule, the combined with wound paranasal sinuses, with the damage of eye, ear and face skeleton.

Page 345.

Were refined the clinical syndromes of the diverse damages of brain stem and ventricles of brain.

Finally, considerably were enlarged representations about wound, in particular, anaerobic, infection, and also diverse forms of infectious complications.

From the functional violations of nervous system, revealed with the penetrating wounds of skull, most frequently were secreted motor disorders - 41.8o/o, disorders of view - 37.6o/o, disorders of hearing - 31.4o/o, sensitive disorders - 17.5o/c and the disorder of speech - 13.7o/o.

Special features/peculiarities of course in connection with the type of the wounding weaponry. The considerable predominance of fragmentation damages with penetrating wcunds (78.2o/o) above bullet cnes (21.8o/o) explains considerable increase in the number of blind-end wounds in comparison with through cnes and multiple wounds in comparison with single ones.

The blind-end penetrating wounds of skull are noted in 52.5o/o of cases, tangents - in 24.7o/o, through - to 15.7o/o those ricocheting - only in 7.4o/o. Single wcunds composed 61.7o/o, but sets - 38.3o/o, i.e., are more than one third (of them 6.7o/o they were related to the multiple wounds only of skull, and 31.6o/o - skulls and other regions).

In comparison with fragmentation ones the penetrating wounds of skull, caused by bullets, flowed/occurred/lasted, as a rule, considerably heavier they were escorted/tracked by the deeper functional violations; e.g., different focus symptoms with bullet wounds were observed in 43.8o/o of cases, and with fragmentation ones - only in 34.2o/o; their outcome was also less favorable.

A large quantity cf wounds of skull by small/fine fragments,

predominantly by the fragments of mines, gave rise to the new peculiar clinical forms, inherent in surface csteo-tunical-cortical wounds with the characteristic for them tunicary-crust or crust-subcortical syndromes of stimulation or fallout of the functions of the corresponding crust centers.

With the X-ray analysis of skull were detected superficially disposition bone, and sometimes also the metallic fragments, penetrating usually in the very defect of skull.

Special attention attracted also wounds by the single small/fine fragments which, penetrating the depth of brain, deposited on the bones of skull only minimum damages. The multiple fragmentation wounds of skull were characterized by the complexity of clinical picture which was characterized by the combination of different neurologic syndromes. During these damages usually there was combination of one-two penetrating and several nonpenetrating wounds, as a rule, moderate/mild.

Special features/peculiarities of course in connection with the mechanism of wound and the character/nature of wound canal. Most essential factors they were: 1) depth and vastness of the decomposition of the substance of brain by the wounding shell; 2) localization of wound canal and wound zone in brain, in its different

regions and portions, and also the proximity of this zone to the vitally important centers; 3) the damage of Krupp tunicary and cerebral vessels - basic reasons for heavy lethal hemorrhages and formation of hematomas; 4) vascular reactions, disorders of the circulation of the blood and cerebrospinal fluid which contributed to the development of ischemic, stagnant and edematic changes in the brain; 5) presence in wound canal in the brain of metallic foreign bodies, bone fragments and other soiling wound objects/subjects - the carriers of the wound microflora; 6) the virulence of the soiling wound microflora and the capability of it tc cause the development of different infectious complications in brain, its shells and bones of the skull; 7) periods and quality of the primary surgical processing of the wound of skull, and also methods of the post-operation treatment of wounded and finally 8) the general condition of the organism of wounded, the degree of his individual staying power for injury and infection, his immunobiologic capabilities, and also presence or absence of the associated factors, which weaken these natural qualities of organism (strong physical and mental overwork, depletion, cooling, catarrhal diseases - influenza, pneumonia, etc.

Page 346.

The blind penetrating wounds of skull by nature differed from other wounds by the following clinical special

features/peculiarities:

1. By the low sizes/dimensions of wound (or trepanation) aperture in skull, by the more considerable zone of the damage of brain which in the majority of the cases although was not great on periphery, but differing in depth, depending on the character/nature of the wound canal: simple, radial, segmental and diametric.

2. By presence in area of skull of considerable number of bone fragments, arranged/located sufficiently deeply in brain, and also metallic fragment, it is thinner/less frequent than bullet, that were being located, as a rule, it is still deeper, in blind end (above day) of wound canal.

3. difficulty of precise determining of dimensions, direction and character/nature of wound canal, and also definition of presence and location of foreign bodies and bone fragments with the aid of X-ray method of research (with blind-end wounds this method of research was decisive, while with tangential and perforating wounds its diagnostic role was considerably more weakly).

4. By little favorable conditions for outflow of wound separable, cerebral decomposition/decay, issuing from blood and withdrawal from wound canal in substance of brain of numerous bone

fragments and foreign bodies.

5. By threat of development of acute/sharp hypertension syndrome due to intracranial hemorrhage and acute edema of brain with phenomena of displacement of barrel of brain and hydrocephalus under unfavorable conditions for spontaneous decompression (protrusion of brain).

6. By little favorable conditions for wide acceptance of primary wound infection in cerebral shells (meningitis), and also for penetration into area of skull of from without secondary infection.

7. By characteristic predisposition to development in brain of restricted purulent infection, mainly abscesses, and by decrease of other infectious complications, more pathognomonic for tangential and perforating wounds.

8. By common clinical picture, which was being strongly changed with these wounds both in relation to of severity and character/nature of neurologic syndromes - common brain and focus.

Page 347.

The tangential (tangential) penetrating wounds of skull were

characterized by the fcllowing distinctive features:

1. By the extended, cval, U-shaped-sulcate form of wound which sometimes had considerable length with small width. Frequently the wound was open and it had a skin cross connectien or a navigation bridge, which converted it of the open chute into the similarity of the locked wound canal. In this case tangential wound approached surface perforating segmental wound with the cnly difference that the intake and outlets with the latter were subglcbose form and small sizes/dimensions, but with tangential wounds they were oval extended and large sizes/dimensicns.

2. By noticeable predominance of surface sizes/dimensions of skin wound above bone, tunicary and cerebral.

However, seeming small the sizes/dimensicns of cerebral wound in a number of cases proved to be illusory, since the numerous bone fragments, which were being deeply introduced in the substance of brain, caused to it serious decomposition.

3. By characteristic X-ray picture, which shows usually: either a) crushed break with many small/fine bone fragments, located superficially in zone of wound defect (surface and favorable form

only of crust damage/defeat of brain), or b) perforated plumb break with many bone fragments, arranged/located within skull, usually on large depth far from bone defect (heavy form deep subcortical, paraventricular decomposition of brain), or finally c) fragmented break with large/coarse fragments and deep cracks in bone with extensive zone of necrotic damage/defeat of brain, that resembled surface perforating segmental wounds (mongrel). However, this fragmented break was encountered considerably thinner/less frequent.

4. By absence in area of skull of metallic fragments and bullets, with exception of random secondary shells, which jammed on surface of wound, sown by small/fine bone fragments, submerged in destroyed substance of brain.

5. By frequency of education of considerable prolapses of brain in acute/sharp stage of wound and extensive inflammatory protrusions in more last stages as a result of edema or bloating of brain, and also infectious complications (abundant liberation/excretion from wound of cerebral detrite was observed rarely).

6. By smaller manifestation of hypertension syndrome, which is explained by comparatively wide decompression, with possibility of free protrusion of brain and frequently developing external

hemorrhages from damaged surface vessels of brain, especially with parasagittal localization of wound, and also by frequently noted in acute/sharp period sub-arachnoidal ligourrhea.

7. By rarity of abcesses of brain and by tendency toward development of osteomyelitis, acute purulent meningitides and meningoencephalitides with extensive cerebral protrusions, which accepted frequently malignant course complicated formations of stable ventricular liquor fistulas.

8. By the clinical picture, for which in the majority of the cases were characteristic the average/mean severity of wound and the satisfactory general condition of wounded, in spite of the deep fallout of crust functions, the considerable sizes/dimensions of wound and extensive prclapses of the destroyed sector of brain.

Page 348.

The ricocheting penetrating wounds of skull considerably resembled to blind-end and tangential wounds and were characterized:

1. By the small sizes/dimensions of wound - one, less frequently two, in appearance which remind blind-end single wound, dual or short tangent.

2. By presence in area of skull, usually at depth of 5-7 cm, large quantities of bone fragments, that were being arranged/located either it is fan-shaped or of those assembled into massive small lump, or arranged/located by narrow long chain/network along crescent-shaped extension with parasagittal localization.

3. By absence in area of skull of wounding shell. Sometimes, with the incomplete mechanism of the ricocheting wound, the wounding shell was detected on surface, towards the outside from skull in bone defect or in the soft tissues of skull, but always far from the deeply arranged/located in brain bone fragments. This in principle differed the ricocheting wound from blind and perforated plumb break from perforated blind.

4. By impossibility of precise alignment in character/nature and mechanism of wound, in character/nature of wound canal and break without X-ray examination. This research was deciding in differential diagnosis and gave the possibility to distinguish the ricocheting wound of outwardly similar ones to it blind and tangent.

5. By combination of special features/peculiarities, inherent simultaneously and to blind-end, and tangential wounds, that were

being expressed in noticeable descent in total number of infectious complications, in comparison with penetrating wcunds of another character/nature by predominance of abscesses of brain, encephalitic protrusions and liquorrhea.

6. By clinical picture, for which were characteristic usually average/mean severity of general condition of wounded, massive focus neurologic syndromes, in majority of cases stable.

Through - segmental wounds were related to the heaviest group of the penetrating wounds of skull and were characterized by the following clinical special features/peculiarities:

1. By presence two small of the wound apertures, situated on one or the other distance from each other on end points of chord, which determined the direction of wound canal in the area of skull, and isolated from each other by the outwardly not changed skin, but in the majority of the cases of that of considerably deformed (remaining swelling, caused by the bulging out outside bone scrap and substance of brain), moreover sometimes on extensive space was created the perception of bone crepitation, ballottement and dummy fluctuation.

2. By the fragmented character/nature of break of bones of skull, determined in X-ray photograph, by long wide cracks of bone,

by displacement of large/coarse bone fragments towards the outside from skull (elevated by bulging out outside edematic, necrotic masses of brain) and by absence in area of skull of foreign bodies.

In more rare cases the break had a character/nature of perforated through with the presence of two small defects in bone and connective crack between them. Similar breaks were escorted/tracked by the clinical picture, characteristic for the diametric wounds, described below.

3. By abundant outflow from wound apertures of semi-fluid cerebral detrite, mixed with blood and cerebro-spinal fluid, frequently this outflow converting/transferring into stable ventricular liquorrhea, that testified about extensive and deep decomposition of hemisphere of brain with damage of wall of lateral ventricle.

Page 349.

4. By rapid intracranial pressure increase as a result of hemorrhages, traumatic and inflammatory edema of brain and heavy wound infection.

5. By frequently observing development of heavy and diffuse pyonecrotic encephalitides and meningitides with extensive and stable protrusions, which were being complicated by ventricular fluid fistulas.

6. By heavy clinical picture of diffuse suppurative or putrefactive-toxic anaerobic process in brain, sometimes with overall septic phenomena, in presence of massive and stable focus symptoms, with expressed tunicary symptoms.

Through - diametric wounds were heaviest clinical form of the penetrating wounds of skull. They were characterized:

1. By two small, almost identical wound apertures at the

diametrically opposite points of the arch/summary of skull, which determined the direction of the long wound canal which crossed/intersected either one hemisphere of brain longitudinally or both - are transverse or slantwise (it is diagonal, axially).

2. By perforated through type of break with two small, almost identical apertures in bones of skulls, of which output there was usually somewhat more than intake (with wounds, plotted/applied from very close distances, these relationships/ratios were reverse/inverse); by external disposition of insignificant number of small/fine bone fragments in outlet, surrounded sometimes by thin small cracks; by presence in inlet of smallest bone fragments, arranged/located in insignificant quantity within skull, and also near bone defect, which had, as a rule, no bone cracks.

3. By integrity of bones of skull, arch/summary and basis, between two perforated apertures and absence according to data of roentgenological examination/inspection of metallic foreign bodies or bone fragments in wound canal.

4. By threatening acute/sharp hanger-on and hypertension phenomena, and in unit of cases by lethal direct damage to hanger-on unit of brain and its ventricles in basal- occipital direction of wound canal.

5. By insignificant quantity of discharge (blood, cerebrospinal fluid and cerebral detrite) from wound apertures into first hours after wound, its complete its cessation subsequently and by rapid education on surface of both wounds of other crusts.

6. By smaller tendency toward develcpment of suppurative processes, like encephalitides and abscesses cf brain, but to course of wound canal, by explicit predominance of acute meningitides and meningoencephalites.

7. By clinical picture of gravest injury of brain in initial period after wound, by massive general spinal clcumn and bulbar symptoms, prolonged and deep loss of consciousness and by stable mental violations, extremely scanty focus symptcmatology, by rarity of development of paralyses, aphasias and other functional violations from the side of large hemispheres.

Table 40 gives the statistical data of the maps/charts/cards of the deepened characteristic about the frequency of infectious complications and general/common/total outcomes with the penetrating wounds of skull depending on tne character/nature of wound.

Page 350.

Table 40 shows that a small number of infectious complications was observed with blind-end wounds (45.2o/o), great - with through ones - segmental wounds (50.8o/o). Rushes intc eyes the high frequency of meningitides and meningoencephalites with diametric (19.2-20.1o/o) and segmental (12.7-17.8o/o) wcunds, and also abscesses of brain with nonpenetrating (13.3o/o) and ricocheting (12.5o/o) wounds. Osteomyelitis of skull, as is evident, most frequently they were observed with tangential (2.8o/o) and segmental (2.2o/o), fluid fistulas with segmental (2.0o/o) and purulent fistulas - with the ricocneting (5.0o/o) and nonpenetrating (4.0o/o) wounds.

Table 41 shows that rarely the focus symptoms and functional disorders were observed with blind-end penetrating wounds (31.7o/o), and most frequently with through ones - segmental (63.3o/o). The penetrating wounds of remaining characters/natures in the frequency of the development of focus symptoms approached a lighter grcup of nonpenetrating wcunds.

Table 40. Frequency of infectious complications with different character/nature of the penetrating wound (in percentages).

(1) Инфекционные осложнения / (5) Характер ранения	(2) Всего осложнений	(3) Из них (6) менингит	(7) менингоэнцефалит	(8) абсцесс	(9) остеомиелит	(10) гнойные свищи	(11) гнойные свищи	(12) комбинации	(4) Не было осложнений
(13) Слепые	45,2	10,0	13,0	13,3	1,3	0,9	4,0	2,7	54,8
(14) Касательные и рикошетирующие	46,6	9,5	12,7	12,5	2,8	0,5	5,0	3,6	53,4
(15) Сквозные (16) Сегментарные	50,8	12,7	17,8	9,8	2,2	2,0	2,6	3,7	49,2
(17) Диаметральные	49,0	19,2	20,1	7,7	—	—	1,0	1,0	51,0
(18) Комбинации	40,5	24,4	7,4	4,7	—	—	2,0	2,0	59,5
(19) Итого	45,7	10,8	13,3	12,2	1,7	0,9	3,9	2,9	54,3

Key: (1). Infectious complications. (2). In all complications. (3). From them. (4). It was not complications. (5). Character/nature of wounds. (6). meningitis. (7). meningoencephalitis. (8). abscess. (9). osteomyelitis. (10). fluid fistula. (11). suppurative fistula. (12). combination. (13). Blind. (14). Tangents and ricocheting. (15). Through. (16). segmental (17). diametric. (18). Combinations. (19). Altogether.

Table 41. Functional outcomes depending on the character/nature of the penetrating wound (in percentages).

(1) Очаговые симптомы / (9) Характер ранения	(2) С очаговыми симптомами	(3) Из них: (4) двигательные расстройства	(5) нарушения психики	(6) расстройства речи	(7) комбинации двигательных, психических и речевых расстройств	(8) Без очаговых симптомов
(10) Слепые	31,7	21,2	2,2	2,2	6,1	68,3
(11) Касательные и рикошетирующие	36,4	26,5	2,0	1,9	6,0	63,6
(12) Сквозные: (13) сегментарные	63,3	40,0	7,9	3,0	12,4	36,7
(14) диаметральные	37,5	12,5	23,6	1,4	—	62,5
(15) Комбинации	34,4	28,1	6,3	—	—	65,6
(16) Итого	36,0	25,1	2,6	2,0	6,3	64,0

Key: (1). Focus symptoms. (2). From them. (3). With focus symptoms. (4). motor upset (5). violation of mind. (6). disorder of speech. (7). combination of motor, mental and vocal disorders. (8). Without focus symptoms. (9). Character/nature of wounds. (10). Blind. (11). Tangents and ricocheting. (12). Through. (13). segmental. (14). diametric. (15). Combinations. (16). Altogether.

Page 351.

Of the individual groups of symptoms attention is drawn to the high frequency of motor discrders with segmental ones (40.0o/o), also, into somewhat smaller degree with the tangential and ricocheting (26.5o/o) wounds. Rarely these disorders were noted with diametric wounds (12.5o/o). On the contrary, the violations of psychics/psyche

are especially frequent were frequent with diametric ones (23.6o/o), also, in smaller measure with segmental (7.9o/c) wounds.

General/common/total evaluation of each cf the enumerated above characters/natures of the penetrating wounds is most vividly illustrated by final outcome. Heaviest outccmes were with through ones - diametric, then with segmental ones and finally with blind-end wounds. Least heavy outccmes were with the tangential and ricocheting wounds.

Foreign bodies and infection. A question about the microbial contamination, introduced into the wound of skull by the wounding shells, should not be identified with a question about the microflora, connected with the presence in area of skull and in the brain of foreign bodies. Difference this has not only fundamental, but also purely bacteriological (difference in the quantitative and qualitative composition cf microbes) and clinical value. It cannot be forgotten that the bacterial contamination, introduced by the wounding shell, is inherent in all without exclusion bullet wounds of skull, and connected with the presence in brain of the foreign body - only blind penetrating, which in the Great Patriotic War comprised more than the half all penetrating wounds (52.5o/o).

According to data some fronts, with the blind-end penetrating

wounds of skull primary foreign bodies in brain were into 95.9o/o of cases the fragments of mines, artillery shells, hand grenades and aircraft bombs, into 0.9c/o - bullets rifle and automatic and into 0.6o/o - circular shrapnel bullets. Secondary shells, which break through the cranium and which wound brain, were as an exception the fragments of steel helmet - 2.6o/o. Bone fragments were detected in the area of skull in all cases as the permanent satellites of metallic foreign bodies.

Foreign bodies in brain were usually unit. The multiple wounds of skull with several independent inlets were observed rarely, altogether only into 2.4c/o of all cases of the perforated blind breaks, of them 1.8o/o composed dual ones against 0.6o/o triple wounds.

Were observed the cases of the penetration of several small/fine foreign bodies through one overall inlet. In 14.0o/o of cases is found two, while in 6.6o/o three and more than foreign bodies, moreover is very probable the possibility of the fragmentation of the fragment of shell at the moment of its penetration through bone into the area of skull. several small foreign bodies with one inlet is found in 7.0o/o of cases, moreover two fragments - into 3.4o/o, three fragments - into 1.2o/o, four fragments - into 1.1o/o, five fragments - into 0.5o/o and six fragments - into 0.6o/o of cases. With the

break of grenade at clcse distance in the brain of wounded it was as stuffed by numerous small/fine fragments.

The multiple foreign bodies of which each sometimes had its direction, created in brain not one, but several wound canals, which complicated the clinical picture of wound.

The disposition of foreign bodies in brain with blind-end wounds depended on the character/nature of the wound canal (see Fig. 4).

With the simple character/nature of wound canal (46.5o/o) the foreign body was arranged/located usually in the limits of one damaged portion of hemisphere and it is comparatively close to the wound defect of skull, on 3-4 cm it. Clinical picture with the simple character/nature of blind canal was in the majority of the cases simple, the mortal cases were observed nct frequently.

With radial character/nature of wound canal (32.5o/o) the foreign body was located much more deeply, at a distance of 7-8 cm from inlet. Piercing entire diameter of large hemisphere, foreign body frequently damaged lateral ventricle, jamming on the line of elastic sickle-shaped extension.

The latter into 68.9o/o of all cases of radiation wounds obstructed further route/path to foreign body, into 25.8o/o it proved to be pierced right through, also, into 5.6o/o, in the presence of two foreign bodies, large/coarser usually was passed through crescent-shaped extension, and small/finer remained. Lethality with radial character/nature of wound in comparison with lethality with blind-end wounds was somewhat above.

With blind-end segmental wound (16.3o/o) the foreign body was arranged/located usually deeply in the contradictory/opposite wall of cranial area at a distance not less than 6-7 cm, but frequently even 10-14 cm from inlet. Wound canal with this character/nature of wound pierced usually two, less frequent than three portions of one or both hemispheres of brain. In conformity with this the clinical picture of wound noticeably became complicated due to the whimsical combination of the individual syndromes, characteristic for each damaged portion of brain individually, and the general condition of wounded deteriorated as a result of the damage of lateral ventricle.

However, lethality with blind-end segmental wounds was below than with radial character/nature of wound.

The least frequent character/nature of blind-end wound - diametric (5.0o/o of all perforated blind breaks) - was at the same time most complicated and heaviest, since with it foreign body broke through to itself long route/path on one of the diameters of cranial area, damaging not less than three portions of brain and, as a rule, ventricles and even brain stem. Lethality with them was most high.

In connection with the presence of foreign body in the brain before the clinician appeared usually three basic questions, that required the practical permissicn: 1) which the role of foreign bodies in the development of wound infection and infectious complications; 2) which further fate of foreign bodies after the healing of wound (in the more distant periods) and how their effect on the development of late complications (late abscesses, meningitides, traumatic epilepsy, etc.); 3) which must be neurosurgeon's tactics in the relation tc foreign bcdies in different periods of coursing cf wcund.

In the beginning of war was already the established fact of the permanent bacterial contaminatica of foreign bodies in brain by pathogenic flora and was proved the identical nature of bacterial flora of wound and located in it foreign bodies and bone fragments. Observations showed that for the smooth healing of wound the metallic foreign bodies are less risky, than numerous bone fragments.

So, from a total number of abscesses of brain, discovered in wounded at Leningrad Front, only 10.3o/o developed in the region of localization of metallic fragments, while 77.0o/o of abcesses developed in the region of the disposition of bone fragments.

The explanation to this should be searched for under the more favorable conditions of a deep and narrow cut of the wound canal where usually jam metallic foreign bodies. A deep cut of wound canal is characterized by the smaller decomposition of the surrounding cerebral tissue, by a smaller quantity of necrotic elements/cells and by smaller contamination by its secondary shells and strongly infected random elements (beams of hair, scraps of the soft tissues of the integument of skull and head-gear, etc.), brought in into wound.

Thus, the comparatively favorable conditions in which is located in brain the majority of metallic foreign bodies, contribute so that the significant part of the foreign bodies, especially small/fine, already toward the end of a third-fourth week after wound proves to be the isolated/insulated and solidly encapsulated connective-glial capsule, which surrounds them together with latent pathogenic flora. With large/coarse foreign bodies with wide wound canal the process of

the encapsulation of foreign body is usually impeded by the heavy pyonecrotic encephalitis of the surrounding departments of brain and by festering wound canal.

Page 353.

Thus, the role of foreign bodies in the development of early infectious complications is comparatively small. However, in it is more late periods, especially after the final healing of wound, it immeasurably grows/rises. About this testifies a number of the authors, who connect with the presence in brain of foreign bodies the development of the late infectious complicatcns: appearance around the foreign bodies of granulcmas and development of rough collagenic connective tissue in cerebral scar.

In conclusion one should speak about the so-called transfers of foreign bodies in brain. It is possible to distinguish three types of the mechanism of transfer.

The first type was observed during the incidence/impingement of fragment, less frequent than the bullet, intc free area or liquid medium, cerebral ventricles, basal tanks, and also during the disposition of foreign body in wide wound canals, in the area of abscesses and cysts of brain. The transfer cf foreign body, sometimes

up to large distances, of one hemisphere into another was possible only under the condition for the open spacing of foreign body in the area when its sizes/dimensions were considerably less than the latter.

The second type of transfer consisted of the passive locomotion of metallic foreign bodies together with the surrounding sector of brain under the action on it of different pathological processes, developing in the neighborhood: the abscess of brain, encephalitic protrusion or progressively wrinkled, pulling to bone defect meningial scar. The displacement of foreign bodies in this case was usually insignificant. Their to reveal/detect it was possible only during the comparison of a series of the X-ray photographs, taken/removed within different periods.

The third type of transfer consisted in the very slow transfer of large/coarse foreign bodies, usually the bullets when, as a result of the constant pressure of these foreign bodies on the underlying tissues, appeared bedsores or softenings, and also when it was developed encephalitic process. These transfers in brain were usually small, frequently they were not noted and were detected when foreign body under the effect of random additional injury - the incidence/drop or the contusion - unexpectedly seemingly fell into the area of cerebral ventricle or into basal tank. If this case did

not conclude with surprise death of wounded, then bullet could rapidly be moved up to very considerable distances in the area of skull and even spinal canal. This type of the migration of bullets, kncwn already to N. I. Pirogov, was studied and described by a number of the Soviet authors in the Great Patrictic War.

Special features/peculiarities of coursing of wound process connection with localization of wound. Of lccalizations of wound, as is known, belonged the tasic and leading role in neurologic symptomatology and clinic of the bullet wounds cf brain.

All penetrating wcunds of skull can be divided into three basic groups, depending on lccalization cf wound and severity of the appearing with it functional violations.

First group - lethal wcunds - result of the incompatible with life decomposition of brain (damage of brain stem, ventricles, paraventricular region).

Page 354.

The second group - paralytic - during the damages of those departments of large hemispheres and cerebellum, where are concentrated important in functional sense centers and guides

(sensomotor, , visual, mental, etc.).

Third group - asymptomatic (in relative sense of word) - with the wounds of the so-called silent regions of large hemispheres, not directly connected with important for a life and functions nerve mechanisms.

In accordance with this all bullet wounds of brain can be divided in terms of damage level into following five groups 1) the wound of large hemispheres - cortex and subcortical layer on individual portions with their combinations, 2) the wound of deep departments of large hemispheres with the damage of cerebral ventricles and paraventricular [Russ. word illegible] (subcortical ganglia/nodes), 3) the wound of the basis of brain (basal and parabasal), 4) the wound of cerebellum or by posterior cranial and 5) the wound of brain stem.

Each of the enumerated five basic groups in turn, they can be subdivided into the individual focus symptom complexes, studied and widely illuminated in specialized literature in the year of the Great Patriotic War and in postwar period.

The focus syndromes of fallout or stimulation of the corresponding sector of brain sometimes were interwoven between

themselves or camouflaged each other. The latter especially frequently was observed in initial the period, wounds when among heavy general cerebral symptoms (loss of consciousness, deep disorder of breathing, cardiovascular activity, etc.) without leaving a trace sunk or temporarily disappeared the numerous [Russ. world obliterated] symptoms, gradually off-set (as if ripening) only in proportion to the output/yield of wounded from heavy condition - wounds of stroke and shock. With the wounds of average/mean severity focus to symptoms protruded considerably more pronounced.

1. Wounds of large hemispheres - cortex and subcortex. The wounds of the frontal portions of brain or similar/analogous regions of skull were characterized from neurologic side by the poverty/scarcity of symptoms with comparative brightness of mental violations. The region of wound was located in neighborhood with additional sinuses/antrums but orbit, by very unfavorable ones in the sense of the development of infection. Prolonged disorders usually were not expressed, with exception of pronounced central paresis of the lower branch of face nerve [Russ. word illeg.] of pyramidal signs in the form of reflector asymmetry and symptom of Babinskiy. Sensitive disorders also it was not noted. Wound 1 of frontal portion, especially in area of localization of vocal center Broca was escorted/tracked in the majority of the cases by engine aphasia which usually achieved sharp degree only in the early periods of wound.

With wounds by small/fine fragments the vocal disorders usually disappeared rapidly.

Psychic disorders, with the wounds of basal cortex were especially characterized by sharp psycho-motor excitation, tangled nature of consciousness, by absence of critical relation to those surrounding and to his condition, by euphoria, by loss of a feeling of diffidence, untidyness of that reaching sometimes coporophagy and, etc.

Page 355.

The wounds of the premotor zone of frontal cortex it is escorted/tracked by the development of the syndrome, which was being expressed in the disorder of the highest automatisms and complicated dynamic coordinations with the loss of the highest motor skills and the appearance of elementary ones of the type of forcible envelopment and inertness with the changeovers, which reached in the most explicit cases the syndrome of the inertness of mental processes.

The wounds of central windings or sincipital region of skull were characterized by the expressed sensomotor disorders. With the blind-end fragmentation wounds of this region with the small zone of the decomposition of brain most frequently attacked/advanced

isolated/insulated paralyses of one, less frequent than two extremities; paralyses comparatively rapidly converted/transferred into monoparesis. with tangential wounds and especially through segmental ones with the decomposition of cortex and subcortex (moreover decomposition these limber was extensive) paralyses, as a rule, bore deeper from stable character/nature. The surface stimulation of cortex, by predominantly bone scrap and by developing edema of brain, was escorted/tracked sometimes by the fits of spasms according to type Jackson epilepsy - the engine less frequently less frequent than sensory or mixed character/nature. Together with motor disorders attacked/advanced, as a rule, loss of deep forms/species of sensitivity, usually in the extremital departments of the afflicted extremity, and also very sharp disorders of the surface sensitivity of skin. To them frequently were connected subjective perceptions in the form of a feeling of numbness or pain, in certain cases to burning, reminding causalgia. Rarely was observed the syndrome of sincipital mound, which was being expressed in the blurred violation of the sensitivity of hand and partly forearm.

The wounds of the sincipital region which were characterized by the great variety completely still studied symptomatology, they were characterized also by the violation of deep and surface sensitivity and by the series/row of others, more complicated dissociation.

The wounds of the temporal portions of brain and regions of the skulls which still recently were characterized by sensory and amnestic type only some vocal disorders and that only with left-side localization of damage/defeat, they were escorted/tracked by the series/row of new syndromes. To this to a considerable extent contributed presence in the temporal portion of a large quantity of crust centers and sensory guides - auditory, gustatory, olfactory and visual. Without giving, as a rule, the distinct fallouts of the enumerated means of sensitivity (with exception of a temporary/time decrease in the rumor, vertigoes and rarely short-term hemianopsia) wound of temporal portion in certain cases they were escorted/tracked by the onset of complicated psychotic syndromes, complicated hallucinations and illusions. Sometimes this clinical picture became complicated by symptoms from the side of lower sincipital and postcranial portion with characteristic for them gnostic and mnestic disorders. Motor disorders with the shallow wounds of temporal portion, as a rule, were not expressed and they were limited to usually only reflector asymmetry. During deeper and more massive damages frequently began to manifest itself the neighborhood of brain stem - the pedicle of brain, which reacted to edema, compression and displacement of the barrel of brain by more massive pyramidal disorders and paresis of oculomotor nerve. Sensitive disorders for the isolated/insulated wounds of temporal portions are not characteristic. The wounds of temporal regions in basal departments

were frequently escorted/tracked by damage to tunicary artery and break of pyramid or mastcid extension with the damage of middle and inner ear. In these cases clinical picture became complicated, process proceeded more heavily.

Page 356.

The wounds of postcranial portions were characterized by the frequency of visual viclations or according to the type of focus fallouts (hemianoptic cr quadrant), or by general/common/total blindness which kept several days and was relieved by a usually uniform descent in the view surrounding of wounded was represented as in fog/mist. the hemianoptic discrders of view during more massive damages/defeats differed by regicn of larger staying power/persistency they often remained to for very prolonged period. Wounds by the small/fine fragments of postcranial portion they were usually escorted/tracked by the temporary/time focus fallouts of view and by primitive visual hallucinations in blind hemianoptic field.

Besides the enumerated above clinical syndromes, inherent in [Russ. word illeg.] forms of the bullet wounds of the individual regions of skull portion of which it is necessary 61.7o/o of all penetrating wounds of skull the significant part of wounds (38.3o/o) was necessary in the portion of different combinations of the damages

of adjacent ones and, it is less frequent, removed from each other regions. In conformity with this became complicated clinical picture. The symptoms diverse and whimsical variegated. Special attention deserve the heavy combined frontal-temporal

wounds of the left hemisphere with which in wounded on long period period sets in complete aphasia and agraphia.

The syndromes of the stimulation of cerebral cortex were observed [ILLEGIBLE IN ORIGINAL DOCUMENT] less frequent they were expressed in the picture of convulsive fits of the type [ILLEGIBLE IN ORIGINAL DOCUMENT] epilepsy, that appeared sometimes in the early period [ILLEGIBLE IN ORIGINAL DOCUMENT] and differing from traumatic epilepsy in terms of chance, [ILLEGIBLE IN ORIGINAL DOCUMENT] by character/nature and absence of the specific rhythm. These early [ILLEGIBLE IN ORIGINAL DOCUMENT] fits, according to the data of the maps/charts/cards of the deepened characteristic, [ILLEGIBLE IN ORIGINAL DOCUMENT] 2.6c/c of wounded have with the penetrating wounds of skull. The most frequent reasons for such fits were the early infection complications - acute purulent menirgitis, meningoencephalitis. [ILLEGIBLE IN ORIGINAL DOCUMENT] the early abscesses of brain, acute/sharp post-operation and, less frequent, posttrauma [ILLEGIBLE IN ORIGINAL DOCUMENT] edemas of brain and forming fresh tunicary-cerebral [ILLEGIBLE IN ORIGINAL DOCUMENT]

2. Wounds of deep departments of large [ILLEGIBLE IN ORIGINAL DOCUMENT] ventricles of brain it is paraventricular [ILLEGIBLE IN ORIGINAL DOCUMENT] departments. The wounds of deep departments of large hemispheres [ILLEGIBLE IN ORIGINAL DOCUMENT] ,as a rule, by heavier clinical picture, in [ILLEGIBLE IN ORIGINAL DOCUMENT] crust or focus symptomatology was strongly choked massive conductive symptoms of supercapsular and capsular passage, with the larger or smaller admixture/impurity of the extrapyramidal, [ILLEGIBLE IN ORIGINAL DOCUMENT] pallidary and thalamic symptoms, going from the side it was subcortical ganglia/nodes. The very aggravating factor of this group of the heavy ones [ILLEGIBLE IN ORIGINAL DOCUMENT] was the damage of cerebral ventricles from they were vital [ILLEGIBLE IN ORIGINAL DOCUMENT]

by paraventricular education and by centers vegetative nature.

The true frequency of the bullet wounds of lateral ones and the third cerebral of ventricle is unknown. Existing statistical data [ILLEGIBLE IN ORIGINAL DOCUMENT] they cannot repel it. Representation about the fact that [ILLEGIBLE IN ORIGINAL DOCUMENT] the wound of cerebral ventricles mortally, is erroneous. [ILLEGIBLE IN ORIGINAL DOCUMENT] are risky only those wounds of the ventricles, with which

there were [ILLEGIBLE IN ORIGINAL DOCUMENT] the hemorrhages into the area of ventricles with development so [ILLEGIBLE IN ORIGINAL DOCUMENT] their tampcnades or during the massive damage of the walls of ventricles and [ILLEGIBLE IN ORIGINAL DOCUMENT] the ventricular departments of brain, ccntaining the most important centers and [ILLEGIBLE IN ORIGINAL DOCUMENT] the peaks of brain.

Page 357.

Parasagittal wounds. The need for the liberation/excretion of these wounds from total group was dictated by the peculiar character/nature of the heavy clinical symptcm complex, which appeared as a result of the wounds of skull along the average, sagittal, line and the adjacent parasagittaldepartments with the associated usually damage of upper longitudinal sinus.

Parasagittal wounds on the whole were cbserved into 5.6c/o of cases (sagittal in the narrow sense word - into 1.0o/o and parasagittal - into 4.6c/o of cases).

With parasagittal wcunds noticeably predcminated the tangential and ricocheting mechanisms of wcund with the crushed and radial hole type of breaks.

Roentgenological picture with the ricocheting penetrating wounds of parasagittal region was typical and it was characterized by the

presence of the perforated break in area of the center line of the skull from which down, in vertical direction, along crescent-shaped extension and along one side from it - parasagitally was headed in the form of chain/network many small/fine bone fragments, which penetrated along the medial surface of cortex and subcortex at the depth of 5-7 cm, frequently to the level of calloused body. Foreign bodies in the area of skull with this mechanism of wound it was not detected.

Peculiar localization of sagittal and parasagittal wounds predetermined their usually clinical picture. With purely sagittal wound clinical picture was characterized by the poverty/scarcity of general cerebral and focus symptoms, since in essence was damaged only upper longitudinal sinus with crescent-shaped extension. The large hemispheres of brain in this case suffered insignificantly.

With parasagittal localization of the wound when bone defect was located directly in center line with one or from both sides, were destroyed the medial departments of cortex and subcortex of one or both hemispheres.

Gaps in the place of inflow into the sinus of the large/coarse surface veins (lacunas) of brain, in view of low blood pressure and tendency toward rapid thrombosis, were not usually escorted/tracked

by hemorrhage. However, the wcunds of front/leading cerebral artery, on the contrary, led tc lethal intracranial hemorrhage. parasagittal hematomas, predominantly extradural, were observed into 20o/o of all parasagittal wounds. In the first place in frequency stood parasagittal wounds of sincipital region, on the second - frontal and on the third - postcranial.

The clinical picture parasagittal wcunds of sincipital region was characterized by the typical mctor disorders which were cbserved into 73.3o/o of all cases of parasagittal wcunds. One-sided motor disorders in the form cf spastic hemiparesis with the distinct predominance of disorders in the extremital departments of lcwer extremity were observed into 45.7o/o, and bilateral in the form spastic paraparesis, and, somewhat less frequent, tri- and tetraparesis with permanent paralysis stop, that resembled spinal wounds, into 26.7o/o of cases (O. V. Domogarova). To this rarely was mixed/added aphasia, discrders cf sensitivity in lower extremity, and also disorders (into 8.Cc/o of cases) of urine (irretention and, less frequent, the delay of urine) during the bilateral damage/defeat of paracentral lobule with its crust centers of pelvic organs/controls. Sometimes were observed Jackson type convulsive fits which were developed after three-fcur [ILLEGIBLE IN ORIGINAL DOCUMENT] wound and began usually with lower extremity.

With tendency toward the rapid disappearance of aphasia they are motor [ILLEGIBLE IN ORIGINAL DOCUMENT] discrders in upper ones and even in the proximal departments lower ones [ILLEGIBLE IN ORIGINAL DOCUMENT] extremetis paralytic discrders in feet usually proved to be very stable.

The clinical picture of parasagittal wcunds by frontal region [ILLEGIBLE IN ORIGINAL DOCUMENT] it was characterized by the relative poverty/scarcity of focus symptoms, [ILLEGIBLE IN ORIGINAL DOCUMENT] rarely in short-term aphasia and only during massive [ILLEGIBLE IN ORIGINAL DOCUMENT] damage/defeat - in deep mental disorders, the character/nature usually for the wcunds of the basal cortex cf frcntal portions. Sometimes [ILLEGIBLE IN ORIGINAL DOCUMENT] whether frontal sinuses, which ccmplicated these wounds, it made with their more [ILLEGIBLE IN ORIGINAL DOCUMENT].

The clinical picture of the parasagittal wounds cf postcranial ones to the portion [ILLEGIBLE IN ORIGINAL DCCUMENT] was characterized, as a rule, extremely stable hemianopsia. During [ILLEGIBLE IN ORIGINAL DOCUMENT] damage cf upper longitudinal sinus in this region the wounded usually perished.

Parasaggital wounds are related to the group of heavy ones, distinguished by comparatively high lethality. Basic reasons for

death was seriousness of wound (mainly through - of segmental, with the considerable decomposition cerebral substance in one or two hemispheres), and also infectious complications (meningitis and encephalitis).

Thus, the clinical picture of deep wounds of large hemispheres was characterized by the more or less massive phenomena of the fallout of subcortical conductor systems and motor and sensitive type assemblies. Sometimes in this case were noted the expressed diencephalic, extrapyramidal, truncal and vegetative symptoms in the form of the sharp disorder of consciousness and psychics/psyche, aseptic cerebral hyperthermia, disorder of water metabolism/exchange, polydipsia, bulimia, etc. Crust symptoms were weakly expressed, but sometimes and completely they were not determined.

3. Wounds of basis of brain and of skull give peculiar and complicated picture.

The special feature/peculiarity of these wounds consisted in the damage of skull on the boundary between its cerebral unit, on one hand, and front, spine and by neck - on the other hand. Because of this basal and parabasal wounds in the majority of the cases were combined with the damage of orbit and eye, nose and its additional sinuses/antrums, ear and mastoid extension. This fact complicated the

clinical picture of wound. Diagnosis, coursing and prognosis and, furthermore, was placed a tunicary-cerebral wcund under the permanent threat of secondary infection from the side of the sinuses of nose and ear. Such wounded required the composite treatment of neurosurgeon, ophthallmologist, otorhinolaryngolcgist and stomatologist.

Special description of the wounds of skull, combined with the wounds of nose, ear and their sinuses, is given below. Here should be been restricted cnly indication of some general/common/total and most essential clinical special features/peculiarities of the neurclogic picture, connected with the wound of the basis cf brain with the combined wcunds of skull, eye and ear.

The combined wounds of skull and eye were observed, as a rule, with frontal-temporal-crbital wounds, which were being escorted/tracked by the break of the basis cf front/leading, rarely also average/mean cranial pit.

Page 359.

For frontal-temporal-orbital wounds of skull was characteristic the heaviest character/nature of wounds by through - segmental, which was being encountered into 38.8o/o of cases (i.e. 3-4 times more frequent than the ordinary). Through - the segmental character/nature of wounds from fracture of the basis of front/leading cranial pit was encountered into 74.5o/o of these wounds and with the implication of paranasal sinuses - in 74.0o/o. The wounds of the walls of orbit, as a rule, were escorted/tracked by crushing, by gap, contusion or by dislocation of one, less frequent than both eyeballs, what into 61.8o/o of cases led to blindness on one eye and into 10.0o/o of cases - on both eyes. With these wounds very frequently (12.7o/o of cases) it was noted sub-arachnoidal liquirrhea, pyonecrotic encephalitides with protrusions and especially purulent meningitides of rhinogenic origin (19.2o/o). Were frequent lethal outcomes. Comparatively rarely were observed the abscesses of brain.

Neurologic picture with these wounds was usually lean, then the mental symptomatology, connected with the persanent and massive

damages of basal cortex of one, and frequently also both frontal portions, was pronounced and characteristic. With the combined wounds of ear, temporal portions and cerebellum neurclogic symptomatology was also well-off. Exception were the wounds of the left temporal portion, for which usually in acute/sharp period the picture of sensory and amnestic aphasia was revealed/detected sharply. Epileptic fits with characteristic for temporal portions sensitive aura (olfactory, gustatory, visual), just as the expressed cerebellar symptoms, in the uncomplicated cases were enccuntered usually rarely, even in initial period the wounds. Then they were characteristic for the early and late complications of these wounds, especially for the abscesses of brain and Rubtsovs of changes in brain.

To a number of characteristic clinical symptoms of the wounds of the basis of skull and brain must be referred the observed sometimes multiple wounds of craniocerebral nerves both in the area of skull and out of it, on what indicated the typical syndromes, well known on the diseases of peacetime. Here are related the observed syndromes of the intracranial damage of the external wall of cavernous sinus/antrum with one-sided paralysis III, IV and of I branch V of the cranial nerve; the extra-cranial damage of latter/last four nerves - IX, X, XI and XII after their output/yield from foramen jugularae; complicated combination of both the syndromes indicated with the one-sided damage/defeat VII-VIII of cranial nerve (III, IV,

V and VI nerve within skull and VII, IX, X, XI and XII out of skull), etc. The correct identification and of these neurological syndromes are possible only with the aid of x-ray examination.

4. Wounds of posterior cranial pit and cerebellum composed even heavier group of penetrating wounds of skull.

According to the data of A. A. Shlykov (specialized KhPPG of armies and front), who represented the statistical data of the wounds of suboccipital region (penetrating and nonpenetrating) with the injury of cerebellum, these wounds were from 1.2 to 1.4%.

The severity of the penetrating wounds of the posterior cranial pit, with which especially many wounded perished on the field of battle and in the forecast stages of evacuation, was determined by the damage of brain stem, i.e., the medulla oblongata, pons varolii, and also the fourth ventricle with diamond-shaped pit, containing in themselves, besides the nuclei of eight pairs of craniocerebral nerves (V-XII), including bulbar (IX, X, XI and XII), also vital vegetative centers (respiratory/breathing, emetic, vasomotor, etc.).

Page 360.

The severity of these wounds was caused also on presence in the

posterior cranial pit of the largest basal liquor cisterns (Galenus's large cistern, bridge cistern, etc.), that are basic liquor main lines on the lines of communication of sub-arachnoidal space of brain with back, and, furthermore, by the presence here of a considerable number of blood vessels, venous sinuses (transverse, sigmoid, postcranial, straight line and circular) they were large/coarse the spinal arteries, flowing together in a basilaris and giving beginning to the numerous small/fine branches, supplying with the blood cerebellum, medulla oblongata and pons varolii. However, by this is explained the high frequency of different complications in the form of abundant liquorrhea, heavy basilar meningitides, and also lethal hemorrhages into posterior cranial pit, into the area of the fourth ventricle and substance of cerebellum with tamponade and compression of the medulla oblongata and bottom of fourth ventricle.

Together with the wound of vessels, was observed also the development of acute traumatic edema of the cerebellum which rapidly converted/transferred to the medulla oblongata and was caused the displacement of the barrel of brain with its jamming in large foramen.

The clinical picture of the bullet penetrating wounds of postcranial pit was complicated frequently by the break of the pyramid and mastoid extension, separating/liberating average/mean

cranial pit from posterior, with an injury of the prisoners in them of internal and middle ear. Finally, the presence of thin tunicary diaphragm in the form of cerebellar coat, which separates/liberates the postcranial portions or large hemispheres from the subjects of hemispheres and worm of cerebellum, facilitated conditions for combined wounds of the adjacent departments of brain.

The physiological value of cerebellum as the organ/control, which knows by the special functions of the regulation of muscular tone, the motor coordinations of the equilibrium of body, etc., determined in essence the symptomatology, having appeared with its wound.

Wounds these were characterized in the majority of the cases the instability of the cerebellar symptoms, which rapidly decreased. The reason for this was besides the already noted above general/common/total favorable tendency toward the reverse development of focus symptoms with bullet wounds by cerebro ones generally and tendency toward the vicarious substitution of the disrupted functions of cerebellum due to large hemispheres in particular, also the fact that the immediate vicinity of the medulla oblongata and bottom of the fourth ventricle excluded the possibility of the massive damages of cerebellum. Therefore noted in some wounded of this group massive functional violations in the form of cerebellar

ataxia of the unsteadiness of gait and nystagmus were explained most frequently not by the severity of wound, but by appeared later infectious complications, having caused such deeper decomposition of cerebellum, than auto/self-wound.

So, according to Ye. I. Stroganova's data (front line specialized evacuation hospital), of 37 wounded with the penetrating wounds of posterior cranial pit and cerebellum died 8. From them only in 2 cases death was caused directly by the severity of decomposition. The others of 6 wounded died of infectious complications (2 cases of meningitis and 4 cases of the abscess of brain). To the dependence of cerebellar symptoms on infectious complications indicates this fact: in 6 wounded, whose wound of cerebellum was not complicated by infection, cerebellar symptoms proved to be such insignificant that all these wounded recovered.

Page 361.

In 23 wounded, evacuated into the rear, the expressed cerebellar symptoms depended in essence on severe infectious complications (meningitis in 4 cases and encephalitis in 6 cases). Remaining massive symptoms in the form of hemianopsia, hemihypesthesia and hemipareses depended on the combined wounds of cerebellum with postcranial and in one case with the sincipital portion of brain.

5. Wounds of brain stem are related to number of heaviest wounds of brain. The reason for this is not only the direct injury of barrel itself or nearest periaxial departments of brain, but also the unavoidably connected with it hemorrhages, circulatory disorders and acute traumatic edema of brain stem, in particular, the medulla oblongata, which entailed the rapidly progressive compression, suppression and paralysis of vital bulbar centers with unavoidable fatal result.

The damage of different departments of brain stem was escorted/tracked usually by the onset of alternating paralyses from the side of the pedicle of brain and pons varolii or bulbar symptoms from the side of the medulla oblongata. However, these isolated/insulated syndromes of the damage/defeat of different floors of brain stem were observed usually only in the late periods of the bullet wound of brain. For early not periods characteristic were the not isolated/insulated individual symptom complexes, but the heavy general/common/total reaction of suppression and disorder of the functions of entire brain stem.

The clinical picture of the acute damage/defeat of brain stem was expressed, first of all, in a deep loss of consciousness (to the

condition of sopor or coma with the loss of almost all forms/species of reaction and reflexes). At the same time, as a rule, were observed deep disorders of respiration and ingestion with continuous vomiting and heavy violation of cardiovascular activity - bradycardia with arrhythmia of the very stressed pulse or with filamentous pulse. Pupils were sharply expanded, uniform, they did not react to light/world. With periaxial foci - deep wound of temporal portion or isolated/insulated damage/defeat of one pedicle of brain - more characteristic was the sharp one-sided expansion of pupil. At the same time, were noted bilateral ptosis, vertical paresis of look and loss of the automatic synchronous rolling of the eyeballs with ankyloblepharon. With the loss of tendinous and skin reflexes, as a rule, appeared bilateral symptom of Babinski and paralysis of sphincters.

One of the characteristic symptoms of deep damage/defeat of brain stem was the offensive of the decerebration rigidity of the musculature of extremities and body with the advent of postural reflexes. Finally, sometimes were observed the general/common/total disorderly spasms of muscles and the hyperthermy, which achieved by 39-40° is above.

Were distinguished three characteristic clinical forms of hanger-on symptom complex.

With the first - the wound of brain stem was escorted/tracked, as a rule, by direct rapid, sometimes lightning ones, by the development of the generalized hanger-on syndrome, whereas that in the overwhelming majority of cases led to the immediate death of wounded on the field of battle in the first minutes, less frequent hours, after wound.

Page 362.

With the second - the compression of brain stem by the growing intracranial hemorrhage was characterized depending on the source of hemorrhage or by the absence of the bright gap/interval between the moments/torques of wound and development of hanger-on syndrome (wound of large vessel), or its presence (damage of veins, sinus), moreover this gap/interval was calculated usually by hours, less frequent by days.

Finally, with the third, when occurred edema of brain stem, hanger-on syndrome was most frequently developed slowly, after bright gap/interval, calculated by one-two days and more after wound.

In the etiology of hanger-on syndrome took very active part also

different inflammatory and infectious processes (meningitis and abscess of brain), which caused compression, insertion and edema of brain stem, dynamics of which affected the virulence and the toxicity of infection, localization of inflammatory focus and degree of its dissemination to brain stem.

The fate of this category of wounded frequently depended on the timely identification and correct nature of long standing waves of character/nature and nature of the developing hanger-on syndrome, and also on special surgical intervention from urgent vital readings.

Combined wounds. Examples of the combined wounds of skull are: frontal-temporal-orbital wounds (6.0o/o), slct- frontal wounds (2.7o/o), combined wounds of skull and ear (0.8o/o). There are also numerous combined wounds of cerebral skull with face, in particular, with upper jaw and maxillary sinus, with neck and spine and finally with other regions of body - by upper extremities, chest and even by ventral area.

Statistical data in the following form reflect the combinations of the wounds of the skull and other regions: combination with upper extremities - 6.8o/o, lower - 6.1o/o, by body - 2.9o/o, by face and by eye - 4.2o/o, by neck - 0.7o/o; other combinations - 10.9o/o. Altogether 31.6o/o.

The combined wounds of the skull and other adjacent and more distant regions considerably complicated the clinical picture of the basic wound of skull, its coursing, made prognosis and outcome worse. The presence of such wounds made it necessary to take serious organizational measures - it was required to ensure the correct classification combined of those wounded in skull and their direction into the specialized therapeutic agencies in accordance with the basic profile/specialty of wound.

Combined wounds of skull, ear and paranasal sinuses.

COMBINED WOUNDS OF SKULL AND ADDITIONAL SINUSES/ANTRUMS OF NOSE.

The question about the combined bullet wounds of skull and additional sinuses/antrums of nose, until now, it is devoted comparatively a little research.

In leadership/manual on otolaryngology and neurosurgery of chapter about the damages of paranasal sinuses with the bullet wounds of skull either completely no or, at best, it is short and it by no means exhausts a question.

Some authors attempt to explain this by the fact that the wounded with the combined bullet wounds of skull and paranasal sinuses due to the severity of wound did not reach the hospital bases, and therefore such wounds were not considered.

Page 363.

O. M. Khol'bek on the material of Russo-Japanese war in 435 cases of bullet wounds of skull observed only the 5 cases of the damages of frontal sinuses.

"The wounds of frontal sinuses, he wrote in 1916 A. L. Ivanovs, it is necessary to observe rarely in all probability because these wounds unavoidably entail damage to cranial area and rapid death". I. I. Baryshnikov, analyzing the materials of war 1914-1918, wrote that the combined wounds of skull and upper paranasal sinuses "are usually blackened with smoke by death even in the field of battle".

The analysis of the material of Leningrad Front, given below, shows that with the bullet penetrating wounds of skull the paranasal sinuses are damaged into 6.0o/o of cases (of them into 4.3o/o - frontal sinuses, into 1.3o/o - latticed labyrinth and into 0.4o/o - basic sinus/antrum). This is completely retrograde, if we consider their anatomical-topographical special features/peculiarities.

Frontal sinuses, as is known, they are arranged/located in the most projecting department of front-lower part of the frontal bone, and their rear-upper wall forms the unit of the forwardmost department of the basis of skull (front/leading cranial pit) (Table 42).

However, basic sinus/antrum is arranged/located deeply and is located near the vital departments of brain stem, in consequence of which its wound is related to a number of risky ones, wounded usually perish on the field of battle or in the foremost stages of evacuation. Latticed labyrinth is maxillary sinus/antrum they are damaged mainly with the wounds of face skull.

The penetrating wounds of skull with the damage of frontal sinuses are among very heavy wounds of wartime, which threaten life. Anatomical-physiological special features/peculiarities of building/structure of frontal sinuses and their connection/communication with the nasal cavity cause the peculiarities of clinical coursing and the frequency of infectious complications.

If in the pathogenesis of the early complications of the bullet wounds of skull plays role mainly primary infection, then with the combined penetrating wounds of skull and frontal sinuses frequently occurs the secondary infection of contents of skull from the cavity

of the nose (rhinogenic infection).

Symptomatology and diagnosis.

Table 42.

(1) Характер ранений черепа	(2) По виду ранящего оружия		(3) По характеру ранения			(4) По локализации ранения		
	(5) осколок	(6) пуля	(7) слепое	(8) касательное	(9) сквозное (сегментарное)	(10) правой лобной пазухи	(11) левой лобной пазухи	(12) обе пазухи
(13) Комбинированные проникающие ранения черепа и придаточных пазух носа (в %) ...	79,2	20,8	53,1	33,8	13,1	21,4	30,3	48,3

Key: (1). Character/nature of wounds of skull. (2). According to type of wounding weaponry. (3). According to character/nature of wound. (4). On localization of wound. (5). fragment. (6). bullet. (7). blind. (8). tangent. (9). through (segmental). (10). right frontal sinus/antrum. (11). left frontal sinus/antrum. (12). both sinuses/antrums. (13). Combined penetrating wounds of skull and additional sinuses/antrums pose (in o/o) ....

Page 364.

Besides the symptoms, which characterize the damage of the integrity of the front/leading wall of frontal sinus and detected with the examination/inspection of wound, are very essential for a diagnosis of rhinological and neurologic symptoms, there are cases of damaging

the frontal sinus with retention/preservation/maintaining and its front/leading walls.

Furthermore, depending on the form/species of the wounding weaponry, character of wound, impact force, its direction and distances, external form [ILLEGIBLE IN ORIGINAL] does not reflect the true picture of the depth of damage. With [ILLEGIBLE IN ORIGINAL] can be observed extensive and heavy damages and [ILLEGIBLE IN ORIGINAL] why for the diagnosis of the visual examination of the wound far not [ILLEGIBLE IN ORIGINAL] Upon rhinological examination/inspection is detected usually [ILLEGIBLE IN ORIGINAL] the discharge from nose, sometimes with the admixture/impurity of tissue fluid/liquid. [ILLEGIBLE IN ORIGINAL] is detected extremely rarely, even in cases when in wound and [ILLEGIBLE IN ORIGINAL] which, apparently is explained by the disengagement of sinus/antrum with nose, [ILLEGIBLE IN ORIGINAL] as a result of the bloating of muccus membrane as in [ILLEGIBLE IN ORIGINAL] and in frontal-nasal canal.

On this reason extremely rarely (into 1.0o/o of cases of given [ILLEGIBLE IN ORIGINAL] of wounds) is detected the outflow of the cerebrospinal fluid through the nose.

Therefore rhinoscopy frequently does not make it possible to recognize [ILLEGIBLE IN ORIGINAL] since obtained with it data are

reduced primarily to the swelling of the muccus membrane of nose, predominantly in [ILLEGIBLE IN ORIGINAL] courses, and therefore by themselves do not give sufficient [ILLEGIBLE IN ORIGINAL] for a diagnosis.

Neurologic symptomatology is composed of common brain and local symptoms. However, they are not [ILLEGIBLE IN ORIGINAL] only for these wounds and therefore separately undertaken also cannot serve as basis for a diagnosis. Valuable and in majority convincing diagnostic method is the X-ray analysis of a frontal-orbital section of skull in two projections - photograph of the frontal sinuses, bottom of [ILLEGIBLE IN ORIGINAL] cranial pit and strictly lateral X-ray photograph, [ILLEGIBLE IN ORIGINAL] tube. By this is established the degree of damage [ILLEGIBLE IN ORIGINAL] of sinuses/antrums, the character/nature of wound - nonpenetrating or penetrating - and location of bone scrap and foreign bodies.

Thus, only composite examination/inspection, [ILLEGIBLE IN ORIGINAL] anamnesis with the instructions of neuro-surgical, neurologic rhinological examination/inspection and confirmed by the data of roentgenological research employing the previously procedure indicated, can give evaluation for a diagnosis.

Treatment. The principles of the specialized treatment,

receiving wide acceptance in the period of the Great Patriotic War, [ILLEGIBLE IN ORIGINAL] considerable role and in the correct treatment of the wounds of the additional diagnosis. The creation of the individual companies medical reinforcing (OBMU) aided in the correct organization of therapeutic process on all [ILLEGIBLE IN ORIGINAL] and provided the timely and qualified aid to wound.

The treatment of the bullet penetrating wounds of skull and [ILLEGIBLE IN ORIGINAL] sinus in foremost stages was into 67.0o/o of cases symptomatic; in 16.0o/o of cases they were carried out antishock measures, in [ILLEGIBLE IN ORIGINAL] cases were limited to dress/lavatory and dressing the wounds, into 22.2o/o of cases - by the primary perfecting of wound. Thus, critical measures of line-of-communication treatment (antishock measures, dress/lavatory of wound and symptomatic treatment) and qualified classification of wounded were conducted already in the foremost stages of evacuation.

Page 365.

Provision of the earliest possible evacuation of wounded into specialized hospital - one of the most important factors of the line-of-communication of the years of wounded with the damages of skull and paranasal sinuses. On the periods of entrance into the specialized hospital these wounded were distributed: in the first

twenty-four hours entered 4.2o/c, on 2-3rd day - 35.9o/o, on 4-5th day - 20.9o/o, on the 6th day - 4.7o/o, later than 6 days - 30.3o/o. The period of entrance 4.0o/o of wounded is nct known. Consequently, bulk of wounded entered in time, most favorable for primary surgical perfecting wounds.

After entrance into the specialized hospital condition 18.7o/o of wounded was satisfactory, 35.8o/o of wounded entered in the condition of average/mean severity and 45.5o/o - in heavy condition.

Primary surgical aid with the drooping bullet wounds of skull and frontal sinuses is related to a number of critical surgical interventions, which require special neuro-surgical and rhinological knowledge and skill. In the best way therefore this process/operation can be carried out in the specialized hospital.

Usually the primary perfecting of wound is conducted two-moment. The first moment/torque of process/operation is the primary surgical perfecting of skin-bone and cerebral wound, i.e., the walls of frontal sinus, cerebral shells and substance of brain.

During the primary treatment of skin-bone wound it is recommended as far as possible to retain the anatomical building/structure of sinus, sparing it bone framework and maximally

insulating it from nasal area. Cerebral wound is treated employing neuro-surgical procedure.

Post-operation supervision of wound is most expedient under the long-term moistly drying bandage according to Mikulicz-Houchman. Anechoic suture is contraindicated.

4-6 Weeks after wound is conducted the second moment/torque of the process/operations which it is reduced to perfecting of frontal sinus employing the rhinological procedure with application of anastomosis with nose.

The two-moment surgical perfecting of wound with the penetrating wounds of skull and frontal sinuses is advisable, in the first place, from the point of view of prophylaxis of intracranial complications on the soil of secondary (rhinogenic) infection and, in the second place, because during the first days after wound the condition of wounded is such heavy that the supplementary manipulations, connected with perfecting of frontal sinus and imposition of anastomosis with nose, can impair the condition of wounded.

Correct treatment and care of patient in post-operation period is not less important and critical, than process/operation itself.

The inherent background of post-operation period is determined by the phenomena of hypertension syndrome and sub-arachnoidal hemorrhage. The hypertension syndrome is observed in all cases, sub-arachnoidal hemorrhage - into 95.0o/o of cases of the combined penetrating wounds of skull and frontal sinuses.

Even during smooth aseptic coursing in post-operation period are observed the symptoms of the stimulation of cerebral shells (rigidity of occiput in 93.0o/o, symptom of Kernig in 85.0o/o and symptoms of Brudzinski in 20.0o/o of cases).

Frequently is observed light emotive excitability or suppression, frequently disturbances of psychics/psyches.

Post-operation period is most dangerous in the relation to the onset of early complications, most frequently meningitis.

Page 366.

Infectious complications were observed with these wounds in 35.2o/o of cases, of them purulent meningitis - into 20.0o/o, encephalitis - into 11.7o/o and the abscesses of brain - into 3.5o/o of cases.

Together with provision in this period of the strictest bed

mode/conditions and use/application of the damping and heart substances, important value has treatment by sulfanilamide preparations. Performing bacteriostatically, they seemingly delimit infection and arrest the process.

Meningitis with these wounds begins sharply, most frequently on the 7-9th day after wounding, i.e., somewhat earlier than during the damages of other departments of skull (13-14th day). Purulent meningitides flow/occur/last heavily.

From noninfection complications is encountered pneumocephalus, i.e., the formation in the area of skull of air bubble as a result of the penetration of air from the sinuses/antrums of the nose through the damaged cerebral shell. The diagnosis of this complication is based mainly on the data of X-ray research, and also on the characteristic clinical symptoms: the noise of splash with shaking by head and tympanic sound with the percussion of skull.

Clinic of pneumocephalus is characterized by in essence asymptomatic smooth coursing; however, is possible the development of the sharp phenomena of hypertension syndrome, and also infectious complications.

The outcomes of the combined penetrating wounds of skull and

paranasal sinuses, according to the data of the maps/charts/cards of the deepened characteristic, are expressed in comparatively high lethality and low percentage of complete recovery.

COMBINED WOUNDS OF SKULL AND EAR.

The damage of different departments of ear with the penetrating wounds of skull has special importance.

The middle ear (upper bone wall of which forms the unit of the average/mean cranial fossa) and mastoid extension (occupying the unit of the posterior cranial fossa) cannot be isolated/insulated from the external infecting medium, since they are anatomically connected with pneumatic routes/paths through the eustachian tube.

The endosteum of the internal surface of labyrinth (inner ear) capsule is formed by the solid cerebral shell, diverticulum of which in the form of bag penetrates the labyrinth through the water pipe of cochlea/snail (aquaeductus cochleae) and lines/covers all its departments (cochlea/snail, threshold, semicircular canals). The same diverticulum of arachnoidal bag follows the solid cerebral shell into all departments of inner ear, forming perilymphatic space.

The water pipe of cochlea/snail is, thus, by the straight/direct

connective canal between perilymphatic and sub-arachnoidal space, perilympha and cerebro-spinal fluid form common system with identical physicochemical properties.

On the basis of the special features/peculiarities indicated the inner ear appears as the peripheral diverticulum of central nervous system, and its wound with the violation of the integrity of bone capsule, in all cases escorting/tracking by the damage of endosteum (i.e. solid and arachnoid cerebral shells), must be referred to the group of the penetrating skull-cerebral wounds.

Among wounded with the penetrating combined wounds of skull and ear always are those many that are suffering the chronic inflammation of middle ear.

After the wound of ear in the overwhelming majority of the cases already during the first days is developed the purulent inflammation of middle ear.

As a result of special anatomical relationships/ratios already at the moment of wound is created connection/communication between the available or rapidly forming pathological exudate in ear and contents of the area of skull.

Page 367.

The combined penetrating damages/defeats of the skull and ear are observed into 0.8c/o of cases of all penetrating wounds of the skull. In this case the auditory function of ear (up to complete deafness) is disrupted always on the damaged side.

The damage/defeat of vestibular apparatus will be observed more rarely and is expressed in the complete or partial fallout of its function (table 43).

On other (undamaged/uninjured) side of skull usually is noted a more or less great decrease in the rumor and is considerably less frequent - the moderate decrease in the function of vestibular apparatus.

Pathoanatomical measurements with the described form of wounds, besides the violation of the integrity of the temporal bone, which forms the walls of the separate units of the ear (external, average and internal), are characterized even in the specific cases and by damage of one or group of peripheral nerves (VII, VIII, IX, X and

XI), and also vascular system (wound and thrombosis of the sigmoid and cavernous sinus, wcund of the internal carotid artery, which passes in the thickness of pyramid and front/leading wall of middle ear). Were observed the cases, when with the blind-end penetrating wound of skull scrap of pyramid (walls of ear) and wounding shell seemingly tamped the damaged internal carotid artery. In overwhelming majority (90.0-95.0o/o) of the wounds of the basis of skull with the damage of ear are observed sub-arachnoidal hemorrhages and hemorrhages into labyrinth. The latter fact leads most frequently to the complete degeneration of the nerve ends of VIII nerve in its cochlear and vestibular unit. In middle ear, as has already been spoken above, greatly rapidly is developed purulent inflammation, and in internal during the violation of the integrity of bone capsule - labyrinthitis.

All these pathoanatomical changes together with cerebral violations determine the complicated clinical picture of the combined wounds of skull and ear.

In 50.0o/o of such all wounds are developed intracranial complications (meningitides, abscesses of brain and cerebellum and thromboses of sigmoid sinus).

Symptomatology. In accordance with the character/nature of the

pathoanatomical and functional changes in the central nervous system and ear the symptomatology of the dismantled group of wounds is extremely varied and is composed from the symptoms of general/common/total ones and local. General symptoms were already described in the preceding/previous chapters. However, it is necessary again to be stopped at the evaluation of meningeal syndrome.

Table 43. Character/nature of the violations of rumor (cochlear apparatus) and vestibular function on the damaged side with the penetrating combined wounds of skull and ear (in percentages).

(1) Кохлеарный аппарат		(2) Вестибулярный аппарат	
(3) частичное нарушение функций	(4) полная глухота	(3) частичное нарушение функций	(5) полное выпадение
33,0	67,0	57,0	43,0

Key: (1). Cochlear apparatus. (2). Vestibular apparatus. (3). partial violation of functions. (4). complete deafness. (5). complete fallout.

Page 368.

It is necessary to bear in mind, that in the overwhelming majority of the cases of the combined wounds of skull and ear is observed sub-arachnoidal hemorrhage which, together with the heavy contusion of brain, it can be very frequently be the cause of the meningeal symptom complex.

Correct evaluation of the symptom complex indicated is facilitated to a certain extent by cerebrospinal puncture and the research of obtained punctate (presence in it of characteristic for subarachnoidal hemorrhage special features/peculiarities, the

determination of a quantity of leukocytes and the consideration of that part of them which comes due to the admixture/impurity of the blood).

Local symptomatolcgy 1. Hemorrhage from external auditory passage with the wcunds cf ear is cbserved alncst always on phenomenon this specifically for any that determined the form of wound. Hemorrhage from ear can tc equal degree be both during the damages cf the soft tissues of auditory passage and eardrum and with very heavy wounds with the break of the base cf the skull and the damage of the substance cf brain. On the other hand, were observed the heavy through faults of brain and inner ear with the retention/preservation/maintaining of the integrity of the tympanum diaphragm and in absence therefcre hemorrhage from ear.

2. Outflow from ear of cerebro-spinal fluid (liquorrhea) is cardinal symptom of combined penetrating wound on it is observed comparatively rarely (cnly into 10.0o/o cf all cases to wound of ear). However, the absence of liqucrrhea frcm ear does not eliminate the presence of the penetrating wound. Frequently edematic cerebral tissue protrudes evidently, intc the break cf basis and seemingly occludes subarachnoidal space. Confirmation of the correctness of this point of view is the fact that frequently after perfecting of wound with the distance/separation of the crushed edges of bcne and

the release of cerebral tissue appears liquorrhea.

3. Presence more or less extensive wound in region of ear and mastoid extension. However, absence this visible local damage does not eliminate the wound of pyramid on the route of the wounding shell.

4. Decrease in rumor to different degree, up to complete deafness to one or both ears, is observed with all wounds of dismantled group. Deafness flows/occurs/lasts predominantly over the type of the suffering of the sound receptor apparatus, in spite of the simultaneous damage/defeat also of middle ear. Complete stable deafness is observed into 65.0-70.0o/o of such all wounds. The majorities of the cases of this deafness must be related due to the damage of peripheral apparatus (cochlear unit of the labyrinth) on the soil of hemorrhage into labyrinth or its direct decomposition.

In view of the bilateral crust innervation of the organ/control of rumor complete deafness can arise only on the soil of psycho-injury and to be bilateral. Usually this deafness gradually passes.

5. Violation of vestibular function in the form of decrease or complete fallout of excitability of apparatus of equilibrium is

observed more rarely than damage/defeat of cochlear (auditory) apparatus. The complete fallout of the function of vestibular apparatus with the dismantled group of wounds is noted into 43.0-45.0o/o of all cases of these wounds. Special interest in the symptomatology of the combined wound of brain and ear are of objective data with the direct wounds of labyrinths.

Page 369.

In these cases usually the complete fallout of the function of vestibular apparatus is observed on one damaged side. The most essential objective symptom of the condition of the function of vestibular apparatus is nystagmus. Besides other special features/peculiarities, vestibular nystagmus is characterized by the presence of two components (slow and rapid, rhythmically following after each other). In norm during the stimulation of one labyrinth appears the slow component of the nystagmus, directed to opposite to the irritated labyrinth side; the rapid component of nystagmus is the response reaction of central nervous system to the caused by labyrinth rotation of eye and is directed to the side of the irritated labyrinth. With suppression or fallout of the function of one labyrinth the direction of the rapid component of nystagmus will be reverse/inverse, i.e., to the side of labyrinth with the maintained function. This is explained by the fact that in the case

of the acute/sharp fallcut of the functicn cf one labyrinth cf another (normal) it prcves to be at first as in the condition of hyper-tone in comparisen with that damaged. The rapid component of nystagmus with the fallcut of the function of one labyrinth is usually sharply pronounced and directed to healthy/sound side. With the straight/direct wounds of labyrinth almost with lightning speed are annihilated all neuroepithelial elements/cells of inner ear, attacks/advances complete stable deafness and fallout of the function of vestibular apparatus. However, in the majority of the cases the expected nystagmus to healthy/sound side does nct appear or it is expressed very weakly. The theoretical substantiaticn of this phenomenon should be searched for in the condition cf central nervous system in wounded with the damage of skull. The numerous observations of I. P. Pavlov's schocl showed that the leading moment/torque in an entire symptomatology of the injury of central nervous system is the inhibition. This conditicn of brain core beccmes apparent in the majority of the cases in the form cf somnolency, apathy, delay or absence of reaction for stimulations. Cortex in this condition of depression cannot normally react, and nystagmus it does not appear. This phenomenon is observed under the influence by cold on normal labyrinth in the conditicn of narccsis: appears cnly the one slow movement of the eyeballs (slow component of nystagmus), rapid component in this case dces not appear.

6. To local symptoms with penetrating combined wounds of brain and ear it is necessary to relate amnestic aphasia. This condition, so/such characteristic for violations in the region of the lower department of the left temporal portion of brain, greatly frequently is observed with the wounds of left ear.

7. Peripheral paresis and paralyses of all branches of face nerve are characteristic for wounds of ear, since on entire route/path from internal auditory passage to output/yield from bone canal (foramen stylomastcideum) face nerve is passed to direct contact with all departments of ear (internal, by average and external).

The diagnosis of the penetrating combined wound of brain and ear, i.e., the penetrating wound of the basis of skull, can be set only on the basis of the comprehensive research of neuropathologist, neurosurgeon, otiatrist and roentgenologist.

A question about the character/nature of the damage/defeat of ear and potential role of the condition of this organ/control in the onset of intracranial complication can be solved only during the special local research of external, middle and inner ear (otoscopy, probing under the control of otoscopy, functional research of the organ/control of rumor and vestibular apparatus).

Page 370.

During this research it is necessary to consider the relationship/ratio of peripheral apparatus and central nervous system in their new pathological condition (mental deafness, absence of nystagmus, in spite of the damage of labyrinth and, etc.).

Vital importance in the diagnosis of the described group of wounds has x-ray examination. The well carried out X-ray photographs of mastoid extension and pyramid with their correct interpretation give many valuable instructions for the diagnosis of these complicated combined wounds. Incorrect roentgenological interpretation can become the source of errors not only during the evaluation of readings to surgical intervention, according to and with the execution of process/operation itself. Thus, only careful combined comprehensive research taking into account the data of anamnesis, general condition of nervous system and local changes, and also data, obtained in the foremost stages of evacuation, can reveal the route/path to correct diagnosis.

Infectious complications with the penetrating combined wounds of skull and ear are observed very frequently (in 48.6o/o). From the

moment/torque of wound there is actually already by intracranial a pathological focus, which is constantly infected from the side of the upper respiratory tract. In the same cases when wounded suffered in the past chronic otitis, this secondary ctogeric infection it is necessary to consider as basic pathogenetic pcint in the development of intracranial complication. The significant role in the pathogenesis of intracrarial complications play the special features/peculiarities cf building/structure cf the mastoid extension, in which very frequently (almost into 95.0o/o of cases of its wounds) is developed osteitis and osteomyelitis (mastoiditis), which frequently leads tc early perisinucus abscesses and thrcmboses of sigmoid sinus. Frcm ccmplicatiens most frequently, into 37.5o/o of cases, are encountered meningitides and meningoencephalites, into 5.5o/o of cases - abscesses of the temporal pcrtion cf brain, into 2.8o/o of cases - abscesses of cerebellum, into 2.8o/o of cases - a thrombosis of sigmoid sinus (sepsis).

To severe complications shculd be also related to the protrusion of the substance of brain, so frequently observing with the wounds of the basis of skull. The protrusions of brain usually are localized in the external unit of the pyramid of temporal bone and, being discharged down, they enclose access to the areas of middle ear, i.e., besides its other disadvantages, they disrupt the normal healing of these areas, which are in such cases the steady scurce cf

infection. Struggle with the protrusions of brain is conducted according to general/common/total neuro-surgical rules/handspikes.

The treatment of the described group of wounded should be realized first of all according to the principles of neurosurgery, but it is simultaneously necessary to consider both the specific character of ear as the organ/control of rumor and equilibria, and also anatomical special features/peculiarities of this organ/control with its inclination rapidly to be converted into the focus of secondary infection. From the timely and high-quality primary perfecting of wound with the penetrating wounds of skull and brain depends all subsequent coursing of process. Even larger role plays the primary perfecting of wound with the combined wound of skull with the damage of ear. The optimum periods of perfecting are the first 2-3 days. Is permitted perfecting, also, during the periods up to 5-6 days, depending on the condition of wound as with other wounds of skull. However, this perfecting is not so simple as perfecting any other cranial penetrating wound.

Page 371.

A question about volume of intervention on ear (antrotomy, mastoidectomy, radical surgery or intervention on labyrinth and pyramid of temporal bone) and intervention technique can be solved

only on the basis of very careful clinical evaluation of the picture of wound process, in the presence of special preparation/training in surgeon. Therefore during war it was necessary to possibly more draw nearer special aid the foremost stages of evacuation. Certain lengthening of periods with the execution of primary process/operation was redeemed by the thoroughness of intervention in the specialized hospital.

In such cases where the wound was limited to mastoid extension, sigmoid sinus and external unit of the pyramid (tympanomastoid wounds) with the damage of the temporal portion of brain in its posterior departments, showed, together with the neuro-surgical perfecting of cerebral wound, the wide mastoidectomy with the autopsy of all grid systems. The latter it was necessary for warning/preventing the subsequent mastoiditis with all resultant heavy consequences.

When into traumatic focus were implicated the posterior and upper wall of auditory passage and of middle ear (tegmen tympani et antri) and deeper departments of pyramid (tympano-petromastoidal wounds), was conducted wide radical surgery with shaping and expanding the auditory passage, but without stitching on parotic would. During the violation of the integrity of bone labyrinth (labyrinth-mastoidal or petro-occipital wounds) it was not need make,

except that indicated above, to any typical labyrinth process/operation. It suffices it was sufficient after the produced radical surgery on middle ear to be restricted to the careful distance/separation of all bone scrap of the capsule of labyrinth and to the release of face nerve, always in these cases of that implicated in process.

With the breaking up of deeper sections of pyramid from damages of the canal of internal carotid artery, and sometimes also by this latter was conducted the preventive temporary/time dressing of internal or general/common/total carotid artery on neck with its subsequent release and by tamponade in canal within pyramid.

Contraindication to primary perfecting was considered only the heavy comatose condition of wounded.

They did not resort to process/operation also in such cases of the wounds of ear, when damage was limited to the crack of the basis of skull in the region of the upper wall of external or middle ear with the break of the dura mater and liquorrhea, but without the presence in area of the skull of bone scrap and metallic foreign bodies. The experiment/experience of the Great Patriotic War confirmed the advisability of this conduct in contrast propagandized by foreign authors to radical method.

However, in all cases of the wounds of the ear (independent of the periods of wound) during the first manifestations of intracranial complication, especially meningitis, it was necessary immediately to resort to process/operation.

After the process/operation of primary perfecting to bone wound, including the areas of middle ear, and also to the surface of cerebral wound was applied a moist-drying bandage. However, in these cases bandage was laid not more than on 7-8 days, otherwise it impeded outflow from wound.

Simultaneously with process/operation and in post-operation period for the purpose of prophylaxis were assigned sulfanilamides and penicillin.

Page 372.

Subsequently the cerebral wound was conducted according to general/common/total neuro-surgical causes, and the defect of temporal bone and area of middle ear - according to the methods of otiatry (filling of defect with granulations with mastoidectomy or its epidermization after radical surgery). After mastoidectomy the

healing during normal coursing continued from 1 1/2 to 2 months, after radical surgery - to 3 months. Unfortunately, hardly ever even after careful process/operation bone wound healed smoothly. Osteomyelitis of temporal bone was very persistent as a result of the special features/peculiarities of the architectonics of this bone and fairly often it was necessary to resort to repeated process/operations. The soft tissues of auditory passage, cicatrizing, frequently impeded access to wound. These interventions were especially difficult because it was necessary to frequently disrupt the integrity of cerebral and tunicary scars. There were proposed many methods of secondary plastic surgery, including transplantation of skin into bone wound, but also this always did not accelerate the process of healing. Expediently therefore it was not to hurry with the occlusion of parotic wound to complete epidermization, but during the contraction of auditory passage - attempt to create permanent course after ear.

The outcomes of the combined penetrating wounds of skull and ear were very heavy and they depended in essence on the onset of intracranial complications.

X-ray diagnostics of the bullet penetrating wounds of skull.

X-ray diagnostics of gun breaks of skull.

After the first world war were published several works, in which was represented roentgenclogical picture of scme penetrating wounds of skull. However, these works were not comprehensive, they did not envelop all possible means of wcunds and they were not systematized.

During the Second World War in the foreign press of the solid works, dedicated to this question, were not published. Soviet roentgenologists during the Great Patriotic war conducted the large number of observations and generalized them. This made it possible to distinguish such wounds with sufficient accuracy.

During the primary x-ray examination of wounded with the penetrating wounds of skull into 71.2o/o of cases is detected the perforated break, into 3.3o/o - fragmented, in 20.5o/o - crushed also into 5.0o/o of cases - the depressed break of skull.

The characteristic of the depressed and crushed breaks of skull is represented in chapter about nonpenetrating wounds. With breaks of this type into 1/3 cases of all penetrating wcunds of the skull the diagnosis of the damage cf solid cerebral shell on the basis of roentgenological data it can be set only suppcsedly. In the depressed and crushed breaks of the essential damage of deep departments of

brain it does not occur. In the remaining 2/3 cases of the penetrating wounds of skull the corresponding diagnosis is placed roentgenologically with large accuracy on the basis of the determination of the perforated or fragmented break. Perforated break is characterized by the presence of perforated defect in the skull which is formed as a result of the decomposition of this sector of bone and considerable displacement of the formed bone fragments. Of the fragmented break is characteristic the extensive zone of decomposition, which envelops sometimes several adjacent bones of skull, and the presence of large/coarse bone fragments with the displacement of them towards the outside.

Page 373.

X-ray diagnostics of the perforated breaks of skull. Perforated breaks, as a rule, are easily established/installed roentgenologically on the basis of the analysis of two X-ray photographs of skull, produced in mutually perpendicular projections. The basic roentgenological symptom of these breaks is the presence of perforated defect in the skull of different, but it is more frequently, small value. Furthermore, with these breaks always are detected the displaced at considerable depth bone fragments. Sometimes the image of bone fragments on one of the two X-ray photographs is deposited to the image of defect in skull as a result

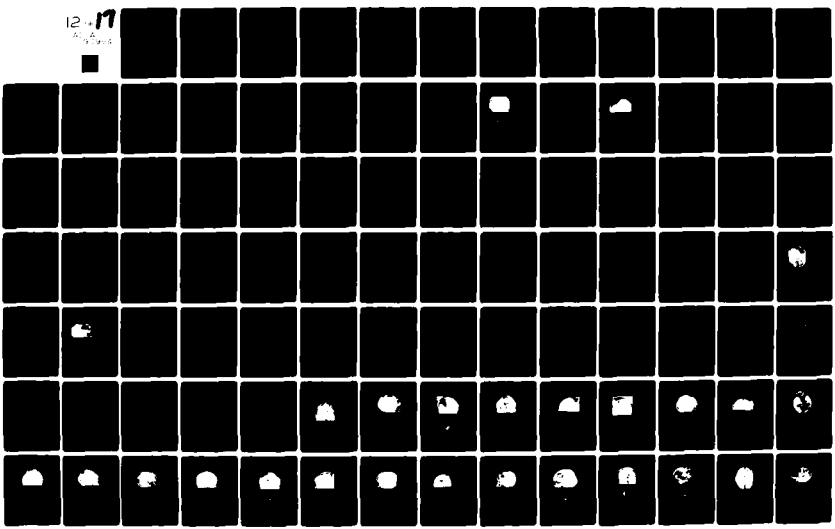
of the fact that with X-ray analysis incident direction in the central beam of X-rays ccincides with the plane of the displacement of bone fragments (Fig. 104 and 105). However, in the second X-ray photograph it is always detected that the bone fragments are located out of aperture in the skull, tc more or less considerable distance from it (Fig. 103 and 106). In the majority of the cases this displacement excellently is determined in both X-ray photographs. The true amount of the displacement of bone fragments is visible only in that X-ray photograph in production of which the central beam of X-rays is passed perpendicular to the plane of the displacement of bone fragments.

Depending on the special features/peculiarities of the wounds which are determined by its mechanism, perforated breaks are divided into three subgroups: a) perforated plumb break, b) perforated blind and c) perforated through break. Perforated plumb break is characterized by the large intracranial displacement of bone fragments and the absence in the area of the skull of foreign body. Bone fragments are always displaced perpendicularly, i.e., vertically to defect in skull, that also served as occasion for the liberation/excretion of this group of wounds by the name perforated plumb break. Perforated blind break is characterized by the presence in area of the skull of metallic foreign body and bone fragments, more than or less deeply displaced into the area of skull. Perforated

through break is characterized by the presence of two defects in skull in the region of intake and outlets which appear with perforating wounds. In the region of inlet are formed the small/fine bone fragments, which are insignificantly displaced into the area of the skull; in the region of outlet are obtained the large/coarser bone fragments, which are displaced towards the outside into soft tissues.

Perforated breaks will be usually deposited by the wounding shell which strikes the skull at right angle. Wounding weapon causes the breaking up of this sector of bone and always transmits to the forming bone fragments the unit of its translational energy, in consequence of which the fragments of bone are introduced in the area of skull. If the translational energy of shell is small, then the large part of it is transmitted to bone fragments. Because of this the energy of shell substantially is decreased, it cannot penetrate in the area of skull and ricochets from it. In this case is developed perforated plumb break. The wounding shell with large translational energy not only forces bone fragments in the area of skull, but also is introduced in it itself at more or less considerable depth. Is such the onset of perforated blind fracture. With even larger translational energy the shell penetrates the skull, crosses/intersects it it leaves the skull, forming perforated through break.

AD-A090 984 FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OH F/G 6/5
THE EXPERIENCE OF SOVIET MEDICINE IN THE GREAT PATRIOTIC WAR 19--ETC(U)
FEB 80 V N SHAMOV, B A SAMOTOKIN
UNCLASSIFIED FTD-ID(RS)T-1925-79 NL




A
098

The stronger the translatical energy of the wounding shell, the more rapid it pierces the skull, the smaller the forming fragments of bone and the less that unit of the energy, which the wounding shell transmits to bone fragments.

Page 374.

Therefore with perforated plumb breaks bone fragments are most large/coarse and are introduced more deeply. With perforated through breaks the small/finest and least displaced fragments of bone are observed in the region of inlet. With perforated blind breaks, other conditions being equal, the value of bone fragments is more and their displacement is greater, the less the depth of the penetration of foreign body.

Much less frequent perforated breaks are developed with the incidence of shell into skull with subacute bearing/angle. If the value of this bearing/angle is sufficiently great, then foreign body crosses/intersects skull but to chord and is caused perforated by blind or perforated through break. With the low value of the bearing/angle of the incidence/impingement of shell, i.e., with the tangential character/nature of wound, can arise only perforated plumb

break. Consequently, perforated plumb breaks are formed with the ricocheting and tangential wounds, perforated blind - with blind, and perforated through breaks - with perforating wounds.

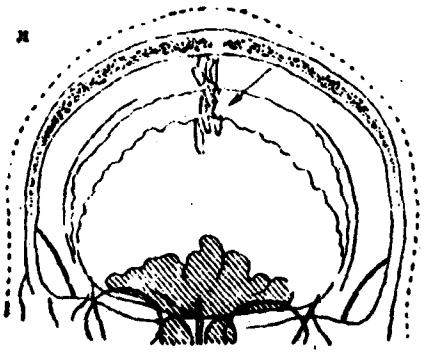
With perforated plumb breaks the basic wounding agent are the bone fragments which are introduced in cerebral substance at depth to 6-8 cm and more. With perforated blind and perforated through breaks the basic wounding agent is the metallic foreign body which with perforated blind breaks is located in the area of the skull, while with perforated through cnes - it leaves it.

Perforated plumb breaks. From the aforesaid it follows that with perforated plumb break rcentgenologically are detected the defect in skull and bone fragments in its area. With perforated plumb breaks, as a result of the ricocheting character/nature of wound, the defect in bone has circular shape and usually small value (Fig. 102 and 104). There is no foreign body in the majority of the cases. However, with these breaks the ricocheting character/nature of wound is frequently incomplete, and foreign body is held up in the soft tissues of the skull. Most frequently foreign body stops at larger or smaller distance from defect in bone (Fig. 103 and 104), and sometimes directly under skin. Rarely foreign body is held up directly in aperture in the skull and are occluded it similarly to plug. With breaks of this type, caused by the ricocheting

character/nature of wound, bone fragments are displaced inside skull in the form of one group. With parasagittal localization of break the fragments of bone frequently slide down on one of the sides of the falx cerebri and they achieve calloused body. In this case they take the form of peculiar zone, which resembles "stalactites" (Fig. 101 and 102). Frequently bone fragments are arranged/located at sufficiently considerable distance from defect in skull (Fig. 103). Because of this the process/operation without preliminary x-ray examination is risked, since the bone fragments, which took root in the depth of cerebral substance, it is possible and not to find.

With the perforated plumb breaks, which appear from tangential wound, the defect in skull has oblong form (Fig. 105). Sometimes from the final pole of defect will withdraw crack (Fig. 108). The bone fragments, mixing into the area of skull, in X-ray photograph appear in the form of zone (Fig. 105 and 106). During parasagittal disposition of break they are arranged/located on both sides from falx cerebri (Fig. 105 and 106) and in such cases they frequently damage it. With perforated plumb breaks sometimes are detected several bone fragments, displaced towards the outside from skull.

Page 375.



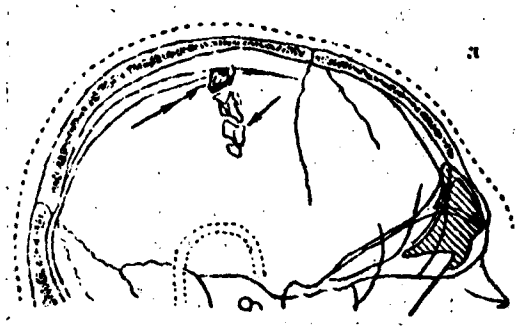


Fig. 101. Fig. 102.

Fig. 101. Ricocheting sagittal wound of sincipital region. Anatomical scheme from the front/leading survey X-ray photograph, produced during primary research. Is determined the perforated plumb break of skull. On this scheme the defect in bone is not outlined, since its image hit the silent zone. Are well visible the bone scrap, which were displaced vertically down into the area of skull in the form of zone in long in 6 cm. Bone scrap (they are shown by arrow/pointer) are arranged/located to the left from falx cerebri and they achieve calloused body.

Fig. 102. Left oblique X-ray photograph of the skull of the same wounded. Arrow/pointer designated bone scrap. Double arrow/pointer noted perforated defect in front/leading third of sagittal suture. To doubtlessness, is wound of upper sagittal sinus in its front/leading department.

Page 376.

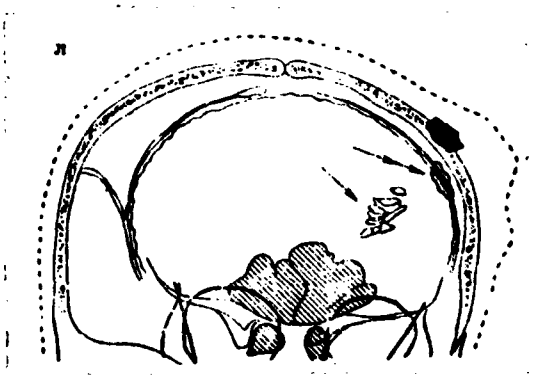


Fig. 103.

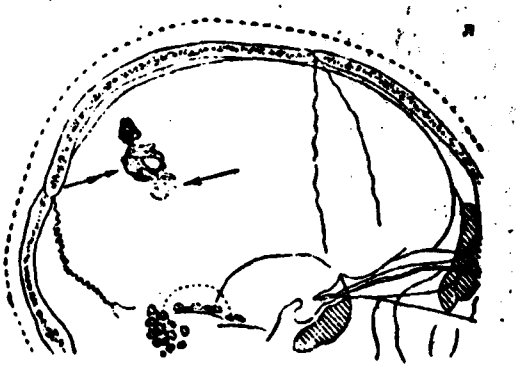


Fig. 104.

Fig. 103. Ricocheting wound of right sincipital region with "incomplete" mechanism. Anatomical scheme from the front/leading survey X-ray photograph, produced during primary research. In the center of right sincipital bone is determined perforated plumb by front. By dual arrow/pointer is shown subglobose defect in the skull with diameter of 1.5 cm. Ordinary arrow/pointer noted the multiple bone scrap, which were displaced into the area of skull towards the inside and downward from the defect of bone, in the plane, perpendicular to it, at the depth of 8 cm. Between the aperture in skull and the group of bone scrap is a sector of cerebral substance in long in 2.5 cm which does not contain scrap of bone. Metallic fragment with the size/dimension 1.5x0.8x0.5 of cm is

arranged/located in the soft tissues of skull upwards from defect in bone.

Fig. 104. Anatomical scheme from left lateral X-ray photograph of skull of the same wounded. Dual arrow/pointer noted defect in skull. Ordinary arrow/pointer showed bone scrap whose image partially protrudes into defect in bone.

Page 377.

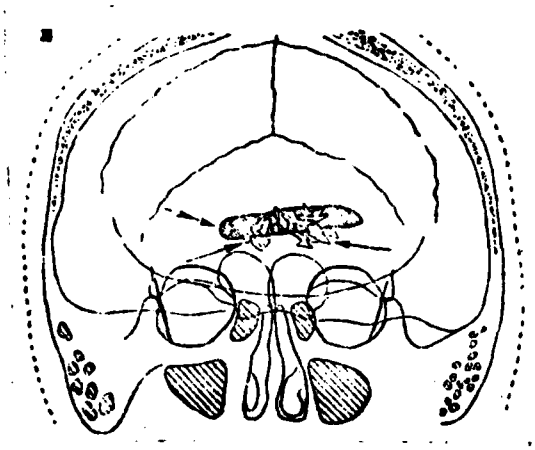


Fig. 105.

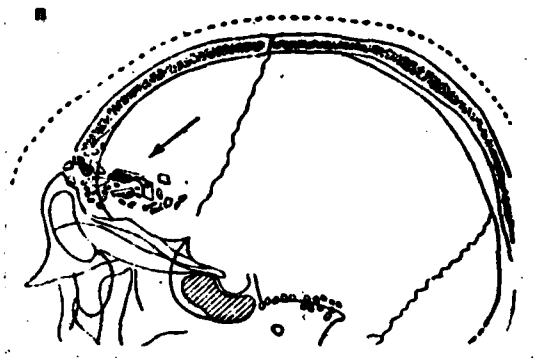


Fig. 106.

Fig. 105. Tangential bullet wound of frontal region. Anatomical scheme from the front/leading survey X-ray photograph of skull, produced during primary research. In this photograph upwards from frontal sinuses is determined the horizontally arranged/located oblong defect of the bone (it is shown by dual arrow/pointer), to which protrudes multiple bone scrap (they are noted by ordinary pointer/riflemen). Frontal sinuses are shaded as a result of hemorrhage. Their image in figure is not shaded in contrast to the remaining paranasal sinuses, which maintained normal transparency whose image is widely shaded.

Fig. 106. Anatomical scheme from right lateral X-ray photograph of

skull of the same wounded. In this photograph it is outlined well that bone scrap (they are shown by arrow/pointer) were displaced into area skulls perpendicular to the defect of bone and in parallel to the bottom of front/leading cranial pit at depth to 5 cm. Consequently, in this case is a perforated plumb break of skull, which arose as a result of tangential wound. Comparison with the X-ray photograph, represented in Fig. 105, shows that bone scrap were displaced into the area of skull on both sides from falx cerebri.

Page 378.

With breaks of this type the bone fragments, penetrating into the area of the skull, is caused the large damage of cerebral substance and they can destroy cerebral ventricle. But fragments, that strike into ventricle system, can rarely be moved in it but to the current spinal fluid/liquid, tc similar metallic foreign bodies.

The contaminated bone fragments, which are arranged/located in substance of brain, limber cause inflammatory process with transition into festering. The latter especially frequently is developed with necrosis of the fragments of bone. Necrotic bcne fragments give not X-ray photographs very intense shadow, which approaches in density an image of metal (Fig. 107 and 108). The presence of such bone fragments always indicates the possibility of the development of the abscess of brain. This complication is typical for the perforated plumb breaks, which were not undergoing primary perfecting.

Perforated blind break. With perforated blind breaks roentgenologically is detected the defect in skull, and also its

areas find bone scrap and foreign body. In dependence on depth of the penetration of foreign body into the area of skull with perforated blind breaks appear the wound canals of four different characters/natures (I. S. Bavchin): simple, radial, segmental and diametric.

With the simple character/nature of wound canal the foreign body is introduced at depth tc 6-8 cm and usually damages only one cerebral portion (Fig. 109 and 110).

With radial character/nature of wound canal the shell traverses skull on radius and stops in its medium plane. Most frequently foreign body is detected in falx cerebri, since it is delayed by springy duplicature of solid cerebral shell (Fig. 111 and 112). Sometimes foreign body passes through falx cerebri and, having exhausted on this its translatical energy, it stops in falx cerebri on the side, contradictory/opposite to inlet (Fig. 113 and 114). Limber foreign bodies stop in cerebellar drift or in basal ganglia. With these wounds the fragment frequently is arranged/located near cerebral ventricle (Fig. 111 and 112), frequently damaging it (Fig. 113 and 114).

With segmental to the slime of wounded canal the foreign body crosses/intersects skull on chord and limber it damages ventricular

system (Fig. 115 and 116).

With the diametric character/nature of wcund canal the wounding shell it passes according to the diameter of skull and to the majority of the cases crcsses/intersects cerebral ventricles (Fig. 117 and 118). With segmental and diametric wounds the foreign body can achieve the internal surface of skull in the sector, contradictory/opposite tc inlet, and be hit against bcne. Rarely in such cases occurs the internal skipout of foreign body, in consequence of which wcund canal becomes broken line. The sector from which proceeds internal ricochet, is usually located comparatively far from inlet. Considerably thinner/less frequent this sector can be near from inlet. This occurs in cases when the wounding shell is introduced in skull at sharp angle (Fig. 119 and 120).

Furthermore, by limber with zero wounds is observed of the broken, or angular, the type wound canal. This character/nature of wound canal is detected roentgenologically easily, if in the place of internal skipout occurred the break of bcne.

Page 379.

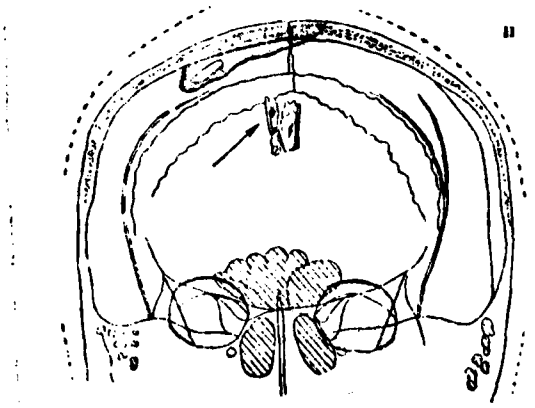


Fig. 107. Tangential fragmented parasagittal wound of left sincipital region. Primary surgical treatment of wound in MSB in urgent indications without X-ray research. Anatomical scheme from the front/leading survey X-ray photograph of skull, produced after 3 weeks after wounding. Is determined the perforated plumb break of left sincipital bone after defective process/operation. The image of defect into skull is densely shaded. By arrow/pointer is indicated the group of bone scrap, located in left sincipital portion at a distance of 7 cm from defect in skull. Bone fragments cause very intense shadow. This testifies about their necrosis and indicates the possibility of the develcpment of the abscess of brain.

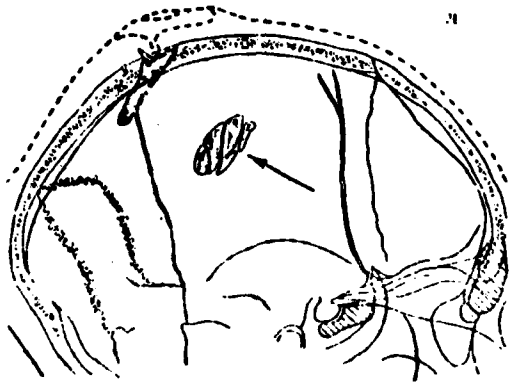


Fig. 108. Anatomical scheme from the left lateral X-ray photograph of skull of the same wounded. In this photograph is detected the long crack which crosses along vertical left parietal bone and attenuates in sutura parieto-mastcilen; necrotic bone scrap are shown by arrow/pointer. After the present investigation is produced the process/operation - total carving cf cerebral scar, during which is discovered and removed the abscess of brain.

Page 380.

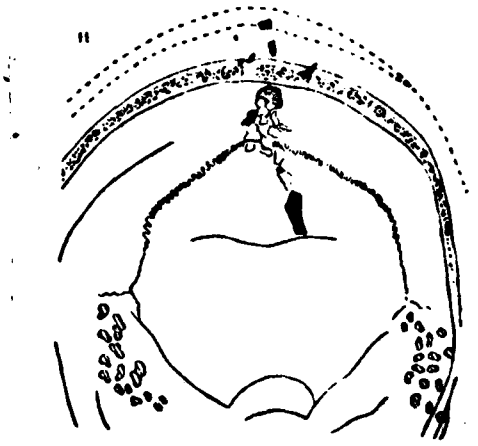


Fig. 109. Blind-end fragmentation wound of sincipital-postcranial region. Anatomical scheme from the posterior X-ray photograph of the region indicated, produced during primary research. In the posterior; parasagittal department of left sincipital bone it is detected perforated blind break of skull with simple type of wound canal. Is densely shaded the image of the subglobose aperture in skull in diameter in 1 cm.

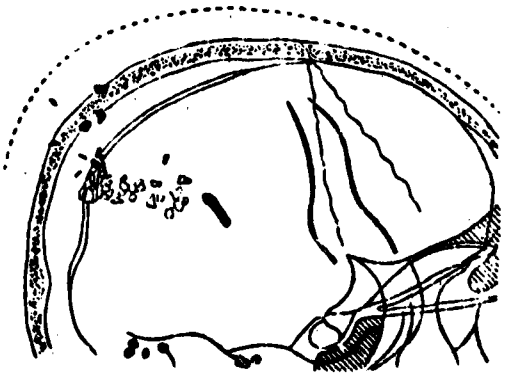


Fig. 110.

Fig. 110. Anatomical scheme from left oblique X-ray photograph of skull of the same wounded. comparison with the photograph, represented in Fig. 109, shows that the metallic foreign body of size 1.5x0.5x0.5 cm is arranged/located in left sincipital portion in calloused body at a distance of 6 cm to front in downward from defect in skull. Entire wound canal from defect in skull tc foreign body is filled with bone scrap. There is wound of sagittal sinus in posterior department.

Page 381.

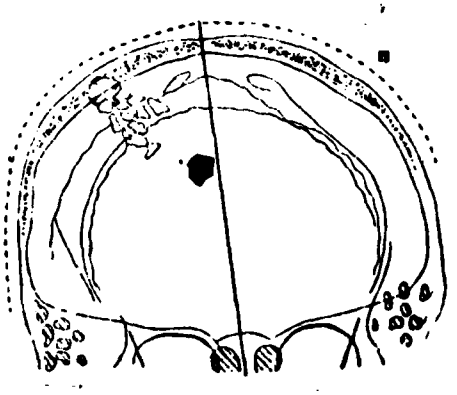


Fig. 111. Blind fragmentation wound of left sincipital region. Anatomical scheme from the front/leading survey X-ray photograph of skull, produced during primary research. In rear-upper department of left sincipital bone is determined perforated blind break with the radial type of wound canal. The image of aperture in skull is densely shaded. The vertical line, drawn in the diagram, corresponds to projection falx cerebri.

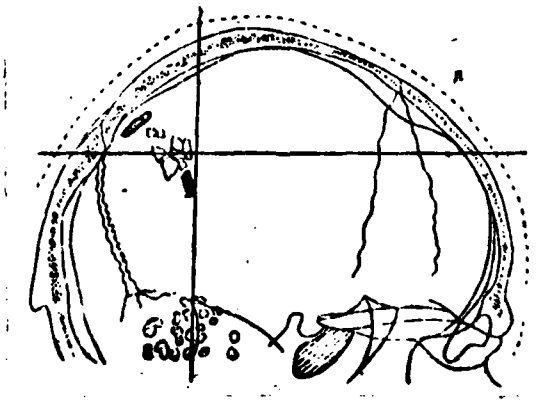


Fig. 112. Anatomical scheme from left lateral X-ray photograph of

skull of the same wounded. The horizontal line, drawn in the diagram through lambda, in parallel to the bottom of front/leading cranial pit, corresponds to that "critical" plane below which is arranged/located ventricular system. The vertical line, raised through the bearing/angle of Chitelli designates the frontal plane, in which is arranged/located the site of the joint of the central departments of lateral ventricles with their posterior and lower crescents. To the rear of this plane through center line is located splenium corporis callosi. Comparison with the X-ray photograph, represented in Fig. 111, shows that the metallic foreign body is located in the left half splenium carporis callosi, at a distance of 9 cm from defect in skull, towards the inside, toward the front and downward from it. The half wound canal in brain, which adjoins intake aperture, is filled with bone scrap.

Page 382.

In the region of this break are formed the sufficiently large/coarse bone fragments, which are displaced towards the outside from skull (Fig. 120). Defect in bone, similar to outlet with perforating wounds, has high value on external plate, than on internal. Skin in this sector can remain undamaged/uninjured. In other cases the soft integuments of skull are broken by the bone fragments, which are displaced towards the outside. Because of this is formed the wound,

which without X-ray research usually is accepted for outlet with perforating wound. If in the region of internal skipout the integrity of bone is not disrupted, the angular character/nature of wound canal is diagnosed on localization of foreign body, which does not clearly correspond to the rectilinear course of wound canal. Furthermore, symptomatic of internal skipout is the rotation of the point of bullet against the direction of its flight (Fig. 119).

With the simple character/nature of blind wound canal bone fragments obtain the significant part of kinetic energy of shell and they are displaced into the area of skull so deeply that they fill entire wound canal from defect to foreign body, which is located on bottom of cerebral wound (Fig. 109 and 110).

Extremely rarely with perforated blind break foreign body is held among bone fragments at different depth. Such cases objectively prove erroneousness of the views Grasgey which assumed that with the blind wounds of brain the foreign body does not force bone fragments, on "entrains" them following by itself.

With radial wounds the bone fragments usually fill a half or third of the length of wound canal, if shell stops on the side of inlet (Fig. 111 and 112). If shell is held up on the side, contradictory/opposite to inlet, then the fragments of the bone it is

usual are displaced not more than on 1.5-2 cm (Fig. 113 and 114).

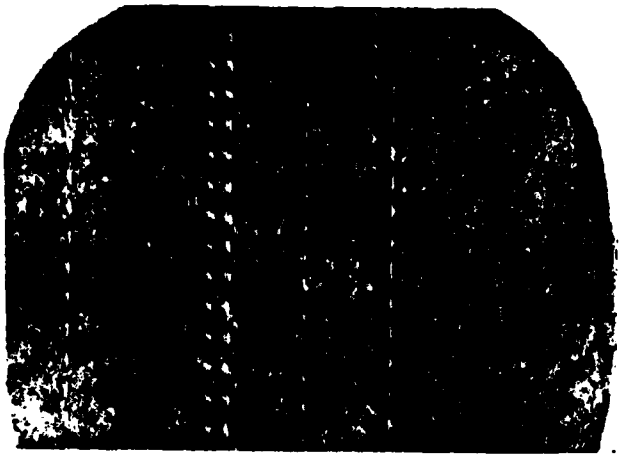
With segmental wounds foreign body penetrates the skull on under straight line, and at sharp bearing/angle. Because of this defect and bones it acquires oval form (Fig. 115 and 116), but bone fragments frequently are displaced in somewhat different direction, than foreign body, and is formed the second additional wound canal in deep in 3-4 cm (Fig. 115 and 116).

With diametric wounds occurs the insignificant intracranial displacement of bone fragments; it is deeper, if wound is deposited by a comparatively large/coarse shell (Fig. 117 and 118). With segmental and diametric wounds foreign, body can be removed only through special applied trepanation aperture.

With X-ray diagnosis of perforated blind fractures of great importance is the determination of the location of the foreign bodies, penetrating into skull. As is known, there is a large quantity of mathematical methods of position finding of foreign body from the specific point/post on skin of head. These methods are barely suitable for revealing the location of foreign bodies, since in these cases has a value not digital expression of the depth of the occurrence of foreign body, but its precise localization in brain. This problem during the Great Patriotic War was solved with the aid

of an X-ray-anatomical method of position finding of foreign bodies both located on surface in the region of arch/summary and base of skull and in depth of cerebral substance.

Page 382a.



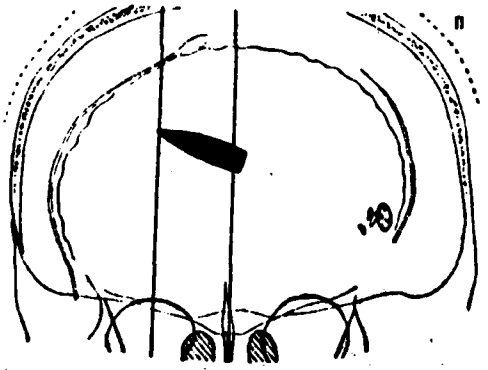
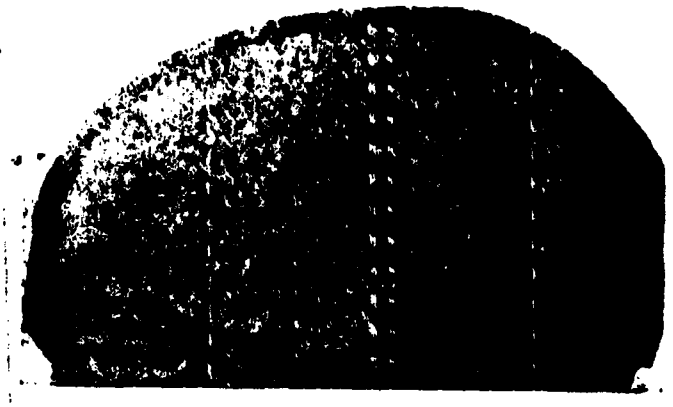


Fig. 113. Blind bullet wound of right frontotemporal region. Front survey X-ray photograph of skull, produced with the primary investigation. Is below - anatomical scheme from this photograph. In a rear-lower department of right half of the scale of frontal bone is detected perforated blind fracture of skull with radial type of wounded canal. Image of defect and bone in the diagram is densely

shaded. Are carried out two vertical lines. One of them occurs through front plane, the seccnd - parallel through middle of left orbit. Between these vertical lines penetrates the region of the middle department of appropriate, lateral ventricle.

Page 382b.



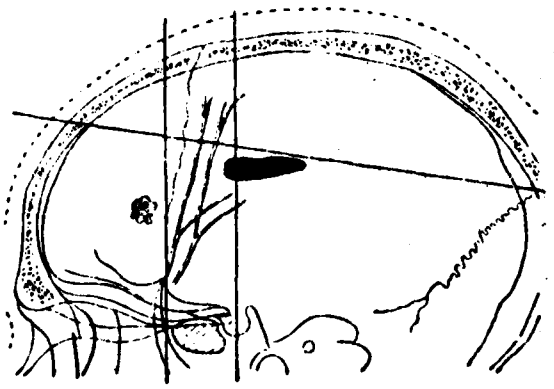


Fig 114. Right lateral X-ray photograph of skull of the same wounded. A low- anatomical scheme from this photograph. In the diagram through lambda and in parallel to the bottom of the front/leading cranial pit is carried out the horizontal line, which corresponds to plane, below

with which is arranged/located ventricular system. From physiological horizontal are raised two vertical lines: one passes through the lateral sectors of low wings, the second - through the middle of sella turcica. Between the appropriate frontal planes is located the projection of the front/leading crescents of lateral ventricles. Toward the rear penetrates the average/mean departments of lateral ventricles. Comparison with the X-ray photograph of that represented in Fig. 113, shows that the bullet is located and to the region of the front/leading half the center section of the left lateral ventricle. Near defect in skull are arranged/located the smallest bone scrap which were displaced into the area of skull on the course of wound canal on 1 cm.

Page 383.

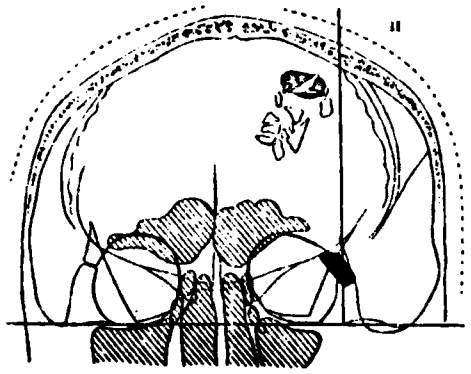


Fig. 115. Blind fragmented wound by right frcntoparietal of region. Anatomical diagram frcm the front/leading X-ray photograph of skull, produced during primary research. In the right half of the scale of frontal bone is determined perforated blind the break of skull with the segmental type of wcund canal. Is densely shaded the image of oval defect in skull with value 2x1.5 cm. Frcm the physiological horizontal through right frontal-malar suture is raised the vertical line, which corresponds to the sagittal plane in which it is located projection of the posterior crescent of right lateral ventricle.

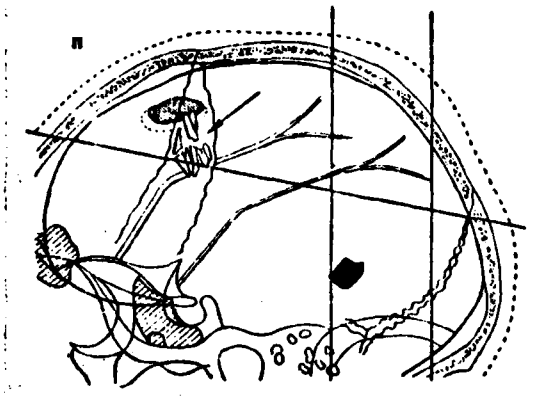


Fig. 116. Anatomical diagram scheme from the right lateral X-ray photograph of skull of the same wounded. The image of opening in bone is densely shaded. Bone scrap are shown by arrcw/pointer. Is carried out the horizontal, below with which it is arranged/located the region of ventricular system, and two vertical lines. One of them is raised through the bearing/angle of Chitelli with respect to the frontal plane, in which the average/mean department of lateral ventricle is connected with lower and posterior arms of it. The second vertical line is passed through the middles of both halves of lambda suture; it coincides with frontal plane which can reach the posterior crescent of lateral ventricle. Comparison with the X-ray photograph, represented in Fig. 115, shows that in the posterior crescent of the right lateral ventricle is located metallic foreign body by the size/dimension 1.5x0.8x0.8 of cm. This fragment penetrated in skull at sharp angle. As a result of this bone scrap were displaced into the area of skull in another direction, than foreign body, and was formed independent wound canal in deep in 4 cm.

Page 384.

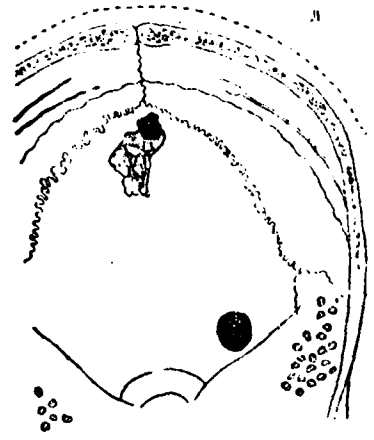


Fig. 117. Blind wound of a sincipital-occipital region by shrapnel bullet. Anatomical scheme from the posterior X-ray photograph of indicated region, produced during primary research. In the upper department of postcranial bone is determined perforated by the blind break with the diametric type of wcund canal. Is densely shaded the image of defect in skull which is located in the region of the doge of venous sinuses into the place of their junctica.

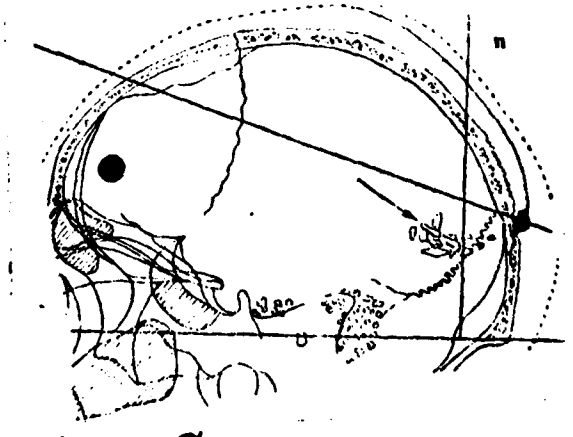


Fig. 118.

Fig. 118. Anatomical scheme from right lateral X-ray photograph of skull of the same wounded. Arrow/pointer showed bone scrap. Is carried out the horizontal line lower than which is located the region of ventricular system. From physiological horizontal is carried out vertical through middle of both halves of lambda suture. This vertical line corresponds to frontal plane, which can achieve the posterior crescent of lateral ventricle. Comparison with the X-ray photograph, represented in Fig. 117, shows that in a front-lower-internal sector of left frontal portion is located the shrapnel bullet. Bone scrap filled the initial unit of the wound canal for elongation/extent 5 cm and they are arranged to the right from falx cerebri. In the wound of the soft tissues of pan is located the fragment of helmet. It is doubtless, there is decomposition of upper sagittal sinus and average/mean department of lateral ventricles.

Page 385.

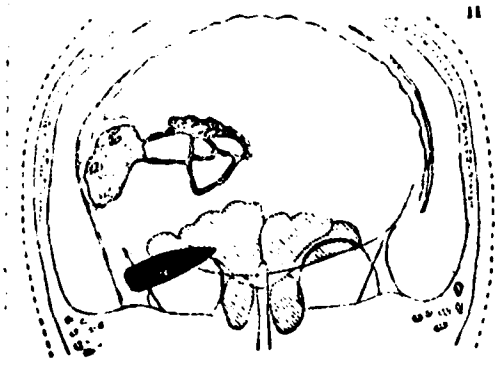


Fig. 119. Blind bullet wound of left frontal region. In MSB the wound was accept as tangent and it underwent surgical perfecting without primary X-ray research. Anatomical scheme from the front/leading survey X-ray photograph of skull, made 4 weeks after wound. In the left half of the scale of frontal bone is determined perforated blind break of skull with the angular type of wound canal after defective surgical perfecting. The image of defect in bone is densely shaded.

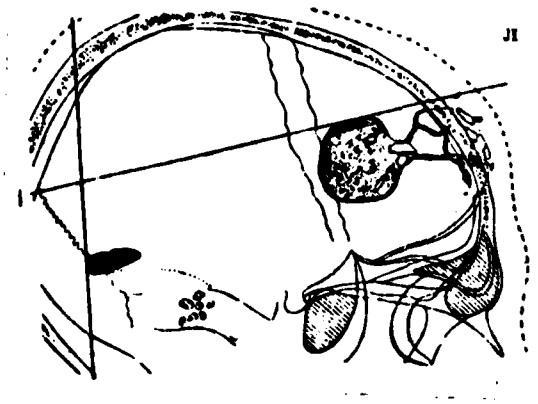


Fig. 120. Anatomical diagram of the left lateral X-ray photograph of skull of the same wounded. The image of defect in skull is densely shaded. Is carried out the horizontal, below by which is located the projections of ventricular system, and the vertical line which it reaches the projection of the posterior crescents of lateral ventricles. By dotted line it is designated projection of of cerebellar drift. Comparison with the X-ray photograph of that represented in Fig. 119, shows that in posteriorly lower section of the left half of the scale of frontal bone is a trepanation aperture. The internal edge of trepanation aperture adjoins the unfinished sector of crushing of frontal bone by value 4x3 of cm in region of which inert scrap were displaced towards the outside. (With the examination/inspection of head in this place it is discovered undamaged/uninjured skin). Bullets it is located in the area of skull, on the left half cerebellar drift, under rear crescent of left lateral ventricle. The point of bullet is turned toward the front and

towards the inside. The discovered data attest to the fact that the bullet entered the brain at sharp angle, hit against the internal surface of adjacent section of frontal bone and, after making ricochet, it recciled into left pcstcranial portion. Entire wound canal passed out cf cerebral ventricles.

Page 386.

For explaining topcgraphy cf the foreign body, located in the area of the skull are made two X-ray photographs in mutually perpendicular projecticns, namely: strictly lateral photograph and front/leading survey. But to relation to ethine to photographs there were developed the tentative, but sufficient fcr practical targets schemes of the relationships/ratios between the most important departments of brain and skull. On the basis cf the anatomical analysis of lateral X-ray photograph are established/installed the horizontal and frontal planes and which is arranged/located the unknown foreign body. Then is analyzed the frcnt/leading survey X-ray photograph, which is as if cut cf the head through appropriate frontal plane. Via ccmparisen the data, cbtained in both X-ray photographs, is determined the sagittal plane, in which will hit the ground the foreign body.

On the basis of roentgenological reference points is determined

the sector of brain, which is arranged/located in the point of the intersection of three planes indicated, and, therefore, is more precisely formulated the topography of the location of foreign body.

After full-valued primary treatment the wounds of skull apropos of perforated blind breaks during the control x-ray examination of bone fragments and available for distance/separation foreign bodies do not detect. If primary treatsent it was nct conducted, is possible the formation of the abscess of brain. The latter most frequently is developed in the region of location of bone fragments. Somewhat thinner/less frequent in later period abscesses appear also in the location of metallic foreign bodies. In this case sometimes is detected the displacement of foreign body under the effect of the growing infiltration of cerebral substance. After the recovery of abscess the foreign body occupies initial position/situation or is moved in opposite direction as a result of the cicatrical strain of brain. Considerably thinner/less frequent fcreign body proves to be connected into the abscess of brain and is moved directly in its area. With the abscesses of brain usually are displaced small fragments of metal. Large/coarse foreign bodies, in particular, bullet and shrapnel, can be turned in asceptic cystic areas which are formed around them as a result of degenerate changes in the cerebral substance. Furthermore, such large/coarse foreign bodies with smooth surface may to be moved in cerebral substance as a result of their

severity outside of connection/communication with suppurative processes. These phenomenon was noticed as far back as of the first world war (N. N. Burdenko, A. L. Polenov et al.) and repeatedly was observed during the Great Patriotic War.

Perforated through break. With perforated through breaks roentgenologically are detected two defects in skull and bone fragments which in the region of inlet are displaced inside skull, and in the region of output - primarily towards the outside from skull (Fig. 121 and 122). Input opening has high value on internal plate, than on external, similarly all defects in skull, which arise under the effect of the force, which operates from without. Outlet is formed under by the effect of the force, which operates from within, and because of this has large sizes/dimensions over the external surface of skull, than on internal. These special features/peculiarities distinctly are detected with emergence of bone defect into edge forming zone of X-ray photograph (Fig. 122).

Perforated through breaks, as a rule, will be deposited by bullets.

Page 387.

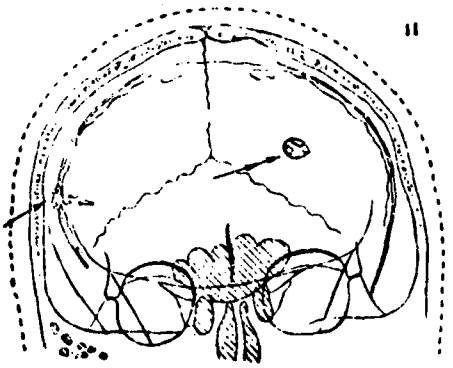


Fig. 121. Perforating bullet wound of left frontotemporal and right frontal region. Anatomical scheme from the front/leading survey X-ray photograph of skull, prcduced during primary research. Is determined the perforated through break of frontal bone with segmental type of wound canal. The inlet (it is shown by ordinary arrow/pointer) is located in lower third of left half rim suture. Is damaged the corresponding branch of average/mean tunicary artery. Outlet (by markedly double arrow/pointer) is arranged/located in the center of the right half of the scale of frontal bone. Both apertures have identical insignificant value. In the region of inlet were formed the smallest bone scrap which were displaced into the area of skull on the course of wound canal at the depth of 1.5 cm.

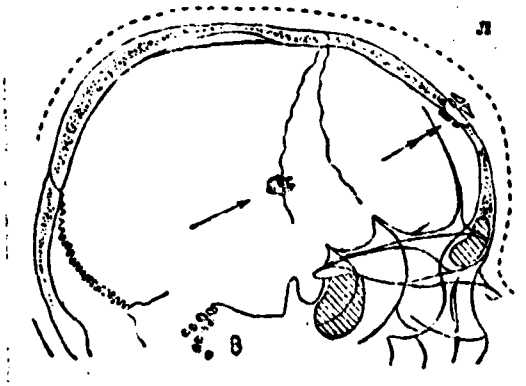


Fig. 122. Anatomical scheme from the left lateral X-ray photograph of skull of the same wounded. Inlet is shown by ordinary arrow/pointer, exit - dual. Area of exit opening is outlining. It is outlined well that in the zone of exit aperture the external plate is damaged for larger elongation/extent than internal, and that in this the place arose the large/coarser bone scrap, which were displaced towards the outside.

Page 388.

Depending on the value of the bearing/angle of the incidence/impingement of bullet, wound canal is segmental (Fig. 121 and 123) or diametric (Fig. 125). With these wounds frequently are damaged cerebral ventricles.

If the wound is plotted/applied of bullet which hit from

average/mean distance and possessed considerable translational energy, both defects in skull are of the same size (Fig. 121 and 122). In such cases both apertures in bone are formed under the action of identical force. With smaller translational energy of shell its force but transit time through the area of skull substantially changes, and therefore penetration effect proves to be less at moment of formation of exit. Then is detected not only penetrating, but also contusing activity bullet in consequence of which outlet proves to be more than intake (Fig. 123 and 126). The correctness of this position/situation is proven by the fact that with the identical sizes/dimensions of intake and outlet in skull never it is observed wounds with the incomplete mechanism. Meanwhile with the large value of outlet the energy of shell can prove to be such weakened that it is held up in the soft integuments of skull towards the outside from outlet in bone (Fig. 123 and 124). In such cases on skin there is only one wound (Fig. 123).

With wounds from very close distances the inlet can be more than exit (N. N. Burdenko).

From the group of perforated through breaks least heavy are that the wounds, with which roentgenologically are detected the identical sizes/dimensions of apertures in skull (Fig. 122). Then in cerebral substance is formed narrow wound canal without abrupt changes in

periphery. The insignificant decomposition of cerebral substance in the similar cases is ccnfirmed roentgenologically also by absence with these wounds of the associated cracks (Fig. 121 and 122). With perforating wounds from closer and more distant distances occurs the extensive decomposition of cerebral substance. This large damage is roentgenologically characterized by the considerable difference in the value of entrance and exit on skull, and also by the presence of cracks. The latter are formed under the effect of the strike/shock, which is transmitted tc the skull through the brain. Most frequently is detected one crack, which connects inlet with exit (Fig. 123) and attests to the fact that the cerebral substance in the appropriate department is hit against the internal surface of skull, is caused damage to bone itself is destroyed against bcne. Most frequently such cracks, which indicate the considerable damage of cerebral substance, are observed with segmental wounds (Fig. 123). With diametric wounds the transmitting strike/shock manages to weaken, and cerebral substance is contused against skull with smaller force, which is explained by the considerable distance which is between the wound canal in brain and internal surface of skull. However, also with diametric wounds rarely is detected the joining crack, which testifies about the vastness of the damage brain (Fig. 125). With wound from closer distances and, it is thinner/less frequent, with wounds by the weakened shells are developed the additional cracks, which exit from exits and inlets and from their ccnnecting crack

(Fig. 126). These wounds are the crank link between the perforated through and fragmented breaks.

X-ray diagnostics of fragmented breaks of skull.

Page 389.

With fragmented breaks roentgenologically it is detected the extensive zone of damage and the predominantly large/coarse bone fragments whose quantity varies. These fragments are formed mainly under the effect of the action of shell, which is transmitted to skull through the brain, and therefore the bone fragments are displaced to the outside from the skull in the direction of that force as a result of which they arose. As a result of the extracranial displacement of bone fragments is created peculiar decompression.

Depending on the character/nature of wound, the fragmented breaks acquire some peculiar features. Breaks of this type are obtained with the perforating, blind and tangential wounds. The fragmented breaks more frequently are developed with the perforating segmental wounds which will be deposited by the shell, which transmits to skull through the brain the strike/shock of considerable force. In such wounded during the x-ray examination sometimes are

detected two ordinary apertures - intake and exit and two bonding agents of their cracks which, girding the appropriate sector of bone, completely separate/liberate it from the surrounding sections of skull. Is formed one very large bone fragment, by which it is displaced to the outside from the skull (Fig. 127 and 128). Most frequently zone, which is located between intake and exit is crushed to a large quantity of bone fragments, which are displaced towards the outside. In these cases intake and outlets look like the sectors of a comparatively small/fine breaking up of bone, between which is arranged/located the zone of large/coarser fragments (Fig. 129 and 130).

The mechanism of the onset of the fragmented breaks with blind wounds is extremely close to that described. These breaks are developed in cases when blind-end wound will be deposited by the large/coarse foreign body, which exerts the large traumatizing activity. This shell, after penetrating in skull, crosses/intersects it along chord and stops, after being hit against the internal surface of skull. This sector and entire/all region, which connects it with inlet, consist of one or several bone fragments, which are displaced towards the outside.

The fragmented break is developed with tangential wound, if it is caused by the shell which possesses considerable energy and it

passes very deeply, concerning to brain. Such wounds by limber are through in relation to the soft integuments of skull, moreover in the region of the direct effect of shell is formed the zone of the small/fine breaking up of bone. Bone fragments sharply are displaced to the outside of skull; sometimes they destroy its soft integuments, they will be carried beyond the limits of wound and is left the long gaping defect in skull (Fig. 131 and 132). This aperture or zone of small/fine breaking up is encircled by the multiple cracks which appear under the effect of the lateral activity of shell. Because of this the edge of the defect indicated they are divided into the large/coarse fragments whose value grows to periphery (Fig. 131 and 132). All these bone fragments are displaced towards the outside.

With fragmented breaks sometimes completely is destroyed entire/all half of skull, front/leading or, is thinner/less frequent, posterior. More considerable damages are detected in those, who was killed on the field of battle.

With breaks of this type always there is The extensive and heavy damage of brain, inclined to be complicated by encephalitis and meningitis. Other infectious complications are less characteristic for these wounds.

After the primary treatment of the wound of skull apropos the fragmented break during the control x-ray examination of the small/fine fragments of bone in wound it is not detected. Large/coarse bone fragments are not driven cut; they gradually take shape. Much more rarely they partially are coalesced with the surrounding sections of skull.

Besides the indicated above basic elements/cells, detected with X-ray diagnosis of the bullet wounds of skull, limber is established/installed the series/row of the associated facts which can have vital importance for clinic. Such facts include the wounds of the cerebral ventricles of the paranasal sinuses and ear, branches of tunicary artery and venous sinuses.

The wounds of cerebral ventricles are diagnosed roentgenologically to the bases of the presence in them of metallic foreign bodies (Fig. 113, 114, 115 and 116) or bone fragments, and also the intersection with the wound canal of the zone of cerebral ventricles (Fig. 117 and 118) and, rarely, on the basis of ventricular pneumoencephalia.

The wounds of the paranasal sinuses and ear are diagnosed

roentgenologically on the dissemination on them of the zone of the straight/direct or indirect break of skull (Fig. 127, 128, 131 and 132). Damaged sinus usually proves to be shaded as a result of hemorrhage (Fig. 127, 128, 131 and 132). Very rarely with the wound pneumotized sectors of skull are developed pneumoencephalia.

The wounds of the branches of tunicary artery can be identified roentgenologically in cases when the corresponding sector of skull is crossed/intersected by the zone of straight/direct or indirect break (Fig. 121, 122, 127 and 128).

Venous sinuses are usually destroyed only in the zone of the straight/direct break of skull. The wound of sinus can be identified roentgenologically completely definitely only with the perforated breaks of skull on the basis of the disposition of bone defect in the region of the bed of venous sinus (Fig. 101, 102, 109, 110, 117 and 118). With the crushed and depressed breaks of the same localization the diagnosis of the wound of venous sinus can be set only supposedly, because with these breaks sinus is retained sometimes completely or decomposition it is limited to its only external wall. Venous sinus sometimes is not damaged, even if it strikes into the zone of fragmented break.

After all penetrating wounds of skull, which were being

escorted/tracked by the perforated and fragmented breaks, in brain appear large cicatrical and degenerate changes. The latter are sometimes sharply proncunced. It is developed hydroencephalia of different types, porencephalia, liquor cysts and cicatrical deformations of brain and ventricular system. These changes are especially sharply prorcunced in cases when ccursing cf wound is complicated by infection and is escorted/tracked by the development of protrusion of brain. All changes I could indicated be discovered only during x-ray examination with the use/application of methods of artificial contrasting.

The produced during the Great Patriotic War x-ray examinations cf wounded with the penetrating wounds of the arch/summary of skull attests to the fact that during primary x-ray examination was possible to a certain extent to reveal the pathcanatomical picture of wound and therefore to establish fact, necessary for judgment about further coursing of the wound of skull and brain in each individual case.

Page 391.

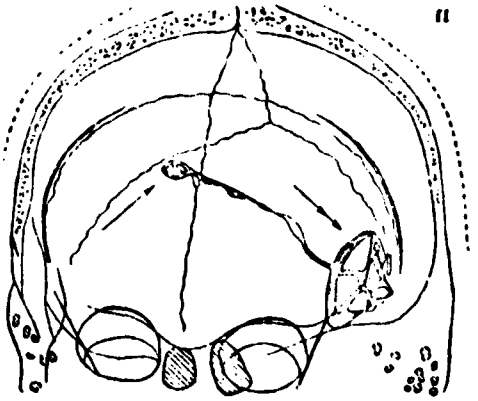


Fig. 123.

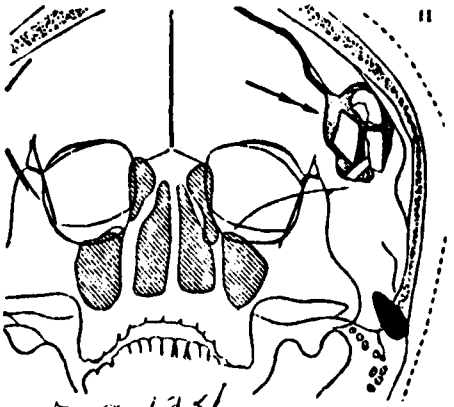


Fig. 124

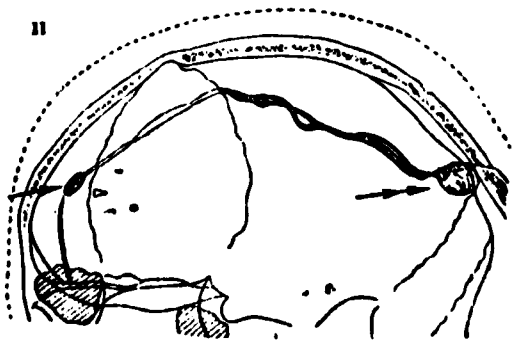


Fig. 125

Fig. 123. Perforating bullet wound of frontal region with "incomplete" mechanism. About the examinatien/inspection of wounded are discovered one wound, located cn forehead on the boundary of the heavy eared unit of the head on average/mean face. Anatomical diagram scheme from front survey X-ray photograph of skull, produced during primary research. In frontal bone is determined perforated through the break with the segmental type of wound canal. By ordinary arrow/pointer markedly inlet, located in the center of frontal squama. Inlet has very insignificant value; in this area was formed the smallest bone scrap. Dual arrow/pointer showed outlet, which has significant value and occupies posterior-lower department of the frontal squama. In the region of exit opening are large/coarse bone scrap, displaced toward the outside. (Skin and this place it is not damaged). Both defects in skull are connected by crack.

Fig. 124. Anatomical scheme from front/leading X-ray photograph of skull of the same wounded, produced in ncse-mentomeckelian projection. In the soft tissues of right malar region PDO by skin it is located bullet. Dual arrow/pointer showed outlet in skull.

Fig. 125. Perforating bullet wound of frontal and sincipital-postcranial region. Anatomical diagram from right lateral X-ray photograph of skull, produced during primary research. There is perforated break of skull with the diametric type of wounded canal.

By ordinary arrow/pointer is indicated inlet. It has quite insignificant value and is located downward from the center of the scale of frontal bone. Dual arrow/pointer noted outlet which doubly more than intake and is arranged/located in a posterior-the upper participation the cion of sincipital bone in lambda. Both openings are connected by the crack, which crosses/intersects the right half frontal bone and right parietal bone. The presence of crack testifies about extensiveness of the damage of the corresponding porticns of brain.

Page 392.

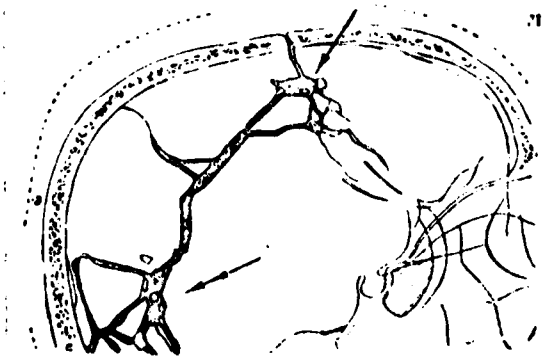


Fig. 126. Perforating bullet wound of left sincipital region. Anatomical scheme with left lateral the X-ray photograph of skull, produced during primary research. There is perforated through break of left sincipital bone with the segmental type of wound canal. Ordinary arrow/pointer showed the aperture which is located in the front/leading department of sincipital bone and has the significant magnitude. By dual arrow/pointer markedly outlet, occupying the posterior department of sincipital bone into the adjacent sector of postcranial. Both apertures are connected by the widely gaping crack from middle of which will withdraw additional crack. Near both defects is another several cracks. Is doubtless the extensive damage of the left hemisphere brain.

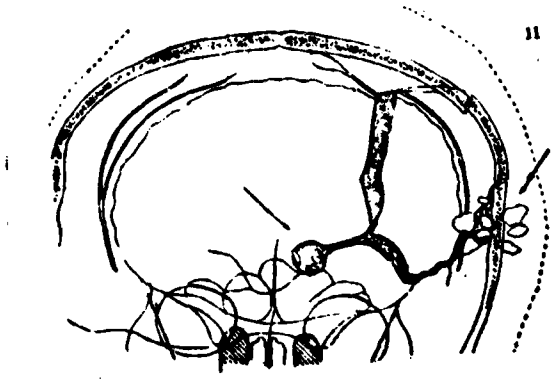


Fig. 127. Perforating bullet wound by the right frontoparietal of region. Anatomical scheme from the front/leading survey X-ray photograph of skull, produced during primary research. There is fragmented break of skull as a result of perforating wound. by ordinary arrow/pointer is shown inlet, located in lower-internal sector of the right half of the scale of frontal bone and occupying right frontal sinus/antrum. Double arrow/pointer is noted outlet, located in front lower department of right sincipital bone. The apertures are connected by two by the cracks which encompass and completely will separate/liberate from skull the right half of the scale of frontal bone and the adjacent department of sincipital. The forming very large fragment of skull was displaced to the outside. There are still several cracks one of which crosses both frontal sinuses. The latter are shaded as a result of hemorrhage (their image is left in the figure by that not shaded).

Page 393.

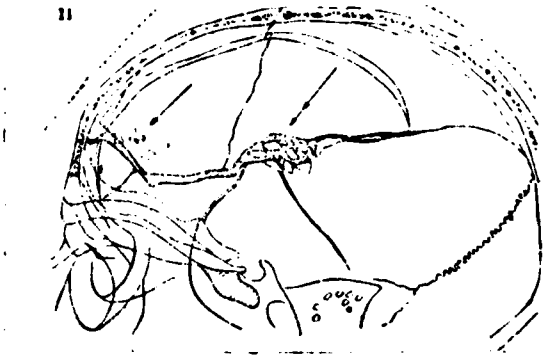


Fig. 128. Anatomical diagram from right lateral X-ray photograph of skull of the same wounded. Intake opening is shown by ordinary arrow/pointer, exit is noted by dual arrow/pointer. Is well visible the large/coarse scrap, which was separated/liberated from skull. Is doubtless the extensive damage of the frontal and sincipital portion of right hemisphere.

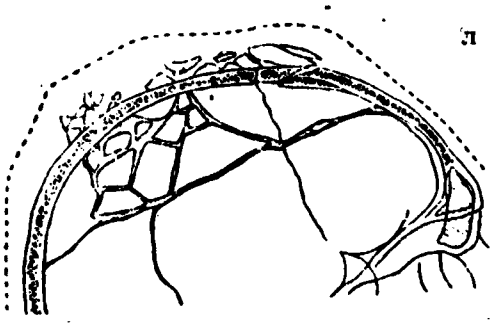


Fig. 129. Perforating bullet wound by the right frontoparietal of region. With the examination/inspection of wounded are discovered two point wounds on skin of head and deformation cf skull. Anatomical diagram from the left lateral X-ray photograph of skull of wounded, produced during primary cf research. In photograph is determined the extensive break the right half cf skull. Entire/all upper half right sincipital bone and that corresponding quadrant the scales of frontal bone were converted into a large quantity of scrap, sharply displaced to the outside. In the region of bregma and ir the rear-upper department of right sincipital bone are sectcrs of the small/finer fragmentation which correspond tc intake and cutlet. Is doubtless the extensive damage of right sincipital portion and partially right frontal.

Page 394.

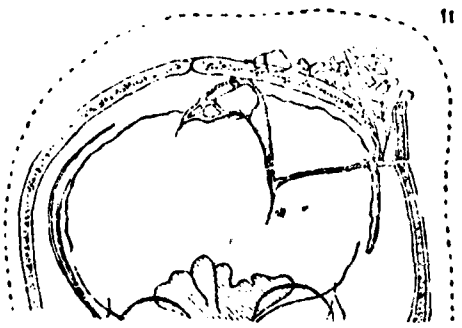


Fig. 130

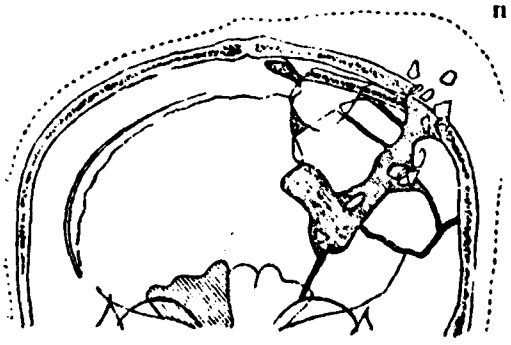


Fig. 131

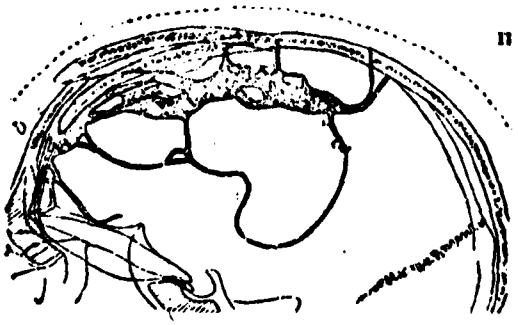


Fig. 133

Fig. 130. Anatomical scheme from front/leading survey X-ray photograph of the same wounded. Distinctly is outlined the considerable displacement of bone fragment tc the outside.

Fig. 131. Tangential bullet wcund by right frcntoparietal of region. Anatomical scheme frcm the front/leading survey X-ray photograph of skull, produced during primary research. There is an extensive fragmented break of the right half of the scale cf frontal bone and front/leading half right sincipital bone as a result of tangential wound. The section of skull indicated is crcssed by the slantwise arranged/located defect cf bcne in long in 12 cm. Formed in this region small/fine fragment of skull sharply were displaced to the outside. The adjacent sectors of the bone were divided into a large quantity of large/coarse scrap whose value grcws to periphery. These scrap were also displaced towards the outside. From the zone of break it will withdraw several cracks. One of them crosses/intersects right frontal sinus/antrum. The latter is shaded as a result of hemorrhage. Its image is left in the figure by that not shaded. Defect into bone and gaping cracks it is densely shaded. Is doubtless the extensive decomposition of the frontal and sincipital portion of right hemisphere.

[redacted].

Fig. 132.

Anatomical scheme from the right lateral X-ray photograph of the skull of the same wounded. Distinctly is outlined the displacement of towards the outside one very large bone fragment. The image of defect of skull and gaping cracks is densely shaded.

Page 394a.

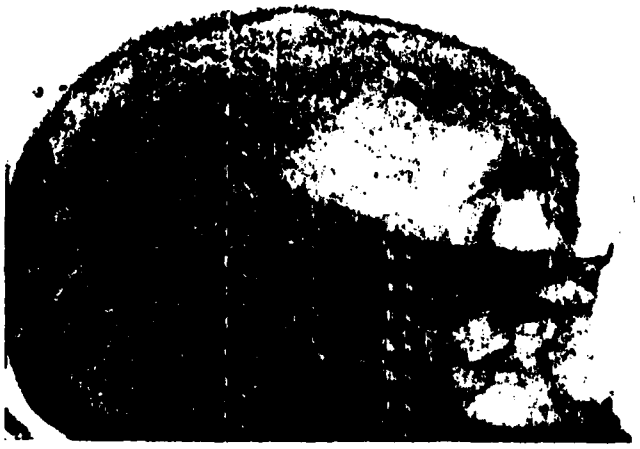




Fig. 133. On lateral X-ray photograph and explanatory diagram is

determined the gas pocket after 20 days after wound. Gradual decrease and disappearance of the bubble through 2 apparitors. Recovery without process/operation.

Page 394b.



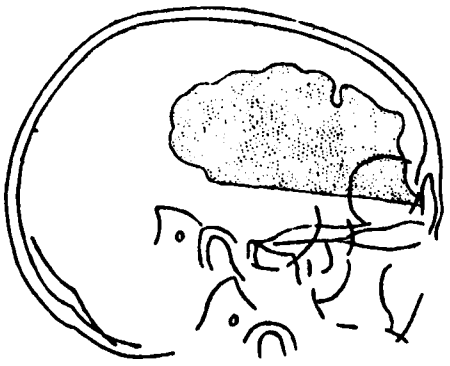


Fig. 134. Repeated closed injury of head. Grcznyys are the phenomenon of the growing lauding cf brain. On lateral X-ray photograph and scheme it is visible pneumoencephalia as a result of the break of internal wall of frontal sinus. Displacement cf brain by air bubble. Puncture of bubble. Puncture of bubble. Decovery.

Page 395.

During the x-ray examination of those wounded into the region of the basis of skull were detected the same types of damages. However, these wounds had a series/row of the special features/peculiarities which were determined by the peculiarity of the anatomical construction of different sectors of the department of skull indicated.

X-RAY DIAGNOSTICS OF THE DAMAGES OF BRAIN.

The possibility of obtaining X-ray- topographic data about the condition of brain by the method of craniography is determined by the presence of one or the other contrast bodies or formation which either were in brain to injury (petrificates of pineal gland, chorioid plexus, petrificates of falciform process) or they appeared with injury (bullet, metallic or stone fragments, bone scrap). On the condition of brain or about the processes, which developed in it, they made it possible to judge, first of all, changes in the position/situation of contrast bodies or education during wound process, and also determination of invisible to that new tissues

(petrificates in hemorrhages or in the shells of abscesses).

The discovered with X-ray analysis skulls of shadow of the spontaneously emergent air and gaseous accumulations in brain or its areas (pneumocephalus, gas pockets) and shadcws of protrusions of brain also gave the possibility to judge about some processes in brain and liquor spaces.

The presence of the gas pockets with craniography in those wounded into skull was noted by a number of the authors. Single opinion about the nature of the gas pockets nc N. N. Burdenko it voiced the assumption that the education of the gas pockets is connected with the develcpment ct anaerobic infection and abscesses of brain. However, the cbserved frequently fact of the disappearance of this gas for several days and even hours, noted by many authors, and absence clinical data also force to search for, except abscess, and other reasons for the onset of the gas pcckets (Fig. 133).

The gas pockets, which are observed sometimes above the horizontal level of fluid/liquid, in the distant periods after wound can testify about the presence of abscess. More frequent they are detected in wounded with craniography, produced during the first days after wound. Usually is noted the accumulatien of gas on the side of inlet, which occurs both with that processed and with the unfinished

wounds.

The appearance of a gas, most probable, it is explained by snifting into the area of skull following by the wounding shell. Phenomenon this, apparently occurs considerably more frequently than it is detected, since normal pressure in skull in the vertical position of the body lower than atmospheric. By this is determined the possibility of entry into the skull of the surrounding air, which escorts/tracks the rapidly moving/driving in the latter foreign body.

The resorption of air occurs during 1-2 days, if the gas pocket is contacted with the shells of brain, and it can continue during several days, if gas penetrated in cerebral tissue.

Page 396.

From the described group of the gas pockets in the region of skull, which are encountered only with bullet wounds, should be differed so-called pneumocephalus. The latter are encountered sufficiently rarely; they more rarely are observed with bullet injury, more frequent - with non-bullet, on there can be, also, with the closed injury the skulls. Usually the gas pockets were detected during the violation of the integrity of the internal wall of the air-containing areas of skull. As a result of the difference of intracranial and atmospheric pressure occurs snifting into the area of skull, moreover in external aperture is formed valve/gate. The

storage of air with pneumocephalus is sometimes very considerable and it leads to the sharp displacement of brain. Timely roentgenological identification and deaeration by puncture cease the terrible phenomena, possible with large pneumocephalus (Fig. 134).

Besides the cases of extracerebral air lock, during the massive injuries of the arch/summary of skull and the violation of the integrity of brain were observed also the cases of the penetration of air from pneumatic sinus into ventricles (spontaneous ventriculography).

Within the time of the Great Patriotic War were observed the unit cases of spontaneous ventriculography as the completion of the processes of decomposing/decaying the cerebral tissue after the extensive wound of the arch/summary of skull and formation of the direct coupling of the ventricle of brain with surrounding air. Are known the cases of the recovery of wounded with these complications. There is no doubt that among those been killed on the field of similar battle the pathological phenomena were more frequently.

Craniography was applied also with protrusion of brain. For an X-ray analysis they used soft rays or abbreviated/reduced exposures with photograph. Such an technology leaves "unpierced" skull, on gives the possibility, besides bone or metallic fragments, to come to

light/detect/expose the protruding soft tissues, homogeneous ones or different ones in their density and structure, badly/poorly distinguished in the ordinary photographs of skull. If preliminarily was conducted the puncture of area on the spot of protrusion with the subsequent introduction of air or occurred the penetration of air in area with encephalography, it was possible to see the level (or levels) of fluid/liquid with the air above it in the protruding unit of the brain or in its chambers/caseras.

Craniographic observation of protrusion of brain in its dynamics gives the possibility to note an increase in the sizes/dimensions of protrusion and its reverse/inverse retraction, and together with it and displacement into the area of the skull of unremoved/uneliminated metallic and bone fragments, which are found in the protrusion of brain.

The basic method of roentgenological observation which made possible within the time of the Great Patriotic War considerably to enlarge and to deepen our knowledge, to notice new phenomena and to create new views to processes in the traumatized brain, was encephalography.

The basic changes, reflected/represented by roentgenographic pictures in the traumatized brain and its shells, were caused mainly

by cicatrization, atrophic and adhesive processes. All these processes, which are observed simultaneously, are revealed/detected in X-ray photographs in changes in the ducts/contours and three-dimensional/space relationships/ratios both in the liquor system and in cerebral tissue.

Interconnection and combination of changes in liquor system, on one hand, atrophic ones, that wrinkle and Rubtscvs processes in brain - with another, give the possibility of roentgenologically comprehending and demarcating initial phenomena from secondary ones, and during similar pathcanatcmical processes to determine their different pathophysiolcgical genesis.

Page 397.

So, into some cases is revealed/detected the effect of the pulling of scar on the development cf protrusion of liquor spaces, in others - dependence of the latter on the atrophic degenerate and wrinkling processes in the unit cf the brain or in entire brain and finally in the third - effect of elevated pressure in ventricles with overfilling of them by cerebrospinal fluid on the subsequent development of the focus or spilled atrophy cf brain.

Dynamic roentgenological observation makes it possible to judge

about progressive coursing of process or about its stabilization during the compensation phenomena now is facilitated the explanation of diagnosis, and also prognosis of disease and selection of the method of treatment.

The aforesaid makes clear the artificiality of the separate description of the combined phenomena in brain and liquor spaces; therefore it is necessary to speak about Rubtsovs processes and hydrocephalus simultaneously.

There are instructions of the authors in the cases of hydrocephalus in initial period, however, as a rule, it is observed in later periods, during the development of the focus or spilled scarry-atrophic processes in brain, which call the phenomena of internal hydrocephalus. These phenomena progressively and unevenly grow to the specific for the present instance limit, which depends on many reasons.

With the penetrating wounds of hydrocephalus it is usually nonuniform it is asymmetric, it predominates on the side of wound.

Depending on the sizes/dimensions of the decomposition of cerebral tissue, direction of wound canal, intensity of inflammatory complications, degree of the subsequent degenerate processes and

development of cicatrization, are observed different degrees of the development of focus internal hydrocephalus.

The following scheme illustrates the development of focus internal hydrocephalus to the degree of porencephalia and protrusion (Fig. 135).

Protrusion of one or the other crescent or ventricle of brain can concern all its walls evenly or for large elongation/extent of one of its walls, which gives grounds to assume changes in entire appropriate sector of cerebral tissue. The character/nature of changes in these cases is the combination of cicatrical process with the atrophic changes in the cerebral tissue, which achieve large degree. Cicatrical changes in such cases have smaller effect on the walls of ventricle. The progressive development of atrophic-Bubtsovs of processes leads to the diffuse expansion of ventricle, moreover the reaction of individual section proves to be already less expressed.

In other cases is detected sharp protrusion of one of the walls of ventricle or even sector of this wall to wound defect (Fig. 136 and 147). In this case protrusion can have even the spiculate contours. This form of changes in the ventricle tells about the sharp effect of local traction, it is frequently connected with the

processes of rough local cicatrization and is noted with protrusion of brain, after the elimination of protrusicn, and also with the wounds, which are escorted/tracked by the prclonged festering of wound with considerable decomposition and by the rejection/separation of cerebral tissue. In the similar cases it is possible to assume the effect of the rough forms of cicatrization, which go from the side of the wound of soft tissues. However, these acute/sharp configuration in late periods gradually are smoothed, the phencmena of focus hydrocephalus increase, causing concept about the fact that in this period, besides cicatrization, occurred the considerable atrophic processes, capturing cerebral tissue for considerable elongation/extent from the place of direct wound (Fig. 137).

Page 398.

The phenomena of fccus hydrocephalus frequently achieve porencephalia. It is roentgenologically usually difficult to establish/install, it is porencephalia of true, i.e., actually/really whether is a direct coupling between ventricle and sub-arachnoidal space or is retained their dividing layer of cerebral tissue. The observations of the surgeons during war showed that in the majority of cases of the injury of brain such a connection/communication actually/really occurs, i.e., some surgeons they noted that from the slots between the windings which were not seen in X-ray photographs,

they issued themselves cerebrospinal fluid.

Distinguish porencephalias - tunnel or teniform, seen in X-ray photographs in the form of pipe/tube (Fig. 138), and also slit-shaped and cyst-like (Fig. 139). However, porencephalias frequently, apparently appear at the first moments of the wound of skull both as a result of the direct decomposition of brain and walls of ventricle by foreign body and as a result of the cracking of brain under the effect of hydrodynamic strike/shock. Furthermore, porencephalic cyst-like formations between ventricle and sub-arachnoidal space appears by combination of the foci of softening and decomposing/decaying the brain (Fig. 138). Are such cyst-like areas, detected with encephalography, intra-cerebral and connected with ventricle or intertunical those not connected with ventricles, to solve difficultly. These stereo-X-ray analyses do not usually also give response/answer to this question.

The experiment/experience of the Great Patriotic War showed that in the majority of the cases is observed connection/communication of these areas with ventricles, which indicates cyst-like porencephalias.

Finally, slit-shaped porencephalias, apparently which are frequently formed with bullet injury, roentgenologically are

diagnosed and become the visible only in cases when they achieve considerable width and in form and position/situation they can be differed from the sub-arachnoidal slots (if the same are).

In the cases of protrusion of brain (protrusion) the air, introduced with encephalography, usually makes it possible to reveal/detect the sharp displacement of ventricle and its wall to the side of the bone defect of skull. In this case the air usually does not penetrate in area, frequently forming in the protrusion of brain. But if air in a small quantity penetrates in them, then the ways of its penetration remain unclear: does go it through ventricle or directly from sub-arachnoidal slots, to say is sufficiently difficult. The supplementary puncture of brain on the spot of protrusion with the introduction to it of air usually makes it possible to reveal/detect area with the level of fluid/liquid in it or series/row of the connected areas with the partitions/septa between them (Fig. 140).

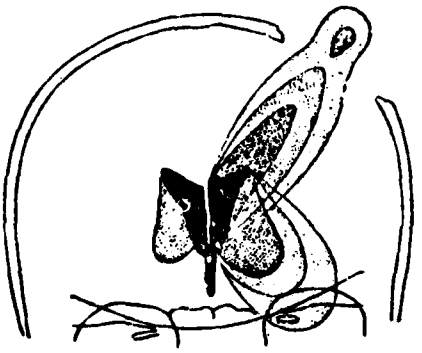


Fig. 135. Scheme of the forms of focus hydrocephalus. Regional hydrocephalus of front/leading crescent with crbital wound.

Page 399.

Combination of encephalography with the introduction of air directly to the protrusion of brain in the later periods of its development (with protrusion in initial period contrast procedure was not applied) gives the possibility in a number of cases to reveal/detect as the angular-figurative stretching of the wall of ventricle toward the protrusion of brain, that and contraction of the area of protrusion towards this stretching (Fig. 141). Thus, on the material of war came to light two points of view to the origin of the protrusion of brain. Some authors speak about necessary participation in its formation of ventricles, others consider equally possible protrusion of brain both with the participation of ventricle and

without its displacement.

Observation of protrusion of brain in its dynamics with the aid of craniography or pneumography tells about the decrease in it of area and reverse displacement into the area of skull together with the protruding sector of the brain of bone and metallic fragments, if the same in it were found.

Besides the described above forms of focus internal hydrocephalus, are encountered the cases of focus external hydrocephalus, also revealed/detected with encephalography. The development of focus external hydrocephalus becomes possible in the case of the absence of adhesive and obliterating intertunical changes in the region of injury during considerable cicatrization in this sector of cerebral tissue. The first condition rarely occurs with the open bullet injury, and therefore the regional external hydrocephalus is encountered usually as the consequence of the closed injury (see the appropriate chapter).

With the open bullet wounds adhesive phenomena in the region of direct injury and cicatrical changes in cerebral tissue lead to overfilling by fluid/liquid of hemisphere according to other side from the place of wound. In connection with this are observed the phenomena of external focus hydrocephalus along crescent-shaped

ligament on the side of wound, above the the cerebellar drift or in basal tanks (Fig. 142 and 143). With the extensive atrophy of brain the phenomena of external hydrocephalus can be expressed on entire arch/summary (Fig. 143).

It should be noted that with external post-traumatic hydrocephalus cerebrospinal fluid (air with encephalography) is usually saved/accumulated subdural. During chronic atrophic processes of the nontraumatic origin of this preferred expansion of subdural space it is not observed, and cerebrospinal fluid (air) is saved/accumulated in the sub-arachnoidal slots between the atrophying cerebral windings.

The phenomena of ventricular and near-ventricular changes were described for the first time in the Great Patriotic War by different authors by the name of ependymitis, ventriculitis, paraventriculitis, periventricular encephalitides. The experiment/experience of Great Patriotic War changed our representation about the unavoidable death of those wounded the ventricles. The roentgenological method of study made it possible to show a large number of relatively happy outcomes of through ones and blind wounds of lateral ventricles. There are also happy outcomes of wounds and third ventricle: to 70 wounds of ventricles, traced in the institute of neurosurgery, during x-ray examination into 26 noted disposition of metal fragments in

ventricle. The frequent delay of foreign bodies in ventricles is explained by the special feature/peculiarity of building/structure of the latter and by the presence in them of vascular webes/plexi. Among this group it is recorded of 4 cases of blind-end wounds with fragments in transverse tank.

Page 400.

The latter/last cases are referred in the group of the wounds of ventricles both on the similarity of momentums (frequent delay of foreign bodies in ventricles and tanks) and on the peculiarity of the manifestation of these wcunds.

All these wounds are escorted/tracked by the prolonged loss of consciousness, which will cost in connection with the violations of the integrity of arteries or veins in vascular plexus of ventricles or in tanks and by the disorder of blood circulation in the deep departments of brain. The prolonged loss of ccnsciousness can be the consequence of the direct or subsequent hemorrhage into ventricles or tanks. Decompensation it can advance, also, in late periods, as a result of the disorder of arterial or venous current in the depth of the brain under the effect of further Rubtsovs of changes or as a result of the education of bedsore in the wall of the vessel, which supplies these departments (Fig. 144).

The expressed considerations tell about the importance of detection and localization of fragments in the ventricles of brain and its tanks. This localization is established/installed with craniography on anatomical-X-ray-topographic data and accounting to the resistivity of the brain tissues, shells and vessels and frequent delay in connection with this of metallic fragments in duplicates of solid cerebral shell, in calloused body, in ventricles and tanks.

The adhesive and obliterating cicatrical processes between the walls of ventricle are expressed with encephalography by the temporary/time or stable absence of involution of entire ventricle or its unit (Fig. 145 and 146). In this case the shadows of air in ventricle or its unit either completely is nct or it is considerably weaker in the casualty ventricle.

The obliteration of the lumen of ventricle can be incomplete. Encephalography shows in such cases cross connection in the wall of ventricle - air can penetrate through waist of the ventricle (Fig. 147). Finally, there is the complete unit/block of the lumen of ventricle or the disconnecting cf its unit. If in the disunited crescent of ventricle is retained the unit of the vascular web/plexus, then subsequently in the region of the blocked sector are

developed the phenomena of occlusion hydrocephalus. Encephalography makes it possible in this case to reveal/detect "bluntness" or deficiency/lack in one of the crescents of lateral ventricle. Puncture into the region of the missing crescent detects at its place the isolated/insulated hydrocephalic area with fluid/liquid, and the substitution of the latter by air in combination with encephalography helps to decipher this area as the disunited hydrocephalic unit of the lateral ventricle.

Speaking about the injury of ventricles and the adhesive obliterating changes in them, one should indicate also the opposite phenomenon of hydrocephalus, as a result of the paraventricular scar-atrophic changes, which develop with the injury of skull after secondary hydrodynamic strike/shock on the walls of ventricle.

Finally, in the Great Patriotic War against the general/common/total background of hydrocephalic ventricles paid to themselves attention low ventricles.

Low ventricles it was possible to see in the relatively small percentage of the cases so with that opened, so also with the closed injury of skull in different periods after wound. The presence of low ventricles with the contiguous walls and the spiculate bearings/angles speaks, that the traumatic process proceeds without

the phenomena of overfilling of cerebrospinal fluid in ventricles, in the absence of hydrocephalia is faster with phenomena of reverse order/formation, at the lowered/reduced intracranial pressure - hypotension.

Page 40Qa.

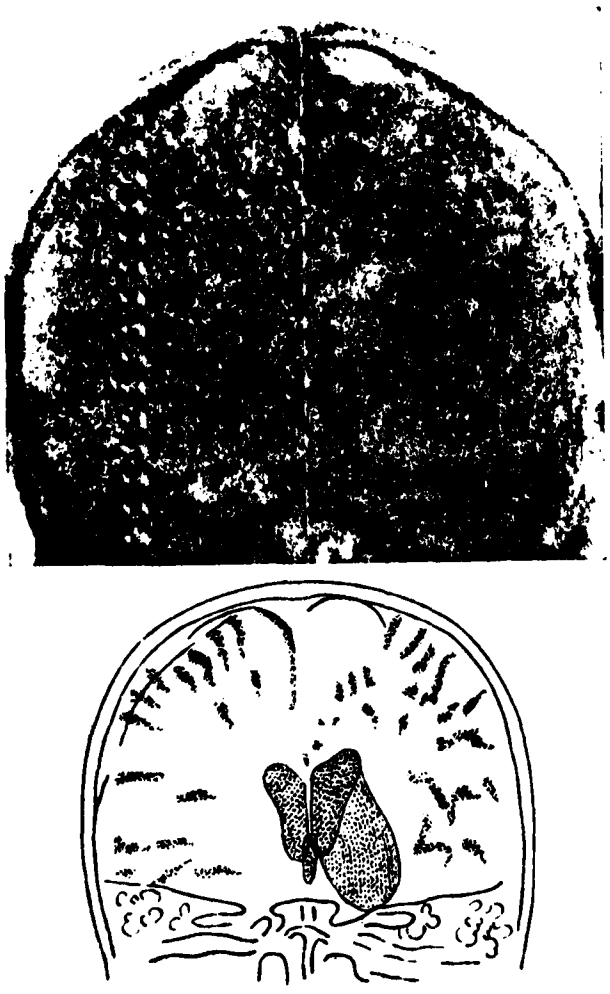


Fig. 136. Asymmetric hydrocephalus of front/leading crescent.

Page 400b.

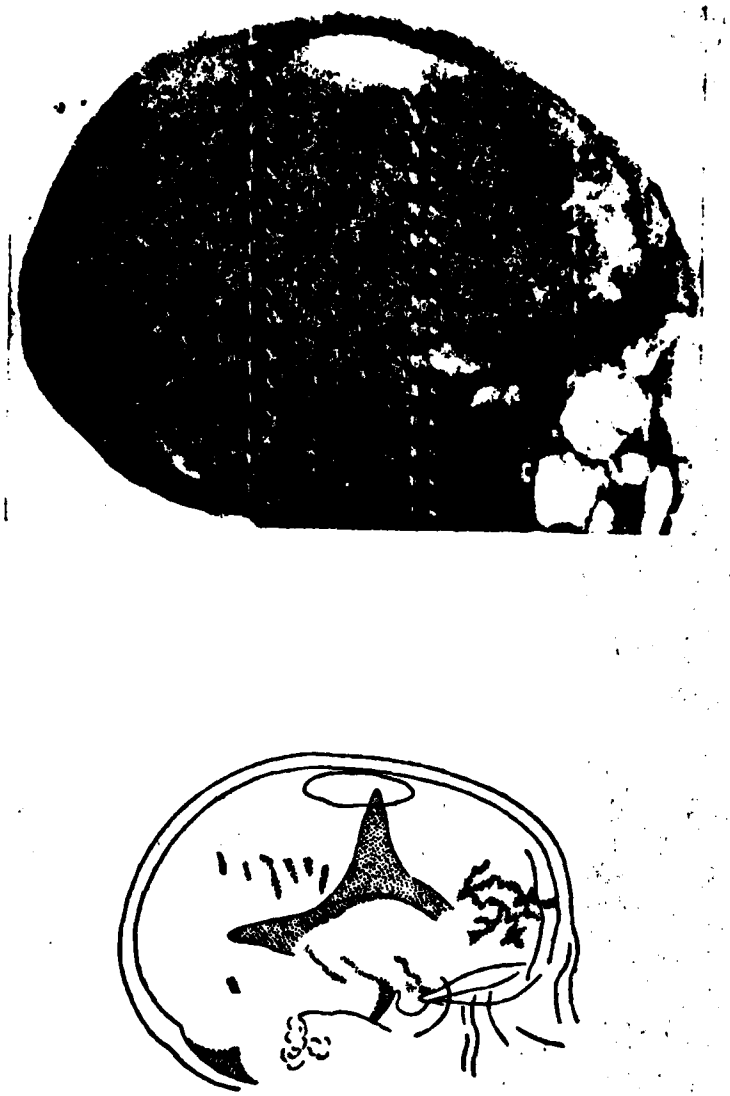


Fig. 137. Angular-figurative stretching of upper wall of ventricle as a result of pulling by scar.

Page 400c.



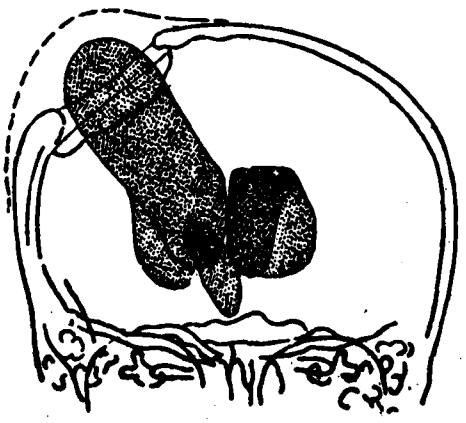


Fig. 138. Porencephalia in the form of wide tunnel.

Page 400d.



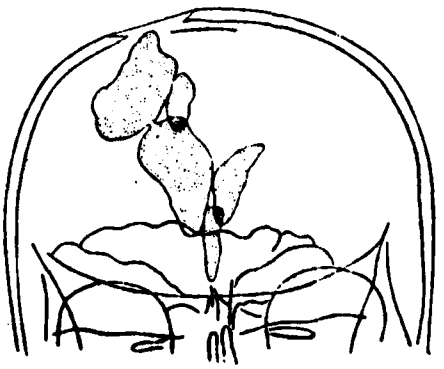


Fig. 139. Cyst-like porencephalia.

Page 400e.



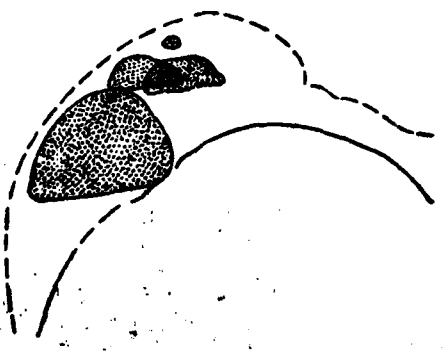
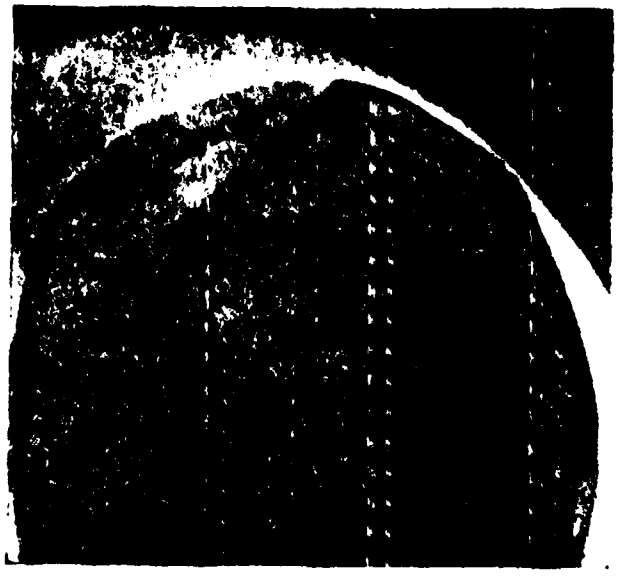


Fig. 140. Series/row of areas with levels of fluid/liquid in them after introduction of air to protrusion of brain.

Page 400f.



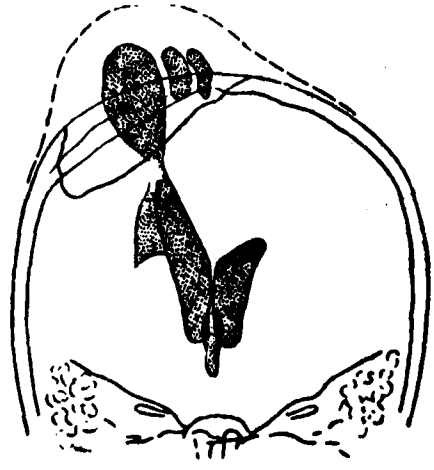


Fig. 141. Rupture of ventricle of brain.

Page 400g.

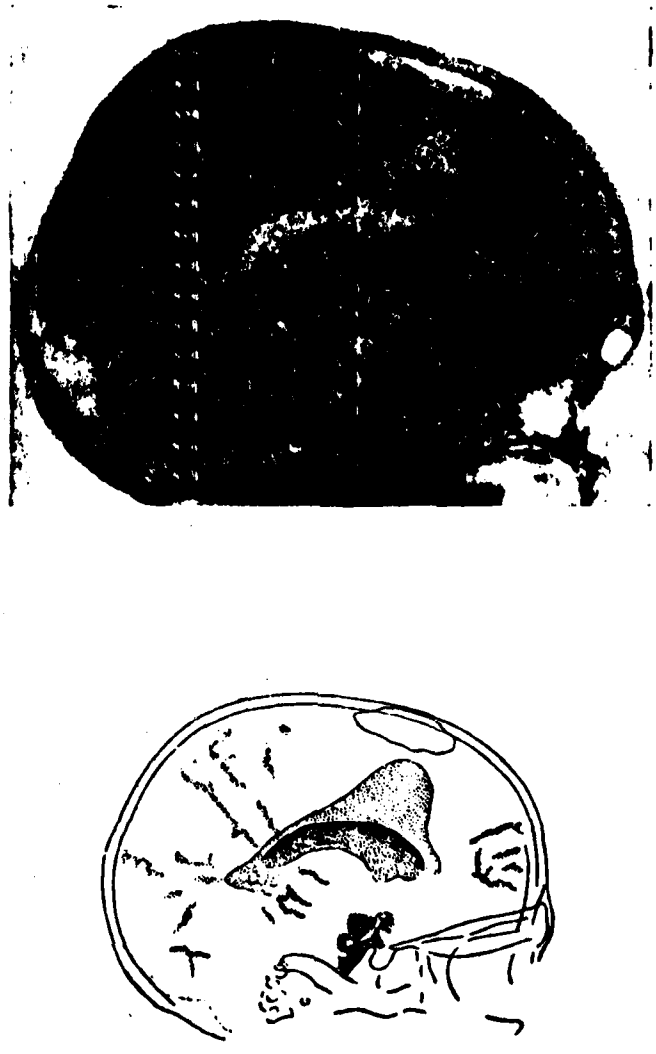


Fig. 142. External regional of hydrocephalus in near-cellular tanks as a result of cicatrization in region of sincipital parasagittal wound.

Page 400h.

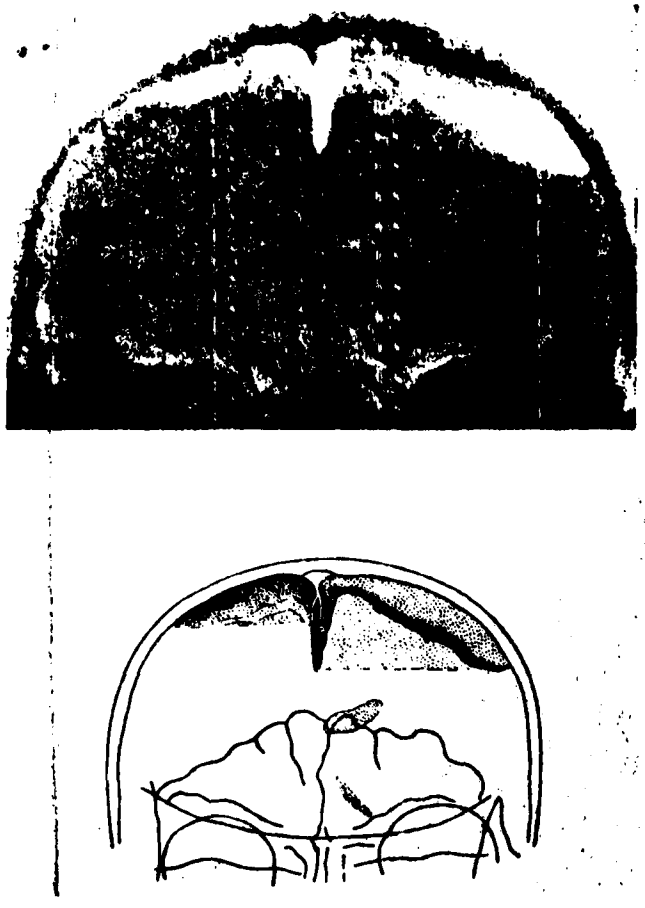


Fig. 143. External spilled hydrocephalus 2 1/2 years after penetrating wound of left temporal region.

Page 400i.

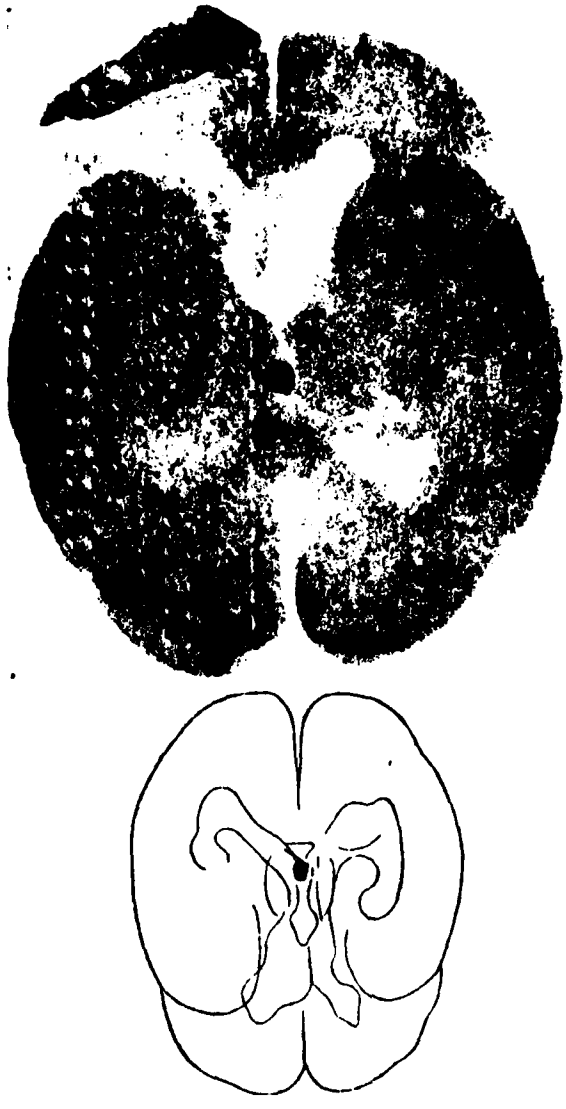


Fig. 144. Fragmentation wound of frontal bone on the right. Fragment is arranged/located toward the rear from III ventricle in transverse tank. Paroxysm with phenomena from the side of III ventricle. It died 2 years after wound. On autopsy the abscess is not discovered. X-ray photograph of the layer of brain - metallic fragment in scar tissue in transverse cistern.

Page 400j.

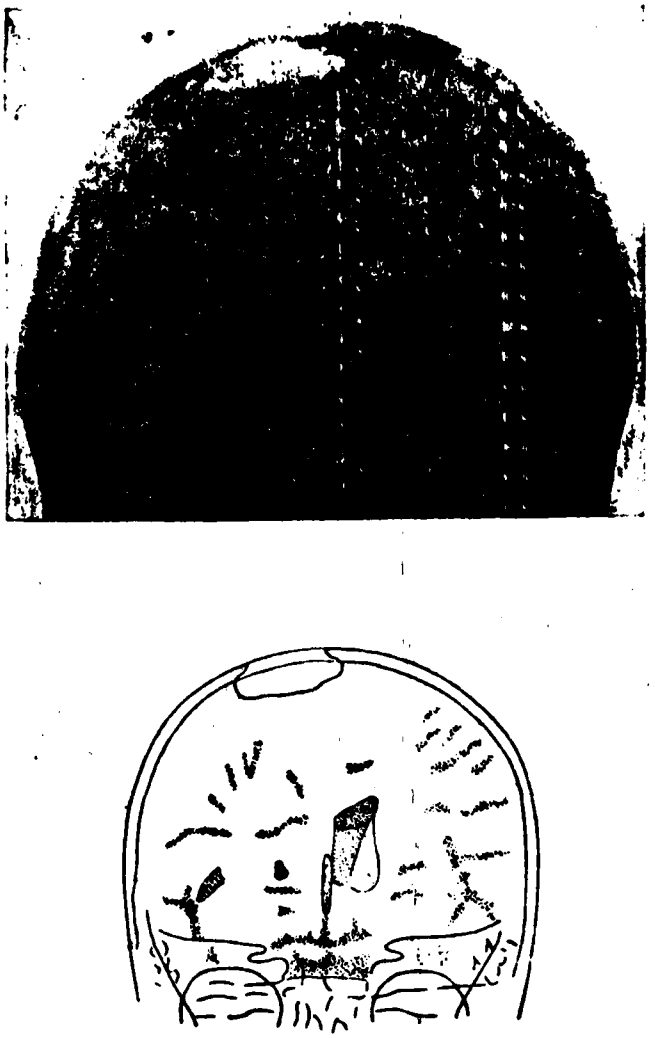


Fig. 145. Wound of lateral ventricle by fragment. Obliteration of the significant part of the lumen of ventricle. Air penetrated in lower crescent.

Page 400k.



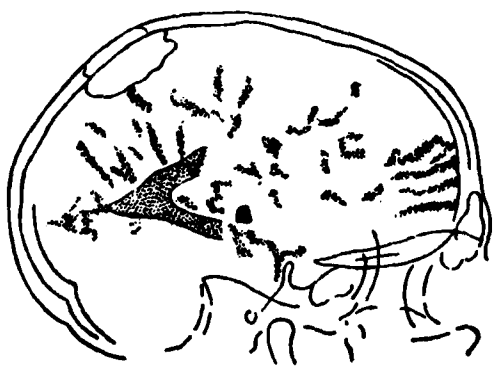


Fig. 146. Lateral photograph and anatomical scheme from X-ray photograph of the same wounded.

Page 4001.



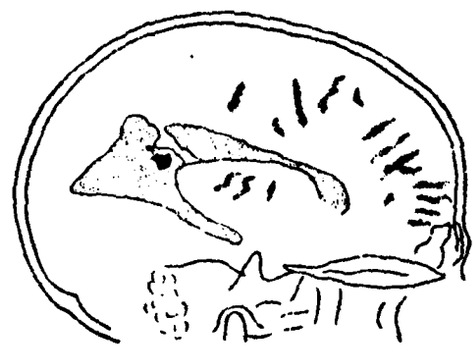


Fig. 147. Fragmentation wound of triangle of lateral ventricle. Encephalography through 2 1/2 years. Cross connections in ventricle. Posterior horn hydroencephalitic.

Page 400m.

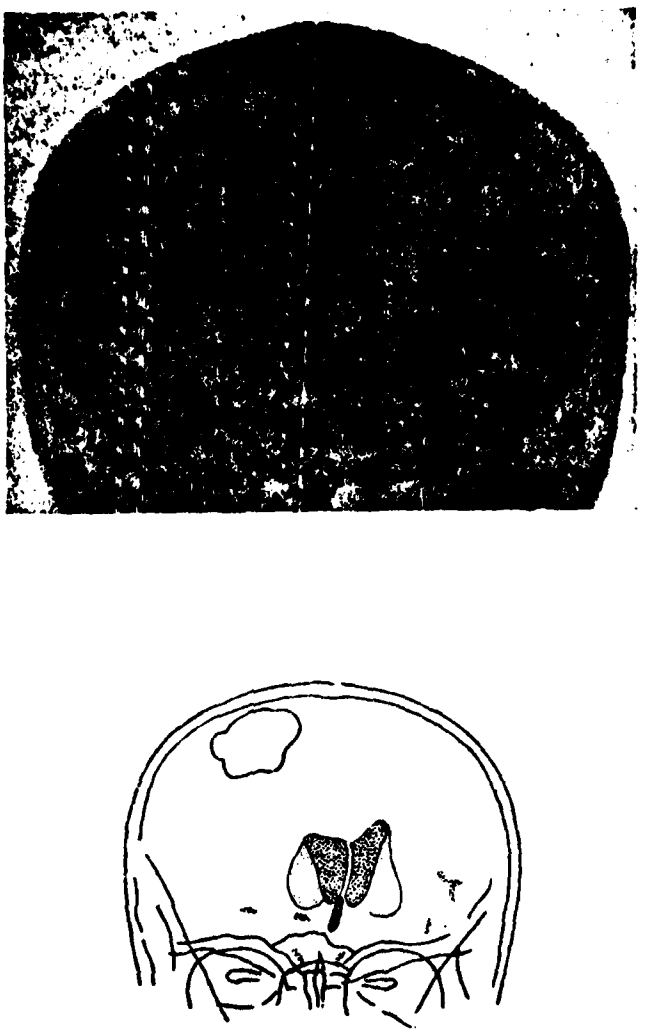


Fig. 148. Post-wound operating defect of bone. Compression of ventricle on the side of abscess. Displacement of ventricular system into contradictory/opposite from abscess side.

Page 400n.



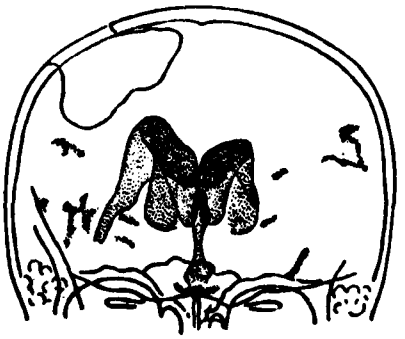
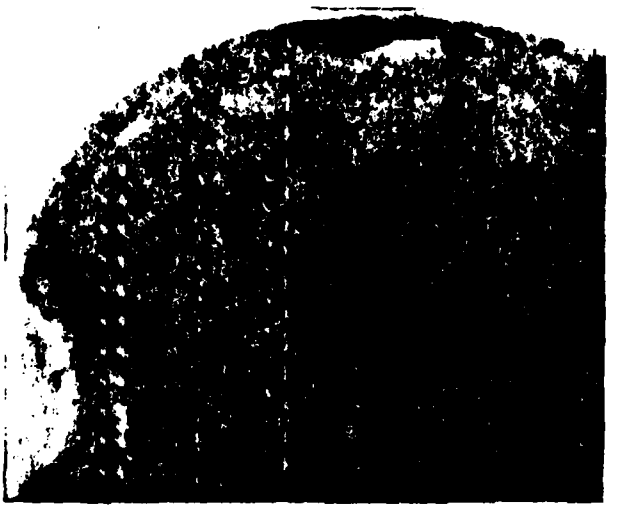


Fig. 149. Restoration/reduction of form of ventricle and development of regional hydrocephalus in the same wounded through 1 year 3 months after process/operation of separating abscess.

Page 400o.



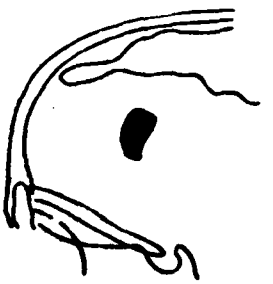


Fig. 150. Metallic fragment in zone of abscess.

Page 400p.

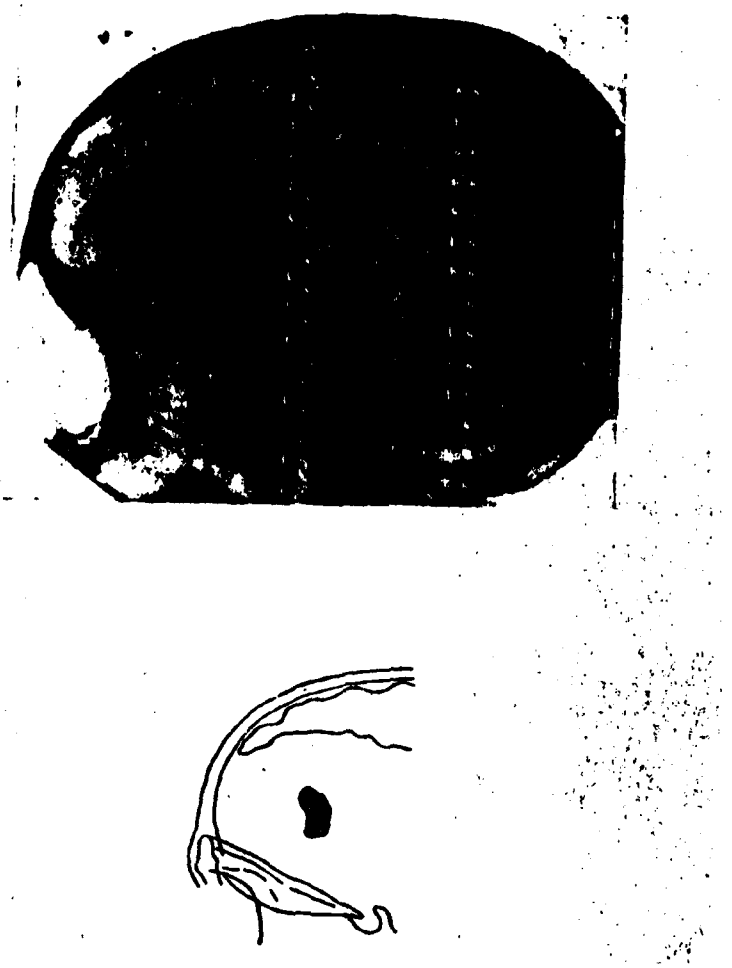


Fig. 151. Change in position/situation of foreign body after emptying of abscess.

Page 400q.



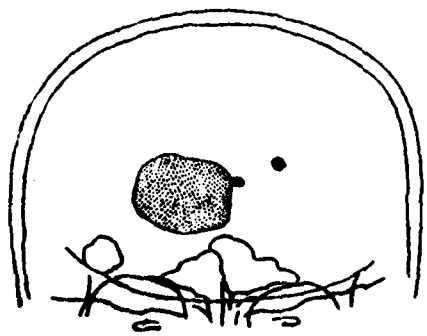


Fig. 152. Abscessography with air.

Page 400r.

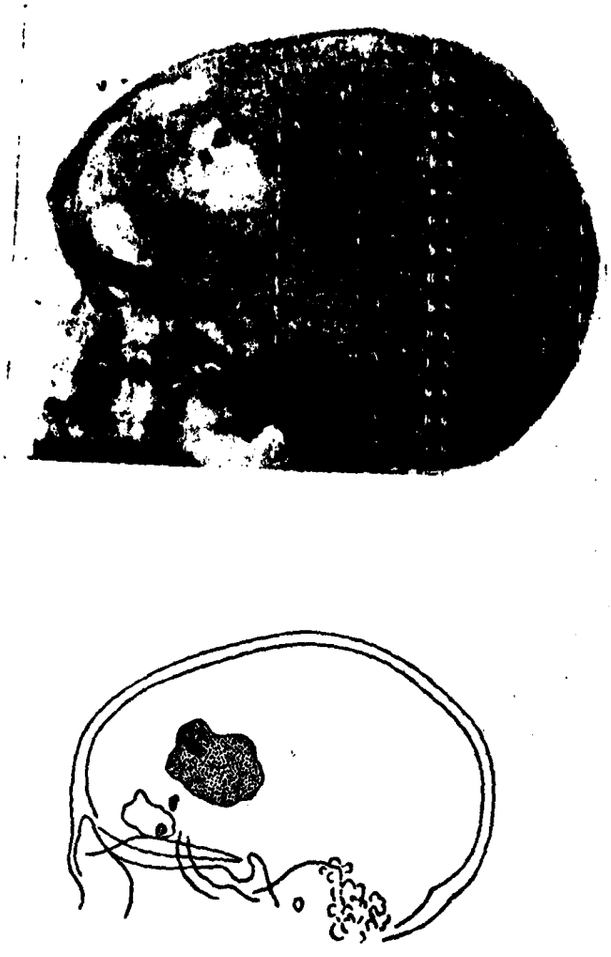


Fig. 153. Abscessography with air.

Page 400s.



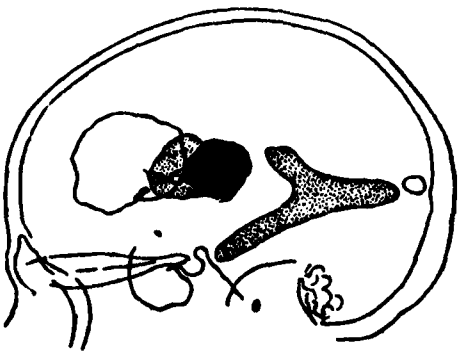


Fig. 154. Abscessography with thorotrast and air. Compression of the front/leading crescent of ventricle.

Page 400t.

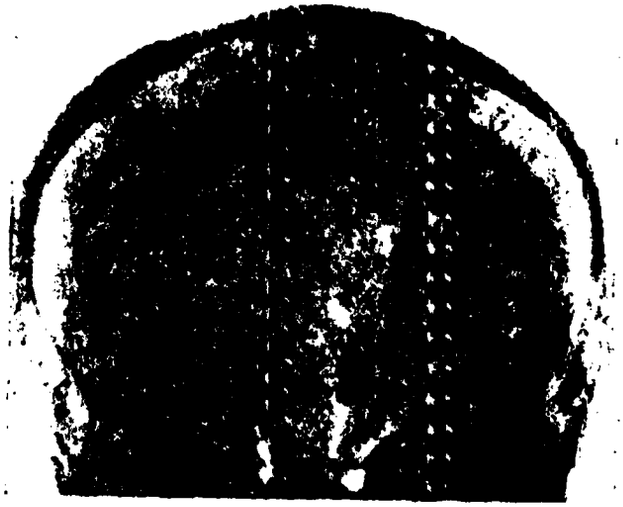




Fig. 156. Encephalography 3 weeks after abscessography with thorotrast. Ventricle on the side of abscess was not fulfilled. one-sided with abscess adhesive arachnoiditis. Is the moderate internal hydrocephalus on opposite side.

Page 800a.



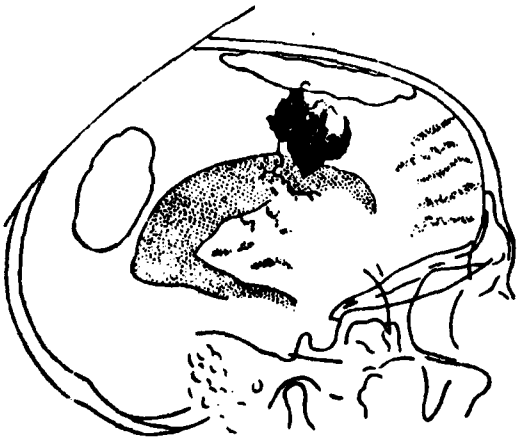


Fig. 157. Lateral photograph and scheme from X-ray photograph of the same wounded.

Page 400v.

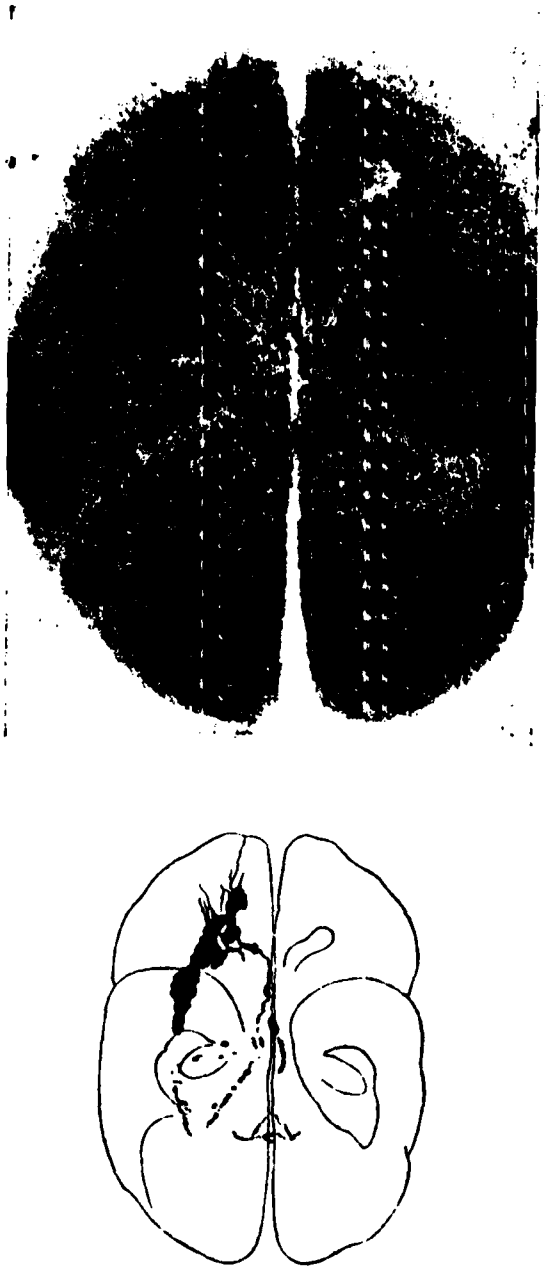


Fig. 158. Wound of frontal portion. X-ray photograph of the layer of brain. metallic fragment in III ventricle. Abscess of frontal portion. Penetration of abscess on wound course into front/leading crescent. Thorotrast in ventricles.

Page 400w.



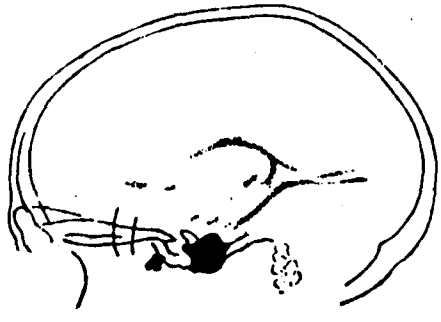
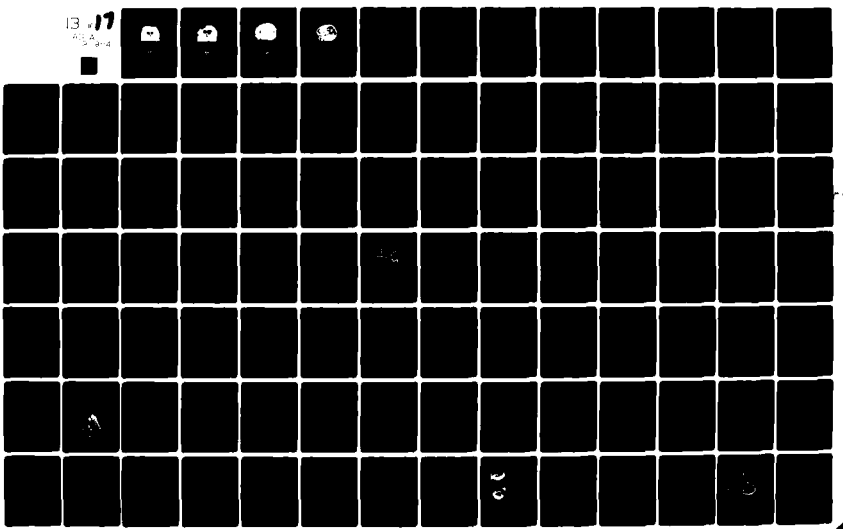
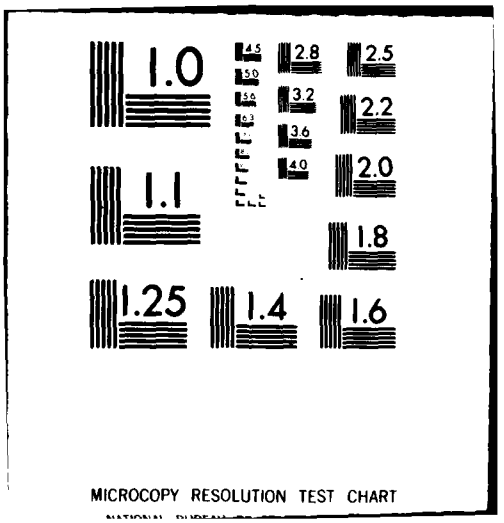


Fig. 159. Fistulography with thorotrast is shown presence of anastomosis of wall of ventricle with abscess. Recovery.

AD-A090 984 FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OH F/G 6/5
THE EXPERIENCE OF SOVIET MEDICINE IN THE GREAT PATRIOTIC WAR 19--ETC(U)
FEB 80 V N SHAMOV, B A SAMOTOKIN
UNCLASSIFIED FTD-ID(RS)T-1925-79 NL




1.0
1.1
1.25
1.4
1.6
1.8
2.0
2.2
2.5
2.8
3.2
3.6
4.0
4.5
5.0
MICROCOPY RESOLUTION TEST CHART

Page 400x.



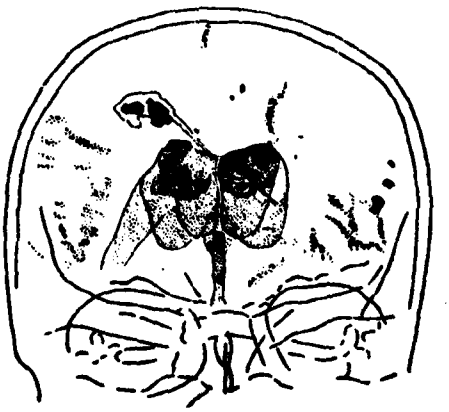


Fig. 160. Fragmentation wound, complicated by meningoencephalitis.

Page 400y.



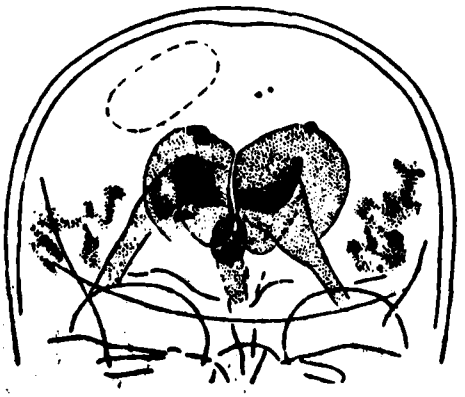


Fig. 161. The same wounded through 1 1/2 years. Development of internal open hydrocephalus.

Page 400z.

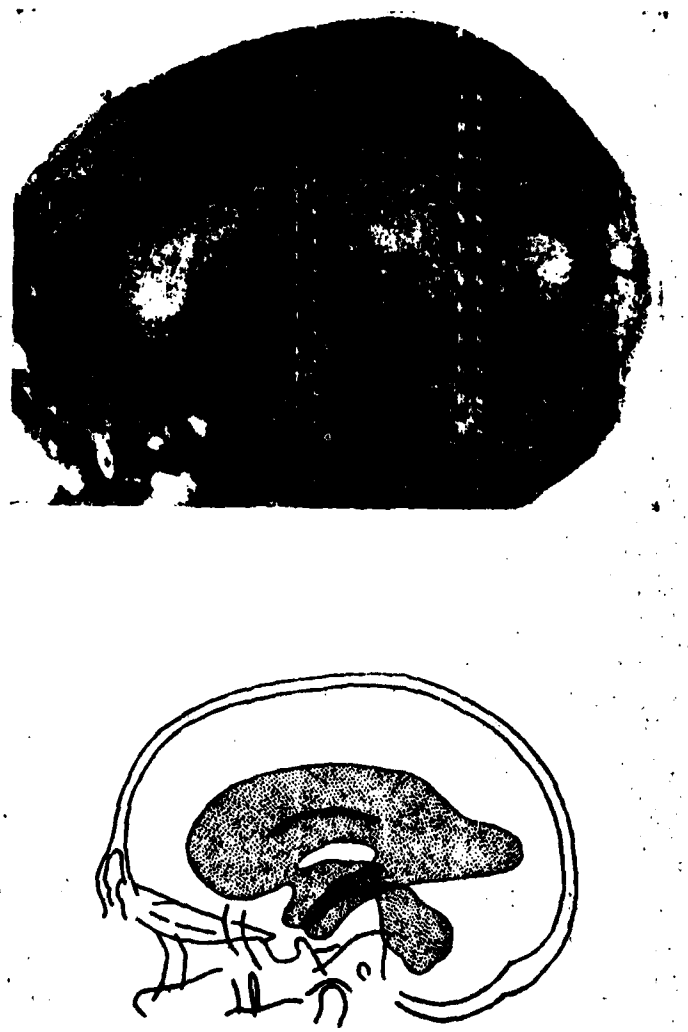


Fig. 162. Internal posterior hydrocephalus. Unit/block of aperture of IV ventricle after injury.

Page 400aa.



Fig. 163. Traumatic arachnoiditis. Sub-arachnoidal slots are nonuniform, expanded and incorrectly arranged/located.

Page 401.

The numerals of intracranial or lumbar pressure in this case either considerably lower than normal or sharply descend in comparison with the preceding/previous periods of wound process. There is another point of view: in the opinion of some authors, low ventricles represent the phenomena of their compression with bloating and edema of brain. This treatment is permitted only for the small unit of the cases of the compression of low ventricles, besides taking place compulsorily with the phenomena of hypertension.

Abscesses of brain. Abscess in undamaged/uninjured skull is reflected/represented with encephalography as tumoral education, by an increase (as a result of infiltrative processes or bloating) in the mass of brain and by compression and by displacement of ventricles from the side of abscess.

During war with bullet wounds the abscess of brain was encountered comparatively frequently and with difficulty it was distinguished; therefore it was the object/subject of permanent roentgenological studies. However, our prewar information about

abscesses proved to be insufficient. It was necessary to consider the changing conditions of the damaged and disrupted skull. The defect of the bones of skull, sometimes for large elongation/extent, and also decomposition and loss of the unit of the cerebral tissue in the field of wound created new conditions for the onset of abscess on the side of injury with bullet wounds. porencephalia, protrusion and cicatrical processes in the region of wound even more reinforced the displacement of brain to the side of the wound defect of skull. Therefore the cardinal and comprehensive in peacetime roentgenological sign/criterion of abscess - compression and displacement of ventricles to opposite from focus side - for wartime proved to be insufficient. The presence of the sign/criterion of compression and displacement of ventricle was proof of the presence of abscess. But also the absence of this sign/criterion or, on the contrary, stretching and displacement of the ventricles into the side of wound defect, indicating the predominance Rubtsovs of processes, in any way do not eliminate possibility the developments of abscess.

The experiment/experience of the Great Patriotic War showed that in the roentgenological diagnosis of abscesses, besides of the moments/torques of the violation of cranial box and defects in cerebral tissue, it is necessary to consider the stages of the development of abscess. Abscess and its surrounding tissue into different stages of the development of process give different and

even contradictory/opposite volume ratios of constituents. Abscess in the period of its development is escorted/tracked by an increase of the mass of brain, whereas in the period of reverse/inverse development by decrease. Thus, ventricle or ventricular system, depressed and displaced from the side of abscess in one period of its development, prove to be displaced and prodtruding to reverse side, i.e., to the side of abscess, in other period.

The experiment/experience of war showed that the X-ray diagnostics of abscesses it is necessary to differentiate on three periods of their development: 1) the period of the formation of abscess, 2) the period of the formed abscess even 3) the period of the outcomes of abscess.

During the x-ray examination of abscesses were applied craniography, encephalography, abscessography and fistulography.

1. In development period and formation of abscess, that are escorted/tracked by infiltration and bloating of surrounding cerebral tissue, craniography can show displacement of cone-shaped gland or ossificate in crescent-shaped ligament to side, contradictory/opposite to abscess, and also displacement of located near abscess metallic fragments, if they were fixed in preceding X-ray photographs.

Page 402.

Encephalography in this period detects the compression of the wall of ventricle, its deformation and displacement of ventricle or entire ventricular system to the side, contradictory/opposite to abscess (Fig. 148 and 149). Sub-arachnoidal slots and tanks on the side of abscess are constrained and are not filled by air. Fissura Palii, if in it are trails of air, is bent from the side of abscess.

2. In development period of formed abscess, when walls of abscess consist area, filled with pus, craniography, besides signs/criteria of preceding/previous period, can reveal/detect gas pocket above level of fluid/liquid. In this period craniography can show transfer or turning of metal fragment, if the latter proved to be in the area of abscess (Fig. 150 and 151).

With encephalography are detected the same phenomena as in the first period, compression and deformation of ventricles and sub-arachnoidal slots from the side of abscess.

Abscessography (as function of the form/species of contrast media) is revealed/detected area with gas (Fig. 152 and 153) or by

contrast suspension with the levels, which are displaced conformably to the position/situation of head and to the physical properties of the used contrast media (Fig. 154). In this case it is explained form and sizes/dimensions of the area of abscess and ratio to it of bone and metallic fragments (Fig. 155).

3. In reducing period and initial period of abscess, in connection with elimination of infiltrative processes and development of atrophic ones, that wrinkle and Rubtsovs of phenomena around abscess, occurs decrease of area of abscess and cerebral mass around it. Previously displaced from the region of the development of abscess identification contrast bodies return to their places. craniography in this period shows either the gas pocket or displacement of cone-shaped gland nor of petrified inclusions in crescent-shaped ligament nor displacement of metallic fragments in brain. During comparison with the X-ray photographs of the development period of abscess it is possible to establish that the identification reference points, if they were displaced, return to their initial positions.

In late periods craniography detects calcification on the spot of abscess.

Encephalography in this period does not give the cardinal

signs/criteria of abscess. There is neither compression nor displacement of ventricles. Ventricle on the side of the abscess either of normal form or even is expanded. In this period frequently is observed the asymmetric internal of hydrocephalia with predominance on the side of abscess. In connection with the considerable phenomena of cicatrization is possible even the flat stretching of the wall of ventricle to the side of abscess (Fig. 149).

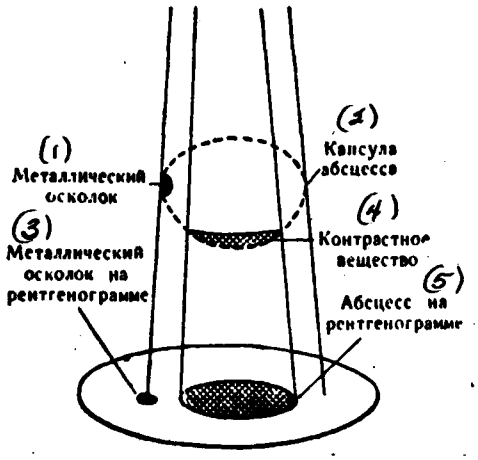


Fig. 155. Dummy representation according to roentgenogram about the disposition of metallic fragment out of abscess.

Key: (1). Metallic fragment. (2). Capsule of abscess. (3). Metallic fragment in X-ray photograph. (4). Contrast substance. (5). Abscess in X-ray photograph.

Page 403.

Sub-arachnoidal slots and tanks on the side of abscess, if there were not grown over are freed/released and can be expanded. Dynamic observation of the abscess whose walls are impregnated thorotrast, introduced into earlier periods, shows the decrease of the area of abscess and the wrinkling of its walls (Fig. 156 and 157).

With other outcomes, in the cases of the penetration of abscess into the sub-arachnoidal space or into the area of ventricle, abscessography or fistulography is shown the dissemination of contrast substance on the windings of brain or on the walls of ventricles.

Detection on the autopsy of the place of the penetration of abscess into ventricle or sub-arachnoidal space is difficult even under the condition of intravital introduction to the area of the abscess of contrast substance, which can easily be seen, if to make an X-ray photograph from brain or its layer (Fig. 158).

The experiment/experience of the Great Patriotic War ascertained that with contemporary methods of treatment the penetration of abscess of ventricles always is not lethal (Fig. 159).

During the war indicated were encountered the cases of dummy abscesses. Similar picture can give traumatic granuloma, differing in no way with encephalography from abscess. The correct decision/solution of a question is possible only upon consideration of all clinical and laboratory data, which is unconditionally compulsory with the selection/analysis of the sums of any X-ray examination, undertaken apropos of the injury of brain.

Festering scar, which takes place without the appropriate perifocal changes, which do not call a sclid increase in the cerebral tissue, roentgenologically differs in no way from the common picture of that characterizing scar.

Hematoma sub-arachnoidal and epidural in late periods after injury can be discovered with craniography only on the developing in it calcification.

Encephalography with hemotomas detects usually sufficiently evenly the displacement of ventricular system with certain flattening of the nearest to hematoma wall of ventricle. Sub-arachnoidal slots on the side of hematoma with air are not filled.

Arachnoidites revealed/detected roentgenologically with one or the other degree of adhesive phenomena, by which they are escorted/tracked. Especially extensive these phenomena are, if the injury of skull was complicated by infection. In the cases, which flowed/occurred/lasted with meningitides, the sub-arachnoidal slots of an entire hemisphere or even both hemispheres both on arch/summary and on the basis of skull can be obliterated and impassable for air with encephalography. The disconnection of the resorbing function of shells for large elongation/extent conducts to accumulation of cerebrospinal fluid in ventricles or in basal tanks, if they are

free. Development of internal progressive aresorptive hydrocephalia of that opened attacks/advances in the cases, if the apertures of the fourth ventricle are free (Fig. 160 and 161), and hydrocephalia of that closed, if if openings of Majandi and Lushka are not obliterated. In the latter/last cases (basal arachoidites) the air with encephalography neither into ventricles nor into sub-arachnoidal slots passes, and they are revealed/detected only with ventriculography (Fig. 162).

Buildup of fluid/liquid in ventricles and pressure buildup in them lead to progressive atrophy of the white substance of brain.

Page 404.

Determination by the methods of the encephalography of formation of new connections/communications between ventricles and sub-arachnoidal slots (into tanks - posterior, transverse, pericellular, calloused body) tells about certain compensation and stabilization of process.

With the wounds, which are not escorted/tracked by extensive meningitis, the zone of the dissemination of adhesive changes usually captures only more or less extensive, but organic area around bone defect. Subsequently this zone of restricted arachnoidite somewhat is

narrowed.

With traumatic arachnoidites, which take place without the participation of infection, especially with the closed injury, adhesive phenomena do not bear the so/such spilled and extensive character/nature. the obliterated sectors are alternated with free ones, moreover free sub-arachnoidal slots are represented overfilled by fluid/liquid. The form of slots is incorrect, they expanded, short, connected (Fig. 163). Individual slots can be so extensive that resemble by themselves the cysts (finger-shaped arachnoidites). Extensive arachnoidal cysts should be differed from porencephalitic areas, and also from the consequences of the chronic atrophic diseases of cortex and white substance of the brain of the nontraumatic origin, with which is retained distribution of slots but to cerebral windings.

Treatment of the uncomplicated wounds.

Healing of the uncomplicated penetrating wounds of skull and brain is reduced in essence to the primary surgical perfecting of the wound, produced in the proper time, under the proper conditions and properly, and also to the postoperative observation and care of wounded, up to the complete healing of wound and recovery of wounded.

Comprehensive composite radiation/emission of the pathomorphological, pathophysiological, bacteriological and clinical special features/peculiarities of the wound of skull and brain in its complicated dynamic coursing, beginning with the moment/torque of onset and ending with the healing, made possible to solidly establish/install the following positions/situations which became the basis of the contemporary exercise about bullet wounds in war: 1) all bullet wounds, including of wound of skull and brain, in effect they are bacterially contaminated; 2) all bullet wounds, including of wound of skull and brain, in principle are subject to primary surgical perfecting in the volume, which depends on general character/nature the wounds and the general condition of wounded up to the moment/torque of process/operation.

A question about readings to the primary processing of wounds with the penetrating wounds of skull and brain in the Great Patriotic War obtained other completely fundamental installation and permission. The results of this proved to be in the highest degree fruitful and pronounced directly on increase quantities and qualities of active surgical perfecting of wounds in comparison with the preceding/previous wars.

Page 405.

According to some data, during the first world war it was operated by 50.0o/o of all wounded with the bullet breaks of skull. In the Great Patriotic War the frequency of surgical interventions with the penetrating wounds achieved 70.5o/c, moreover to each wounded fell into 59.0o/o of cases one process/operation, into 10.0o/o - two and into 1.5o/o - three and more than process/operations.

At the same time, was observed a considerable descent in the frequency of traumatic and infectious complications the decrease of lethality, significant increase in the number of those completely recovered.

A question about contraindications to the primary perfecting of the wound of skull and brain could not be solved standard, but it required strictly individual approach to each individual wounded, his sober evaluation from the fixed points of view pointed out above. By basic contraindication to the primary perfecting of wound was the very extensive wound, incompatible with life, which was being escorted/tracked by massive destructin of of arch/summary or basis of skull, by gaps or defects of cerebral shells for large elongation/extent, by wound of large vessels, by deep and extensive decomposition of one or two hemispheres cf brain together with the walls of cerebral ventricles and paraventricular education and

finally the heavy wounds of brain stem. The significant part of these wounded perished in the field of battle. However, in connection with an improvement in the quality of the medical service of wounded and an improvement in their carrying out from the field of combat, from rapid and cautious transporting to foremost stages evacuation some of these heavily wounded remained in living ones. Surgical interventions for certain unit of them immediately on delivery/procurement in specialized KhPPG were aimless and nonproductive, but additional operational injury - disastrous.

Contraindications to perfecting from the point of view of the condition of wound primary provided for first of all the degree of freshness and contamination of the latter, and also the presence of the expressed inflammatory changes in the periphery of its and suppurative process in it. Depending on the conditions indicated was solved usually a question about character/nature and volume of surgical intervention.

Finally, a question about contraindications to perfecting, depending on the general condition of wounded and his capability to transfer this process/operation, was solved in each individual case. In this case thoroughly was estimated the physical and mental condition of wounded. The presence of heavy general condition made it necessary to usually temporarily plot/deposit the primary perfecting

of wound until wounded could not be put into operable condition.

In the presence of shock surgical intervention was counted, as a rule, contrasted to the moment/torque of the elimination of shock. For this purpose energetically were utilized all antishock substances (heating of wounded, transfusion of blood, antishock solutions, the injection of morphine, the designation/purpose of hot drinking, fault, heart substances, etc.). Nonfulfillment this rules led to sad consequences, since severe wound injury as a result of transportation and furthermore sometimes in cold season, it was complicated and delivering operating injury was already fateful.

The comatose or soporic condition of wounded, caused by direct severity and massiveness of the wound of brain, was serious contraindication to process/operation as a result of the threat of the death of these wounded either during process/operation or soon after it. In these cases was shown expectant therapy with the use/application of symptomatic substances, directed by an improvement in the general condition.

Exclusion represented only those wounded, whose loss of consciousness grew gradually after wound as the symptom of the progressive the intracranial pressure increase as a result of internal hemorrhage or acute traumatic edema of brain.

Page 406.

In the similar cases the wounded underwent urgent process/operation from vital readings. The heavy disorders of respiration testified about the disorder of the function of brain stem and, in particular, medulla oblongata, and they were also almost always terrible precaution against additional and in the majority of the cases useless operating injury. The disorders of ingestion served as absolute contraindication for any surgical treatment. Convulsive fits, status erylerticus and sharp psychc-motcr excitation were relative contraindication for the primary perfecting of wound. After the energetic unsuccessful attempts to remove these spasms and to rest wounded with the aid of conventional medicinal/medicamentous means (morphine, chloralhydrate, hexenal) surgical intervention was sole substance to take victim away from this condition.

Purulent meningitis earlier was absolute contraindication for surgical intervention. Recently in connection with the use/application of sulfanilamides this question was reviewed. After the energetic reception of sulfanilamides ("strike/shock") during 2-3 days of wounded with meningitis it is possible to operate. When was produced the timely primary perfecting of wound, lethality proved to

be much smaller.

On the basis of bacteriological data (S. V. Kryzhanovskaya) by most favorable period for the primary prccessing of the wound of skull from the point of view of microbial contamination occur the first day after the wound when the presence of pathogenic microflora is smallest, and the sterility of the medullary layer of the highest. By 2-3 and day after wound a number of bacterially contaminated layers of the wound of soft tissues somewhat grows/rises with the parallel incidence/drop in the sterility of bone wound to 29.7o/o and cerebral to - 30.0o/o. Thus, primary processing within these early periods (to three days) is completely favorable. On 5-6th day a number bacterially contaminated layers of the wound of soft tissues grows/rises to 82.1o/o with a descent in the sterility of bone wound to 25.2o/o and cerebral - to 19.3o/o. The conditions for the deferred processing of wound to the 5-6th day are less favorable, than within earlier periods, but nevertheless it is incomparably more favorable than within later periods. By the 7th day more lately usually sharply rises a number of microbial contaminated layers of the wound of soft tissues - to 92.0o/o, with the signs/criteria of the generalization of infection with the sharp incidence/drop in the sterility of bone wound - to 13.0o/o and cerebral - to 14.0o/c. Process/operations in this late period in the majority of the cases are unfavorable, since, begining on the seventh day and it is later, all layers of wound

become sharply contaminated and infected.

The bacteriological data indicated confirmed the main conclusions of clinico-statistical observations about a considerable deterioration in the conditions for the primary processing of wound, beginning with the seventh day even later.

The proof of this is an increase in the quantity of abscesses of brain, emergent after primary processing penetrating wounds of skull, produced after 6 days after wound, from 9.0 to 17.5o/o. Besides the data indicated, to a deterioration in the conditions for the primary processing of wound contributed also attacked/advanced during this period next phase of swelling and dehydration of brain, which relieved the phase of traumatic edema which grew after wound approximately to 6 days and were created the favorable conditions of the "immobilization" of brain and wound infection, because of the ceasing dissemination of this infection on sub-arachnoidal space and the perivascular lymphatic spaces of the parenchyma of brain.

Page 407.

Thus, on the basis of clinicostatistical and bacteriological research it is possible to secrete the basic periods of the primary processing of the wound of skull and brain: early - into the first 3 days after

wound, so-called deferred - in time from 4 to 6 days and late - after 6 days after wound.

To these periods of the primary processing of the wound of skull and brain to a certain extent corresponds its appearance. According to the data of Leningrad Front, 88.3o/o of all pure/clean wounds were observed into the first three days after the wound; wounds with the inflamed edges: to the 3-4th day - 48.9o/o and to 2-5th day after wound - 82.0o/o. Finally, 76.8o/o of all purulent wounds fell to the 7-8th wounds.

Recognizing as uncontestable the old rule to perform processing the wound of skull and brain within possible the earlier periods - into the first three days when under the proper conditions is still possible the imposition of anechoic suture, should be nevertheless considered completely permissible and advisable the deferred processings (to 4-6th day after wound) and even late processings (after 6 days) under the condition of the careful and cautious selection of wounded and corresponding operation technology.

From the very beginning of the Great Patriotic War the Soviet neurosurgeons developed widely extended the comparatively simple, minimally traumatizing and sufficiently radical operational technique of the primary neuro-surgical processing of the wound of skull and

brain, the ensuring sufficiently careful cleaning/purification of all layers of wound, in the majority of the cases smooth course and comparatively rapid healing of wound. under local anesthesia was conducted the carving of the wound of soft tissues and trepanation of defect in bone before the appearance of the unchanged solid cerebral shell (see Fig. 42 and 43). Average sizes of bone defect with such an technique of processing ordinary perforated blind and plumb breaks did not exceed 3-4 cm.

During processing of the wound of solid cerebral sheath is required special care, since cerebral shell protects the uninjured sector of brain and sub-arachnoidal space in area of the trepanation defect. In the overwhelming majority of the cases (blind-end, tangential, ricocheting wounds) the dimensions of the defect of solid cerebral shell they were small and in diameter they were inferior to cerebral wound. More extensive damages and gaps of solid cerebral sheaths were observed only with perforating segmental and some contact wounds with large-splintered breaks and mixing of bone scrap towards the outside.

After removal of fragments of bone in the limits of healthy/sound solid cerebral shell the surface of the latter in the periphery of defect was cleaned by acute/sharp spoon from its covering blood clots and soldering themselves scrap of internal bone

plate. Then were extracted bone fragments, after which of the depth of cerebral wound began the outflow of cerebral detrite with the blood clots (see Fig. 44). The exposed edge of solid cerebral shell in the majority of the cases in no way they cut all over or cut all over very economically in periphery to avoid disturbance of joints with the soft cerebral shells, protecting sub-arachnoidal space from the penetration into it of infection. Especially one ought not to have spared the integrity of solid cerebral shell before processing of the cerebral wound, from which is possible the liberation/excretion of the infected cerebral detrite and foreign bodies.

Page 408.

Only with the defile of the aperture of the solid cerebral shell, which impedes processing cerebral wound, were conducted small cuts in periphery within the limits of the existing joints of cerebral shells.

Processing cerebral wound according to the principle of its radical carving in the limits of healthy/sound tissues, which was being persistently propagandized by Hartel and Venson under military conditions proved to be completely unacceptable. Therefore it was necessary to be restricted to simple emptying and

cleaning/purification of wound canal in brain from its contents - cerebral detrite, blood clots, bone fragments, available metallic bodies and other inclusions/connections and random contamination (beams of hair, scraps of tissues, etc.), packed in into the depth of brain by shell.

For this purpose was used the biological capability of brain of self-purification and for ejection from the depth of the wound of its contained under the effect of the increased intracranial pressure and pulsation brain.

This simple and almost physiological purification method of cerebral wound underwent its further development and improvement during the Great Patriotic War in the form of the series/row of the technical methods of an artificial increase in the intracranial pressure (cough, sneezing/popping, stretching/straining and also compression of jugular veins or ventral wall of wounded or inhalation by them ammonium hydroxide). During the use of artificial methods of intercranial pressure increase it is necessary to observe care in order not to increase or not to renew hemorrhage in brain. Nevertheless one this method for cleansing of wound it is usually insufficient, especially during the late processing when liquid cerebral detrite begins already partially to be resolved and they are organized. Arose need to additionally wash wound canal in warm

physiological or, it is still better, by antiseptic solutions (Rivanol, streptocide or peroxide of hydrogen), which contributes to the rejection/separation of blood clots, small pieces of the become numb brain and free foreign bodies (see Fig. 45). Great removal was given usually to the distance/separation of all bone fragments, which constantly clogged cerebral wound and arranged/located usually at the depth of 3-5 cm and only in the exceptional cases (with the ricocheting parasagittal wounds) of achieved depth 6-7 cm. These bone fragments, which possess capacity to cause the education of the early abscesses of brain, were driven out under the control of X-ray photographs. Most small/fine from them spontaneously were secreted and were eluated together with detrite and blcod clots. The others were extracted with the aid of anatomical tweezers or Volkmann's spoon. Since the unit of the bone fragments proved to be that deeply submerged in the wall of wound canal and is easy to be left in brain, it was necessary to thoroughly monitor cerebral wound on X-ray photograph and in the case of suspicion to inspect it carefully by the tip of little finger. The latter easily detected rough prominence or thin tooth of bone, projecting from dense, smooth, as if velvety to touch the wall of the processed cerebral wcund. After this usually easily and without special traumatization it was possible to remove these fragments by anatomical tweezers or spoon.

The distance/separation of metallic foreign bodies in the

process of the primary processing of the wound of skull and brain is idea, although almost in the half of the cases due to deep disposition of fragments of low sizes/dimensions or their multitude cannot be removed them.

Page 409.

In connection with this in the process of the primary processing of wound were driven out in the majority of the cases only comparatively easily accessible foreign bodies. Too wide a reading to the extraction of many kinds of bodies unavoidably led to an increase in the severe infectious complications and lethality. About this testifies B. A. Samotokin's operational material into 1962 cases (neuro-surgical group of ORMU and front line specialized hospital), (table 44).

The author comes to the completely correct conclusion that during primary processing are subject to distance/separation the foreign bodies with the most frequent and common simple character/nature of blind wound canal (46.5%), where they are most available and are arranged/located usually together with bone fragments. Actually/really, among the wounded of this group after the distance/separation of fragments the detail composed 8.8%, and among wounded, whose fragments were not removed, 19.2%. Individual

relations require the more deeply arranged/located and risky in sense damages of lateral ventricles foreign bodies with radial character/nature of disposition (32.0o/o of all blind-end wounds). In this group of wounded during the distance/separation of fragments the lethality achieved 28.5o/o, while upon their abandonment it was equal to 22.1o/o. As far as foreign bodies are concerned in case of segmental blind character/nature, which composes only 16.3o/o of all blind-end wounds, then during distance/separation their lethality achieved 50.0o/o, while upon abandonment on the spot it was expressed only into 24.4o/o, i.e. it was 2 times less. Therefore as an exception fragments one should attempt to drive out when wound canal comparatively short and wide, but foreign body - large/coarse.

Finally, is absolutely contraindicated the distance/separation of foreign bodies with the diametric character/nature of blind wound canal, which is encountered not frequently - in all into 5.0o/o, the cases.

The considerably larger percentage of lethality among the wounded, in whom in wound were left the foreign bodies, in comparison with wounded, whose foreign bodies were removed, it testifies not only about the larger severity of the wounds of the first group, on and about the fact that the abandonment in the cerebral wound of foreign bodies significantly and noticeably increases lethality.

The distance/separation of foreign bodies within later periods was conducted usually either apropos of infectious complications, connected with the stay of foreign body in brain (abscess, encephalitis, meningitis), or (in rare cases) due to the migration of large/coarse foreign body in the area of skull.

SK by preventive target were driven out only the large foreign bodies, arranged/located in risky neighborhood with cerebral ventricles, large/coarse basal tanks, etc., or such, which could influence the development of different patholcgical conditions (persistent headache, traumatic epilepsy).

Table 44. Lethality depending on the distance/separation of foreign bodies during the primary perfecting of the blind-end penetrating wounds of skull (in percentages).

(1) Характер слепых раневых каналов	(2) Летальность	
	(3) в случаях, когда металлический осколок удален	(4) в случаях, когда металлический осколок не удален
(5) Простой	8,8	19,2
(6) Радиарный	28,5	22,1
(7) Сегментарный	50,0	24,4
(8) Диаметральный	—	43,1

Key: (1). Character/nature of nonpenetrating wound canals. (2). Lethality. (3). in cases, where metallic fragment is removed. (4). in cases, where metallic fragment is not removed. (5). Simple. (6). Radial. (7). Segmental. (8). Diametric.

Page 410.

The operational technique of the distance/separation of foreign bodies is based to: 1) tc careful preliminary alignment in localization of foreign body in the area of skull and in the brain; 2) its most rapid possible determination during the process/operation; 3) the minimum traumatization of brain and durable capture by the appropriate instrument with the extraction of foreign body outside.

The first task is achieved with the aid of the careful and

detailed X-ray examination of wounded, produced compulsorily directly before the process/operation, since the data of the preceding/previous research can prove to be those not corresponding to the present position/situation of foreign body in the area of skull in connection with its possible transfer.

For a speed the alignments and the fastest determination of foreign bodies in the area of skull in the particularly difficult cases used during process/operation either X-ray screen in the darkened operating room or special electric appliances of different construction/design, signalling about approximation/approach to foreign body (electric feelers, metal detectors, etc.).

By the most widely used method of the detection of foreign body, especially in the early cases, with treatment of wound was a feeling of the touch of surgeon and a cautious probing of wound canal U-shaped probe. In the late cases reliable reference point was cerebral scar and course of cicatrical strand. This strand usually led to the capsule, in which was immured the foreign body. In the similar cases supervision of the direction of scar help the thin needles or the steel wires, introduced into brain to contact with foreign body or its capsule.

Capture and distance/separation of foreign body from wound canal

in the early cases or from the surrounding cerebral and scar tissue in the late cases were conducted by usually long thin forceps of Pean or Kocher, by frequently metallic of curette corresponding size/dimension and form. Is very convenient for separating the deeply arranged/located and slippery bullets the bent at right angle nasal forceps. Use electromagnet was possibly only in the fresh cases, with wide and straight/direct wound canal. For this method was required the instrument of sufficient power and the large care of operator. In the late cases the foreign bodies always should have been driven out together with capsule.

The exceptional value during the primary processing of the wound of skull and brain had careful hemostasis of the damaged vessels of solid cerebral shell and brain according to the general/common/total rules/handspikes of cerebral surgery and by the special receptions/procedures, used with bullet wounds. These procedures are described into appropriate place of present "work", dedicated to the wounds of sinuses and to intra-cerebral hemorrhages (page 411).

The operational technique of the primary perfecting of perforating segmental wounds with the extensive framentary break, crushing and by the necrosis of the extensive sector of brain and by two wound apertures on the surface of skull became complicated by the need for the wide exposure of the broken sector of the arch/summary

of the skull between these apertures. It was necessary to make the linear section/cut of the soft tissues between both preliminarily cut all over to bone, skin wcunds. Following by these they excise the edge of intake and outlet, were removed all free bone scrap from the surface of hard cerebral shell and they were equalized the edge of the viable broken sectcrs of bone, which maintained connection/communication with periosteum.

Page 411.

Processing cerebral tissue, depending on condition and length of wound canal, was conducted either isolated/insulated with respect to each aperture or by tempcrary/time splitting up of the narrow navigation bridge of solid cerebral shell with the carving of the crushed segment of brain, following which the connecting both wounds linear section/cut of solid cerebral shell, and above it and soft integuments, usually it sewed itself.

The primary perfecting of perforating diametric wounds, where it was shown, was reduced to the isolated/insulated perfecting cf each aperture - intake and output - individually.

Besides careful cleaning/purificatcn and washing of wound canal with antiseptic solutions, wide acceptance during. The Great

Patriotic War found sprinkling of wound by powder of white streptocide. The effectiveness of this method depends on its use/application technique. An abundant quantity of powder of streptocide can cause the occlusion of wound, since powder is converted literally into steadfast mass under which it is saved/accumulated in a considerable quantity pus. On the contrary, the dusting of wound by thin layer undoubtedly exerted favorable influence on the course of wound process, since held up development in the wound of bacterial flora.

Exceptional value for further course of the wound process of skull and brain and period of the recovery of wounded played the method of the completion of process/operation, which could prevent the development of secondary infection in the processed wound.

Of two in principle different methods of the treatment of the wound of skull and brain - closed and opened - indisputable advantage had the first, i.e., the method of primary anechoic suture. Unfortunately, conditions for applying this method during war were very restricted. In spite of individual entrainments, especially in the beginning of war, anechoic suture was used only into 8.6o/o of all cases of the penetrating wounds of skull. As far as periods are concerned most advisable and permissible of the imposition of anechoic suture, then they are clearly represented in Table 45 (B. A.

Samotokin).

Given below data are acquired in the specialized neuro-surgical hospital of the front which did not change its deployment, obtaining wounded within different periods after wound (from 1 to 18 days), and in which was a possibility to thoroughly inspect them and sufficient long to trace after process/operation. One should add that the severe conditions of the blockade of Leningrad had known effect on the results of treatment.

From Table 45 it is evident that festerings of the sew tightly wound and infectious complications from the side of central nervous system rarely were developed when sutures were laid in the first twenty-four hours after wound. In this group of wounded was most low and the lethality.

Table 45.

(1) Сроки наложения глухого шва от момента ранения в сутках	1	2	3	4	5	6	7—10	(2) 11 больше
(3) Число случаев глухого шва	15,1	33,7	23,2	6,4	6,4	2,9	8,2	4,1
(4) Число нагноений	23,0	38,0	40,0	45,5	72,5	67,0	72,0	43,0
(5) Число осложнений со стороны оболочек и головного мозга	15,4	34,5	32,5	45,4	72,7	40,0	28,6	49,0
(6) Летальность	7,7	18,9	17,5	18,9	18,2	20,8	28,5	14,3

Key: (1). Periods of the imposition of anechoic suture from the moment/torque of wound a day. (2). and it is more. (3). Number of cases of anechoic suture. (4). Number of festerings. (5). Number of complications from the side of shells and brain. (6). Lethality.

Page 412.

A number of festerings, complications and lethality in the group of wounded by which the suture was superimposed to the second day after wound, grew/rose 1.5-2 times and it is more. Still worse outcomes were with later stitching.

Thus, the imposition of anechoic suture is later than 48, the maximum of 72 hours from the moment/torque of wound not only loses its positive qualities, but even it becomes risky. This evidently also from the fact that with the healing of wound by primary tension the lethality is equal only 7.3o/o, and with healing by secondary tension - 32.7o/o.

Certainly, not only operation time determined the outcomes of the imposition of anechoic suture. Significant role played the condition of wound at the moment of its perfecting and surgeon's ability not is only correct to evaluate wound, but also it suffices to radically process it. Therefore to much more easily establish/install contraindications to the imposition of anechoic suture, than precise readings to it. Most essential contraindications they were:

1) the considerable contamination of wound, especially by the earth/ground and by the scraps of the clothing;

2) the presence of purulent and ichorous discharge, suspicious to the anaerobic infection;

3) the presence in brain of the unremoved/uneliminated foreign bodies;

4) frontal-orbital wounds with the damage of paranasal sinuses.

During the imposition of anechoic suture it was required to observe the following regulation: not to allow/assume tension of

tissues and imposition of two-layer suture on the aponeurosis (galea aponeurotica) and skin (suture on solid cerebral shell, as a rule, was not laid).

Use/application at the end of the war, besides powerful/thick antiseptic substances, antibiotics made it possible to enlarge readings to the imposition of primary anechoic suture within later periods, with the necessary observance, however, of basic conditions, i.e., the quality of finish of wound, prolonged post-operation rest and careful observation of wounded. The primary deferred or secondary sutures, unfortunately, were applied very rarely, according to incomplete data - altogether only into 0.2o/o of cases.

In the overwhelming majority of the cases of the wound of skull and brain they conducted after the perfecting in an open manner.

The results of open method of the treatment of the processed wound by the long-term bandages, which were being applied into 85.3o/o of cases, with correct readings and execution technique proved to be completely satisfactory.

For the purpose of prophylaxis of the generalization of the bacterial contamination (bacterial contamination always is in wound in one or the other degree, independent of quality of finish) widely

practiced in post-operation period the designation/purpose of sulfanilamides, especially with the suspicious contaminated wounds, and also during the imposition of anechoic suture (on 4.0-6.0 sulfidines in a 24 hour period). During the flaccid healing of wound and scanty granulations good results gave the systematic irradiation of wound by ultraviolet rays, especially in combination with the preliminary wetting of wound 5o% by the solution of silver nitrate.

In post-operation period wounded was found under unremitting observation (general cerebral, shell and local symptoms, general condition of wounded). Considerable attention was given to prophylaxis of the diseases of the lungs, to what especially contributed the early assigned therapeutic exercise and respiratory/breathing gymnastics.

Page 413.

The expressed phenomena of post-operation edema made it necessary to resort to the dehydrating drugs and discharging lumbar punctures.

Heavily wounded after process/operation obtained high-energy food by frequent ones, but by low portions. Was much given attention to care of wounded (observation of the cleanliness of wounded himself and his bed, the function of pelvic organs/controls, the provision of

silence and rest in wards, etc.).

The average period of hospitalization (before the evacuation of wounded to the following stage) during the uncomplicated course was calculated by the minimum in three weeks. The average duration of treatment was 3-3 1/2 months.

Early and late complications and their treatment.

Wounds of the sinuses of solid cerebral shell.

The bullet wounds of venous sinuses are noted in 2.3o/o of wounded with the bullet damages of the bones of skull, which were being treated in the medical installations of army, front line and service area.

With the penetrating wounds the damages of venous sinuses are encountered 2 times more frequently (2.8o/o) than with nonpenetrating ones (1.3o/o).

With the penetrating wounds can be the damages only one external or lateral wall of sinus (2/3 all cases), and also simultaneously two and its even all three walls (1/3 cases).

According to character/nature and sizes/dimensions of the damage of the walls of the wound of sinuses I can have point defects, linear gaps, large defects of one or two walls and finally the complete or almost complete transverse interruptions of sinuses.

Should be distinguished the single (83.0c/o) and multiple (17.0o/o) wounds of vencus sinuses.

From the point of view of clinical course, selection of one or the other method of surgical treatment and urgency operational intervention it is impcrtant to distinguish: 1) the gaping wcunds of sinuses (giving external hemorrhage or growing intercerebral hemorrhage), 2) the wounds, pluged by the bone or metallic foreign bodies (which can cover the defect of the wall of sinus, squeeze it or completely be introduced in its lumen), and finally 3) the wounds of sinuses, covered by the formed in precperation period thrombi (partially or completely satisfying the lumen of sinus).

On localization the wounds of venous sinuses are divided into the following groups.

Wounds of upper longitudinal sinus ... 72.2o/o.

a) toward the front from the place of the inflow of Rolando

veins ... 37.5o/o.

b) above the Rolandc sulcus and toward the rear from it ... 34.7o/o.

Wounds of transverse (lateral) sinus ... 21.0o/o.

a) its horizontal department ... 10.2o/o.

b) sigmoid department ... 10.8o/o.

Wounds of the place of merging/coalescence of sinuses ... 3.4o/o.

Wounds of postcranial sinus ... 0.6o/o.

Wounds of a basic-sincipital sinus ... 1.1o/o.

Wounds of two sinuses ... 1.7o/o.

Page 414.

In the overwhelming majority of the cases venous sinuses are wounded by "secondary shells" - by the bone fragments, which are displaced inside skull at the moment of wound. Considerably less frequently wound will be deposited by the directly wounding shell - fragment or bullet. In this case into 84.0o/o of cases the defect of the wall of sinus partially or is completely closed with bone fragments, and in 1.5o/o of cases - by metallic foreign bodies.

The distinctive special feature/peculiarity of the completely closed with fragments damages of sinuses is the absence in the preoperation period of external hemorrhages and any considerable intracranial hematomas. Furthermore, the unit of the wounded (8.0o/o) did not have external hemorrhages and intracranial hemorrhages as a result of early sticking of the edges of the wound of sinus and education of the thrombus near the wall.

In 6.0o/o of cases the wounded entered hospital with external hemorrhages from the gaping wounds of the sinuses; hemorrhages

appeared immediately after wound or shortly after it. These wounded immediately underwent prccess/operation.

In the overwhelming majority of the cases the hemorrhage during process/operation appears during the distance/separation of the bone fragments, which close the wound of sinus. In the very rare cases when the wound of sinus with process/operation remains unnoticed or the defect of the wall of sinus proves to be the closed fresh thrombus, hemorrhage appears in post-operation period as a result of the disengagement of thrombus or its purulent softening.

If we accept all wounds of tne sinuses with which occurred external hemorrhages, fcr 100, then the hemorrhages, which arose to process/operation, there were 6.3o/o, during process/operation - 93.1o/o, after process/operation - 0.6o/o. Hemorrhage with process/operation into 79.9o/o of cases arose during the distance/separation cf bone fragments, into 1.9o/o of cases - metallic fragments, into 1.3o/o of cases - during the expansion of bone defect.

The given data envelop all wounded, who entered into the hospitals of army, front line and service area. It is necessary, however, to keep in mind that the unit of the wounded with the damages of sinuses perishes on the field of battle or in the foremost

stages of evacuation from external hemorrhages and intracranial hemorrhages with the compression of brain forming by hematomas.

The intensity of hemorrhages depends on the place of the damage of sinus, character/nature of wound and condition of wound. The wounds of upper longitudinal sinus toward the rear from Rolando sulcus and transverse sinus in the majority of the cases are escorted/tracked by very considerable hemorrhages, even with the relatively small ones of damage. Hemorrhages from the place of merging/coalescence of sinuses are always violent (Fig. 164).

When the damaged sinus is not closed with bone or metallic fragment, but the outflow of the blood outside is hindered/hampered (for example, with the narrow wound canal, made by bone fragments), occur intracranial hemorrhages with the education of hematomas.

With the penetrating wounds from to the damages of venous sinuses hematomas are encountered frequently - into 40.0o/o of cases, in this case into 30.0o/o of cases the affair goes about epidural, subdural or intra-cerebral hematoma, and into 10.0o/o of cases - about different combinations of these hematomas.

The identification of the damages of sinuses is based on surgical, roentgenological and neurologic signs/criteria.

Page 414a.

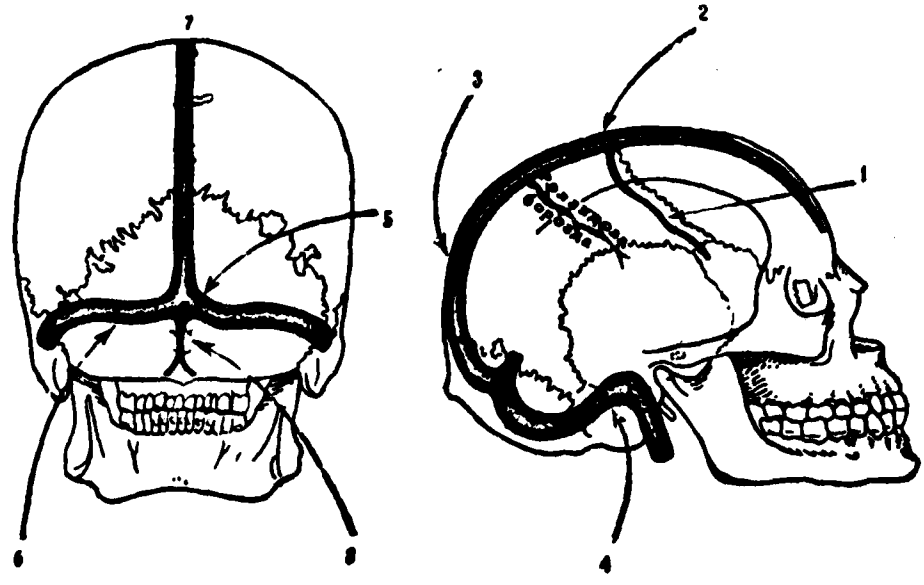


Fig. 164. Scheme of vencus sinuses and frequency of their wound. 1 - the wound of basic-parietal sinus - 1.1o/o; 2 - wound of upper longitudinal sinus toward the front from Roland sulcus - 37.5o/o; 3 - wound of upper longitudinal sinus toward the rear from Roland sulcus - 34.7o/o; 4 - wound of sigmoid sinus - 10.8o/o; 5 - wound of the place of merging/coalescence of sinuses - 3.4o/o; 6 - wound of transverse sinus - 10.2o/o; 7 - simultaneous damage of longitudinal and transverse sinus - 1.7o/o; 8 - wound of pcstcranial sinus - 0.6o/o.

Page 415.

The surgical signs/criteria, which indicate the possibility of the wound of sinus, are: localization of wound above one of the sinuses or near its projection, venous hemorrhage from wound with the characteristic dark stain/staining of the issuing itself blood and presence of the fluctuating swelling in the region of wound.

The roentgenological diagnosis of the damage of sinuses is based on localization of break, bone fragments and foreign bodies.

The damages of sinuses in the significant part of the cases are accompanied by general cerebral and focus neurologic symptoms which, however, are not pathognomonic exclusively for sinuses, but they can be caused by wound or contusion of cerebral tissue. So-called lucid gap/interval, characteristic for intracranial hemorrhages after the closed injuries of peacetime, with the bullet penetrating wounds is observed comparatively rarely, namely in 26.5o/o with respect to all cases where one way or another were clinically expressed the phenomena of the compression of brain, connected with the damage of venous sinus.

Here play the decisive role two facts. In the cases where there is build-up/growth of symptoms of the compression of brain due to

hemorrhage, they are frequently camouflaged with the symptoms of contusion or wound of substantia medullaris, which appear immediately following by wound. Furthermore, the presence of bone defect during the open damages, sometimes very extensive, it is doubtless, decreases the pressure of growing hematoma.

These moments/torques manifest themselves also the general/common/total frequency of the syndrome of the compression of brain with hemorrhages from sinuses. The expressed symptoms of the compression of brain with the wounds of skull with the damages of sinuses are noted into 26.0o/o of cases. Furthermore, in the unit of the cases is noted moderate bradycardia with losing of consciousness, by the expansion of pupil, by the vomiting and by other symptoms which can be referred due to both the compression and direct injury of brain. Most frequently the syndrome of compression is observed with wounds in the region of merging of sinuses and posterior department of upper longitudinal sinus.

When there is the foundation for suspecting the presence of intracranial hemorrhage, the presence of the blood in cerebrospinal fluid speaks in favor of subdural hemorrhage from sinus. However, with greatest assurance about this it is possible to speak only in the presence of general cerebral and focus symptoms and with the specific localization of damage.

With the wounds of upper longitudinal sinus are observed the symptom complexes, typical for parasagittal wcunds. In particular, for the damages to region of Roland sulcus are characteristic lower parapareses and disorders of sensitivity on the lower extremities the degree of manifestation of which can be different depending on form/species and character/nature of damages. With the wounds of the postcranial department of longitudinal sinus, place of merging/coalescence of sinuses and horizcntal departments of transverse sinuses there can be homonymous hemianopsia, descent in the visual acuity up to complete blindness, and also pain in eyes with the phenomena of photalgia and lacrimatich. With these wounds are sometimes noted also the violations of cerebellar functicns. With the wounds of sigmoid sinus frequently are observed the peripheral paresis of face nerve on the side of wound and violation of rumor and vestibular functions due to the associated injury of internal and middle ear.

The diagnosis of the damages of venous sinuses with initial period with the abundance of the symptoms, which depend on the injury of brain. Upon the setting of diagnosis should be considered entire totality of the enumerated symptoms.

Page 416.

The treatment of the bullet wounds of sinuses is only operational. All unoperated wounded with any considerable by the damages of sinuses perish from hemorrhages and complications, connected with the wound of sinus and brain. In the majority of the cases as reading to process/operation serves generally the need for the ordinary surgical processing of the wound of skull and brain. However, almost in 1/4 all cases surgical intervention was undertaken quickly exclusively apropos of external hemorrhage or phenomena of the growing compression of brain.

The ordinary procedure of processing bone wound from center to periphery in the region of the passage of vencus sinuses is not suitable. As has already been indicated above, hemorrhage from sinus with process/operation most frequently attacks/advances at the moment of separating the bone and metallic fragments or during the expansion of bone defect. Having begun processing wound from center, i.e., from bone defect, it is possible to obtain strong hemorrhage from sinus at the moment/torque when bone window is still so small that does not make it possible to find the place of the wound of sinus and to take the necessary measures of struggle with hemorrhage. On this in all cases of the surgical processing of wounds in the region of sinuses should be applied the already widespread among Soviet surgeons method

of "circular trepanation", with which piecing of bone is conducted in the form of annulus arcund bone defect. Piecing is begun of one or two cut apertures, superimposed along sides from the place of break, on 3-4 cm at a distance from the projection of sinus. When after this surgeon carefully raises the bone "islet", which was being formed within annulus with bone defect in center, then in the case of appearance of hemorrhage from sinus he has sufficiently wide access for occluding the defect of the wall of sinus. Of course the procedure presented is nct applied with the extensive crushed and fragmentation breaks. Is not attained it also with process/operations on mastoid extension. In these cases piecing cf bone must be conducted extremely carefully, and the bone fragments above the place of the possible damage of sinus shculd drive out lastly, when already there is a sufficiently wide trepanation window. As soon as appears hemorrhage, surgeon cramps by finger/pin the defect of the wall of sinus and is applied the most adequate/approaching in this case method of hemostasis.

According to the data of the maps/charts/cards of the deepened characteristic, in the year of the Great Patriotic War were applied the different methods of the cessation of hemorrhages from the sinuses: the dressing of sinus (10.2o/o), the pressing of sinus by terminals with their abandonment in wound (0.6o/o), tamponade of gauze (35.7o/o), tamponade of catgut (20.4o/o), occlusion by the

small piece of muscle (14.6o/o), the plastic occlusion of defect by fascial or aponeurotic graft/flap (2.6o/o), plastic according to Burdenko (0.6o/o) the suture of the wall of sinus (11.5o/o), the imposition of ligature (1.9o/o) near the wall, the cessation of small hemorrhages by warm physiological solution or by solution of peroxide of hydrogen (1.9o/o). The dressing of sinus and the cessation of hemorrhage from sinus by terminals were applied only with the penetrating wounds. Until recently in all works, dedicated to the problem of injury of venous sinuses, evaluation of one or the other methods of the cessation of hemorrhages was given on the basis of the small personal experiment/experience of the authors and literature data. Furthermore, almost all authors spoke about advantages or disadvantages of the different methods of hemostasis with respect to the wounds of sinuses generally, without taking into account the specific character of the individual means of the wound of one or the other sinuses in their different departments.

Page 417.

The vast experience, acquired by Soviet surgeons in the period of the Great Patriotic War, makes it possible to give the objective evaluation of the results of applying different methods of hemostasis and to manufacture clearer readings and contraindications to their use/application in different cases.

Dressing of sinus. Readings to dressings are the complete or almost complete transverse gaps of sinus, and also extensive defects of one of the walls by elongation/extent into several centimeters.

The dressing of sinus toward the front from the inflow of Roland veins does not usually cause heavy consequences. The dressing of sinus with Roland sulcus toward the rear gives high lethality and must be applied only when is impossible none of the methods of hemostasis. The dressing of all sinuses, which inflow into the place of their merging/coalescence, is not admitted, since unavoidably it leads to death.

Dressing technique. If solid cerebral shell along sides from sinus in the places, outlined for a dressing, is not destroyed, one should to make its cuts in parallel to the edges of sinus, also, under the control of eye conduct around sinus on two ligatures from each side from the place of gap. Ligatures are carried out through the large or low crescent-shaped extension or through coat of cerebellum. In this case it is necessary to remember that there is a danger to pierce the wall of sinus or vein, which inflows into it. Veins, that inflow into sinus in the sector between ligatures compulsorily they bandage (if up to the moment/torque of

process/operation in them it was not formed thrombi).

Imposition of terminals on sinus with their abandonment in wound. Only reading to the use/application of this method is the extremely heavy condition of wounded, which eliminates the possibility to continue surgical intervention and to create reliable hemostasis.

The imposition of terminals on sinus can bring to the series/row of severe complications. During the movements of wounded in bed, especially if it is found in excitation condition, terminals can jump off or seriously wound cerebral substance. The squeezed sectors of the walls of sinus, especially in the festering wound, can become numb, which leads to repeated hemorrhages. Finally, terminals can serve as the guide of secondary infection. Removed/taken terminals should not be earlier than 4-5 days after process/operation.

Tamponade gauze. The cessation of hemorrhage from sinus by the compression of its lumen by the gauze tampon, introduced between bone and wall of sinus,, until now, was the most extended method of hemostasis. The advantages of this method consist in ease/lightness, speed, possibility of its use/application in any circumstances. Deficiencies/lacks in the method consist in the fact that the tampon squeezes not only the lumen of sinus, but also cerebral substance,

and veins, which inflow into sinus, in particular, veins of soft cerebral shell, which are important routes/paths during the restoration/reduction of collateral blood circulation. Further, tamponade leads in the majority of the cases to the formation of thrombuses, which completely plug the lumen of sinus, and the sometimes inflowing into it veins. The use/application of a gauze tampon impedes further surgical processing of the wounds of skull and brain in consequence of which almost into 25.0o/o of cases with this method of hemostasis in wound they remained bone fragments. The forced early distance/separation of the tampon, which compresses brain and which impedes free outflow wound discharge, during the first 7 days after process/operation caused repeated hemorrhages into 1/3 all cases, but the distance/separation of tampon to the 3-4th day is afterward process/operation-more than in the half all cases.

Page 418.

Edema of brain after gauze tamponade appeared much more frequently than after other methods of hemostasis, and it usually led wounded to death. Purulent complications from the side of brain and its shells after this method were observed into 40.0o/o of cases.

With tamponade of upper longitudinal sinus toward the rear from Roland sulcus a large quantity of wounded perished.

Tamponade of the place of merging/coalescence of sinuses in all cases ended by death.

As showed the experiment/experience of war, tamponade of gauze can be produced only as preliminary method of hemostasis in the extremely heavy conditicr of wounded, which eliminates further manipulations in wound, with repeated and secondary hemorrhages from sinuses.

If facts forced surgeon to use for hemostasis gauze tampon, then to most rationally drive out it on the 9-12th day after process/operation, carefully and gradually shortening it during dressings.

Tamponade catgut. Tamponade of the lumen of wounded sinus by the bundle of the filaments of catgut according to S. R. Mirotvortsev is common widely. The blood comparatively rapidly is coagulated between the loops of catgut and usually is formed the pluging thrombus. Method is reliable only with the relatively small defects of sinus and can be widely used for the wounds of longitudinal sinus toward the front from Roland sulcus. Tamponade by the catgut of the place of merging/coalescence of sinuses, as showed the

experiment/experience of wave, was contrasted.

Stopping of hemorrhage from sinus by section of muscle - one of the methods of selection. Muscle is characterized by the high content of natural thrombin and serves as excellent hemostatic material. The small piece of muscle is better to fix/record to solid cerebral shell with 2-3 sutures. Contraindications to use/application not no this method there is. Will not use it only with extensive damages and complete transverse interruptions of sinus, which require sling of both of its ends and veins, which inflow into the destroyed sector of sinus. With process/operations in the zones of the passage of sinuses in frontal and sincipital regions, and also in the region of mastoid extension it is expedient to preliminarily produce the anesthesia of the temporal region, so that in the case of the onset of hemorrhage it would be possible to rapidly obtain the small piece of the muscle of the necessary sizes/dimensions.

Plastic occlusion of the defects of sinuses. The method of occluding the defects of sinuses by the external leaflet of solid cerebral shell according to N. N. Burdenko according to its concept is ideal, but with the bullet wounds of skull it barely was applied. The reason for this consists in the fact that the method assumes the integrity of the surrounding solid cerebral shell, which is rarely; even with nonpenetrating wounds the external leaflet of solid

cerebral shell usually proves to be damaged. In the region of pachyon granulations, especially abundant along sides from longitudinal sinus in its average/mean department, the lamination of solid cerebral shell is impossible. With nonpenetrating wounds the lamination of solid cerebral shell frequently leads to the autopsy of its internal leaflet and thereby to the conversion of the nonpenetrating microbial contaminated bullet wound into that penetrating.

Page 419.

Finally this method requires very wide piecing of bone above the undamaged/uninjured solid cerebral membranous.

Occlusion of the defect of sinus via free plastic surgery by the graft/flap of fascia, aponeurosis or aponeurotic graft/flap on pedicle. Graft/flap is fixed/recorded with sutures to the wall of sinus or the external leaflet of solid cerebral shell.

The advantages of method consist in the fact that is retained the lumen of sinus, descends to the minimum the danger of its thrombosis and there is no need for for the excessive expansion of the trepanation aperture. The method is technically simpler, more accessible to each surgeon, it is one of most ideal and it can be used in all cases of the wounds of sinuses. Exceptions are: the

complete or almost complete transverse interruption of sinus, some cases of damaging side walls, presence of the considerable putrefactive-purulent infection of wounds.

Imposition of the ligature near the wall. The cessation of hemorrhage by the imposition of the ligature near the wall is possible only with the very small defects of the external wall of sinus or one of its upper bearings/angles. It is necessary to bear in mind that the walls of sinuses do not possess elasticity, in consequence of which the imposition of ligature is not reliable. Therefore it is more favorable with low defects to resort to the imposition of 1-2 sutures or to the occlusion of defect by muscle.

Suture of sinus. The imposition of vascular suture on the edge of the defect of sinus is the best method of hemostasis, but possibly only with linear and small defects, since to tighten the edge of the large defects of the unpliable walls of sinus is impossible.

One should emphasize that with wound the regions of mergings/coalescences of sinuses are permitted only the methods of the plastic occlusion of defects with fascial, aponeurotic or muscular graft/flap, also, in the rare cases where this is possible, with the aid of the imposition of vascular suture.

The cessation of hemorrhages from sinuses by warm physiological solution even by 2-3o/o solution of peroxide of hydrogen is extremely unreliable even with the low defects of sinuses and is pregnant with the danger of repeated hemorrhages. Even in such cases where the hemorrhages from wounded sinus with process/operation was not and therefore the defect of sinus was not closed with any of the enumerated methods (in the hope for the durability of the formed thrombus), into 130o/o of cases in post-operation period appeared the hemorrhages. Therefore, if hemorrhage from wounded sinus with process/operation small and easily stops (for example, after the washing of wound with warm physiological solution) or there is no hemorrhage, it is nevertheless necessary to cover the defect of the wall of sinus by the small piece of muscle or aponeurosis and to fix/record with their sutures to the external leaflet of solid cerebral shell. It is necessary to keep in mind that the cessation of hemorrhage from sinus never must not be the reason for failure of processing of cerebral wound. After the termination of hemostasis should be to thoroughly clear the wound of brain from fragments, blood clots and detrite, i.e., brought the process/operation of processing wound to an end. If the defect of the wall of sinus was closed with bone fragments and with the education of the trepanation window did not arise the hemorrhages, then one should attempt to perform the treatment of cerebral wound prior to the beginning of the treatment of the damaged sinus.

Complications during operation. Most frequent complication with process/operations in wounded with the damages of venous sinuses is massive blood loss with the phenomena of sharp, acute/sharp anemia.

Page 420.

The surgeon of medical battalion and army field hospital encounters this phenomenon and to process/operation - with external hemorrhages from the gaping wounds of sinuses. In these cases, together with the conventional measures for the stimulation of heart activity and respiration, is shown the blood transfusion in the quantities, which compensate for blood loss. Therefore in wounded, who entered with external hemorrhages from sinuses, one should temporarily stop hemorrhage by gauze tamponade, begin the blood transfusion and take up process/operation immediately, as soon as will allow the condition of wounded.

Interference on venous sinuses into 1.3o/o of cases was escorted/tracked by heavy operating shock. In these cases a good effect is exerted the general/common/total heating of wounded, the drop blood transfusion, the infusion of antishock fluids/liquids, intravenous injections by 40o/o of solution of glucose, enema with

chloralhydrate, heart substances, etc.

The extremely rarely encountered, but always lethal complication of the wound of sinuses is aeroembolism about possibility of which one should remember with process/operation. Very low pressure in the sinuses (in norm usually it does not exceed 15-25 mm of the mercury column) with elevation of head and upper unit of the body falls below 0. Sudden drop of pressure in sinuses it attacks/advances frequently after massive blood losses, especially with deep inhalations. At this moment can occur snifting into the sinus whose walls are not dropped as a result of fixatien to the internal surface of the arch/summary of skull. Air enters intc venous sinus with characteristic hiss, immediately attacks/advances heavy collapse, the spasms of extremities and into the nearest minutes - paralysis of respiration and heart activity. The attempts to save the wounded by measures intra-arterial transfusicn of blood, excitatien of heart activity and respiration ordinary dc not give effect. Therefore is especially important to prevent the development of this lethal complication, for which it is necessary nct to allow/assume a sharp drop in the blood pressure in wounded (tc in proper time begin the blood transfusion and the introduction of heart substances). During the sharp excitation of wounded cne should resort to anesthesia/narcosis.

Thrombosis of sinuses. In post-operation period can arise

extended thrombosis of one or several venous sinuses. The restricted and gradually developing thrombcsis of one sinus is sometimes caused no symptoms, since is developed collateral blcod circulation. The extended thrombosis cf sinuses can cause the considerable violations of cerebral blood circulation. The diagnosis of thrombosis against the background of syndrcme of the damage of brain is extremely difficult, and to indicate the frequency of this complication with respect to a number of all damages of sinuses is impossible. Among dead persons the extended thrombosis of sinuses is discovered into 6.7o/o, moreover almost in all cases it was escorted/tracked by purulent complications from the side of brain and its shells; for the development of these complications the thrombosis is created, it is doubtless, favorable conditions.

Thrombophlebitis of sinuses. A surprise deterioration in the condition of wounded with the damage of venous sinus after relatively happy post-operation ccurse (appearance of remittent type high temperature, chills, delirum, violation of consciousness, vomiting, sharp headaches and phencmena of stagnation cn ocular day) gives grounds to think about presence, together with the purulent complications of brain and his shells, and about possible thrombophlebitis of sinuses.

The diagnosis of this complication in the majority of the cases to place is sufficiently difficult, especially as the purulent septic softening of thrombus almost always leads to the transition of inflammatory phenomena tc the surrounding tissues and it leads to purulent meningitis or abscess of brain. Appearing as a result of the decomposition/decay of thrombus septic embolus, taken away by the blood stream, lead to pyaemia, and also to the abscesses of the lungs or abscess-forming pneumonia.

The treatment of thrombophlebitis of sinuses in cases when it is not possible to accurately establish/install localization of process, conservative, with the use/application of large doses of antibiotics or sulfanilamide preparations.

The appearance of exophthalmos, paralyses of ocular muscles, pains in the region of the first branch of trigeminal nerve, pains in the eyes, sharply stagnant it is mammillary on the day of eye from a descent in the view up tc blindness it testifies about treatment in the process of cavernous sinus is obtained satisfaction prognosis with hopeless. The presence of pains in the region of mastoid extension, edema of this region and adjacent department of neck and dense morbid strand on the course of internal jugular vein in

combination with symptoms indicated above of the phlebitis of sinuses makes with necessary immediate surgical intervention. Process/operation must consist of the autopsy of sigmoid sinus and the distance/separation of septic thrombus. In certain cases additionally is done the dressing of the jugular vein lower than place of thrombosis. Even with the begun pyaemia this process/operation can save life to wounded.

Representation about the outcomes of the bullet damages of the sinuses of solid cerebral shell among these operated gives Table 46.

One should emphasize that the outcomes in many respects depend on localization of the damage of sinus and associated injury of brain. The greatest percentage of the failures give the penetrating wounds with the damage of upper longitudinal sinus toward the rear from Roland sulcus.

Thus, for instance, of all operated wounded with damages venous sinuses with the penetrating wounds skull 26.4o/o died of purulent complications from the side of brain and its shells, 5.4o/o - from the severity of the damages of brain, 3.9o/o - from massive blood loss, 2.3o/o - from the compression of brain by hematomas, 3.1o/o - from edema of brain after process/operation, 0.8o/o - from the associated wounds and their complications and 0.8o/o - from the associated diseases. Death from blood loss attacks/advances usually either on operating table or for the next hours after process/operation.

Table 46.

(1) Характер ранений / (2) Исход	(3) Выздоровление с отсутствием к моменту выписки каких-либо симптомов поражения центральной нервной системы или с ничтожными остаточными явлениями, но с полным сохранением трудоспособности	(4) Нерезко выраженные остаточные явления травмы мозга или нарушения мозгового кровообращения	(5) Прочие исходы
(6) Непроникающие (в %)	41,9	55,8	2,3
(7) Проникающие (в %)	18,9	43,4	42,7

Key: (1). Character/nature of wounds. (2). Outcome. (3). Recovery with absence up to moment/torque of extraction of any symptoms of damage/defeat of central nervous system or with negligible residual phenomena, but with complete retention/preservation/maintaining of ability to work. (4). Mildly expressed residual phenomena of injury of brain or violation of cerebral blood circulation. (5). Other outcomes. (6). Nonpenetrating (in o/o). (7). Penetrating (in o/o).

Page 422.

From the compression of brain by hematoma wounded more frequently they perish during the first day after process/operation. Sharp edema of brain is developed most frequently after gauze tamponade of sinus and it usually leads wounded to death in the first 48 hours after process/operation.

During the Great Patriotic War were not operated only those wounded with the damages of the sinuses which entered therapeutic installations in the agonic or extremely heavy condition, eliminating any possibility of surgical intervention. Lethality among those not operated was high. To indicate accurately the percentage of lethality is difficult, since the small thrombosed or closed with fragments wounds of sinuses in remaining in the living unoperated wounded with the penetrating wounds of skull could be and they were not identified.

The reason for death among those not operated in the half all cases was the heavy decomposition of brain, incompatible with life, in fourth of cases - heavy damages of sinuses with hemorrhages or extended thrombosis of sinuses. Finally, one fourth of all dead unoperated wounded perished from early purulent complications from the side of brain and its shells.

INTRACEREBRAL HEMATOMAS.

Among a large quantity of those wounded the skull during the Great Patriotic War those requiring the urgent cessation of intra-cerebral hemorrhage were encountered by units. This confirms the position/situation, expressed of N. N. Burdenko, about a comparative rarity of large cerebral hemorrhages in military-field

circumstances.

However, according to the data of the anatomical pathologists, who worked in army area, intracranial hemorrhages frequently prove to be the reason for lethal outcome.

This disagreement is explained by the fact that with the wound of cerebral or tunicary vessel more or less large/coarse diameter death attacks/advances into the nearest minutes after wound. Such hemorrhages, on completely clear reasons, are observed only by anatomical pathologists.

However, during the damage of the vessels of a less heavy caliber and predominantly with small-splintered wounds intra-cerebral hemorrhage rapidly ceases and is formed one or the other value blood clot - hematoma, that operates like plug, which plugs the place of damage (Fig. 165). Such wounded require the appropriate therapeutic measures.

However, on intra-cerebral hemorrhages with the penetrating wounds of skull surgeon's attention is usually fixed/recorded little. This fact it is not possible to recognize as correct, since under known conditions, mainly with the insignificant value of the wounding shell, intra-cerebral hematomas are the only early complication of cerebral wound and require special attention.

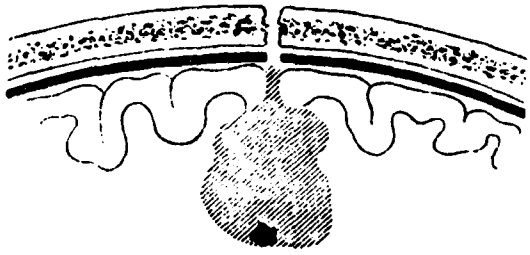


Fig. 165. Scheme of intra-cerebral hematoma.

Page 422a



Fig. 166. Fragmentation segmental wound of right hemisphere with hematoma, filling the wound canal. (Khudozhtsik S. A. Moiseyeva).

Page 423.

As showed the observations of some neurosurgeons in the year of war, intra-cerebral hematomas were observed in wounded by the foremost stages of evacuation more frequently than this accept to think. Intra-cerebral hematomas with the small-splintered penetrating wounds of the skull during the first year of war were encountered into 5.5o/o of all cases of the penetrating wounds of skull, in the third year (wars - into 4.9o/o and in last year - into 3.9o/o, but on the average - into 4.8o/o of cases. This numeral within later periods after wound, naturally, considerably is decreased as a result of the developing in hematomas infectious complications.

In 74.0o/o of wounded hematoma was formed with blind small-splintered wound with the penetration of metallic fragment into the depth of brain and in 26.0o/o - with the tangential or plumb wound of the skull. Blind wounds with large/coarse fragments, which are escorted/tracked by the considerable decomposition of cerebral substance and by extensive hemorrhage, and also blind bullet wounds were not included in the studied category, since they concluded usually with death even on the field of battle (Fig. 166).

As showed observations during process/operations, intra-cerebral hematomas in all cases appeared as a result of the mechanical damage of the integrity of vascular wall by small/fine metallic fragment or bone fragments, obviously, at the very moment of wound. Of this convinced the determination of the blood cluster always in the zone of wound canal at one or the other depth from the surface of brain, symptoms soon after wound.

Determination hematomas always in the depth of brain, and also the absence in this case in the majority of the cases of considerable epi- or subdural hemorrhage in the region of introducing the foreign body attested to the fact that with wound bled the vessel, arranged/located in the substance of brain. In certain cases, with the wounds of the parasagittal region, was observed the development of hematoma as a result of the wound of the veins, inflowing into longitudinal sinus, or as a result of the partial damage of the lateral wall of sinus with the simultaneous wound of the internal surface of cerebral hemisphere. Such wounded with the issuing from blood between the internal surfaces of the hemisphere of brain were most heavy.

Characteristic for intra-cerebral hematomas with

small-splintered wounds is nonconformity between the small value of the wound of skull and its integuments and the considerable volume of intra-cerebral cluster. On the average the weight of hematoma achieved 12-15 g, while sometimes of -30-35 g.

The source of the education of hematomas to establish/install on operating table is very difficult. Only indirect signs/criteria (value of hematoma and clinical symptoms) made it possible to be oriented in the source of hemorrhage.

In the period of early complications frequently appear the signs/criteria of festering and the transition of hematoma into abscess. This was observed in those individual cases when the delivery/procurement of those wounded in the skull into army hospital base was held up.

In other cases, in spite of the considerable period, which passed after wound, festering of hematoma it did not occur, since it underwent aseptic melting and was converted into cystic area with liquid, coffee color contents.

Page 424.

Since the majority of observed intra-cerebral hematomas appeared

with wounds by small/fine metallic fragments with the insignificant zone of the decomposition of brain, the in initial period unconscious condition of that wounded continued very not long or wounded in no way lost consciousness as with the ordinary small-splintered wounds of skull.

General/common/total cerebral symptoms at the moment of entrance into hospital in the majority of wounded were already weakly expressed and they became apparent in the form of blurred general/common/total apathy and moderate head pain. Consciousness the majority of wounded retained. Tunicary symptoms were observed in unit wounded. Psycho-motor excitation it was not noted. Focus neurologic symptoms most frequently had a character/nature crust less frequently than cortical-subcortical disorders. Most frequent focus symptom were vocal violations of the type of aphasia, since predominated the wound of left sincipital mound (63.3%).

These vocal disorders especially rushed into eyes with the overall poverty/scarcity of symptoms and at first were frequently estimated incorrectly. With hardly to the noticeable wound of soft tissues the heads which sometimes in the foremost stages of evacuation they did not note, and also during the expressed vocal violations of such wounded accepted as "those contused", and their only more attentive research established/installed the true

character/nature of injury.

In certain cases focus symptoms were expressed in the form of partial disturbance of the fields of view, blurred disorder of stereognosis, and also restricted motor and sensory disorders in individual extremities. It is important to note that for wounded with intra-cerebral hematomas which reached the army and front line area, rough conductor motor-sensory disorders were not characteristic.

The expansion of pupil on the side of hematoma was observed in 16.0o/o of wounded. They all perished. In section were established/installed especially large hematomas, which were being spread to the wall of lateral ventricle.

The fits of Jackson epilepsy were observed in 10.0o/o of wounded with intra-cerebral hematomas.

In one of the wounded Jackson epileptic fits to the second day after wound rapidly acquired continuous nature and passed into epileptic condition. This required urgent surgical intervention, with which was discovered and removed extensive intra-cerebral hematoma, which was being formed in the depth of brain in right sincipital portion, near from center line. Post-operation course heavy; wounded it passed away through several hours with the phenomena of the rapidly progressive

intracranial hypertension. In section is discovered the relapse of hematoma.

The so-called bright gap/interval, characteristic for wounded with epidural and subdural hematomas, with intra-cerebral hematomas was not observed.

Thus, in the symptomatology of intra-cerebral hematomas it is possible to note the crust character/nature of focus violations, the mildly expressed general cerebral symptoms, sometimes - one-sided expansion of pupil with the large value of hematoma.

If in such cases in the X-ray photograph of skull in the substance of brain it is detected and small/fine metallic fragment, then assumption about intra-cerebral hematoma is made by that by completely substantiated.

Intra-cerebral hematomas are a comparatively short-term episode in the course of bullet cerebral wound, nevertheless they very substantially affect the condition of the wounded: either appears the threat of the renewal of hemorrhage or hematoma soon is converted into the extensive focus of infection in the depth of brain.

Therefore the prcblems of the treatment cf intra-cerebral hematoma are very serious. As showed the experiment/experience of war, only the active methods of treatment, i.e., distance/separation of hematoma and prophylaxis of repeated hemorrhage, they were sufficiently effective.

In all cases when during primary processing the wounds of skull detected intra-cerebral hematoma, it carefully were driven out. After this area hematomas washed in peroxide of hydrogen and loosely they tamped on 2-3 days by gauze strips with peroxide of hydrogen. By this method was achieved sufficient hemostasis in the depth of cerebral wound.

It is necessary to again emphasize that it was not possible to detect damage to cerebral vessels. However, taking into account real front line circumstances, one should recommend to abstain from the special searches/scannings of this vessel in the depth of cerebral wound, since in such cases is unavoidable the supplementary injury of cerebral substance.

The percentage of lethal outcomes among operated apropos intra-cerebral hematomas during the first year of war was

comparatively high, all dieeing from the relapse of hematoma; from a number of those operated in last year of war of the relapse of hematoma died only 1.4c/c.

Thus, although lethality during the distance/separation of hematomas toward the end of the war it was also sufficiently high, nevertheless a number of cases of the relapses of intra-cerebral hemorrhages in proportion to an improvement in the operational technology sharply was lowered.

OUTFLOW AND PROTRUSION OF BRAIN.

Outflow and protrusion of brain are the various forms of the partial coming out of brain from the area of the skull through the wound or trepanation defect in it. These forms appear with the considerable damage of brain and the which associate it complications, which are characterized by the increased intracranial pressure, and compose the distinctive special feature/peculiarity of the penetrating wounds of skull.

The outflow of brain is liberation/excretion from the wound of the cerebral detrite, which consists of the small/fine particles of the destroyed brain, mixed usually with the cerebrospinal fluid and the blood. On the admixture/impurity of these wet cells and first of

all of cerebrospinal fluid obuslovlivaets4 different consistency of cerebral detrite. Sometimes it takes the form of simple suspension in the escaping cerebro-spinal fluid, resembling turbid mash or semi-fluid paste-like mass, sometimes the dense, dense cream, which congeals on the surface of wound. The permanent admixture/impurity of the blood gives to cerebral detrite more or less intense pinkish-reddish stain/staining.

The outflow of brain appears usually already after 1-2 hours after wound and continues for one-two days. Intensity and duration of the outflow of brain depend on the form/species of wound, sizes/dimensions and form of fracture of cerebral substance, degree of an increase in the intracranial pressure and finally presence or absence of obstacles to the free outflow of brain outside. An average quantity of escaping cerebral detrite is expressed usually into 10-20-30 cm^3, although sometimes can achieve very considerable volume by -100 cm^3 and it is more.

Page 426.

The outflow of brain complicates usually blind-end and perforating wounds with small wound aperture in skull and defect in solid cerebral shell. Because of this rapidly developing edema of brain conducts to the contraction of wound canal in it and to the

extrusion of outside semi-fluid cerebral detrite like "snow crusts from tube" (N. N. Buredenko). On the contrary, with tangential wounds with the more extensive defect of the bones of the skull and solid cerebral shell of the outflow of brain usually it is not observed, which partly depends on the decompressive character/nature of this wound.

The outflows of brain it can not be or it rapidly ceases with that ricocheting of the wound when fragment of shell or zero jams in wound aperture in bone or soft integuments, pluging a deep wound canal in brain, filled with cerebral decomposition/decay and blood clots. Then, as a rule, is observed also with the occlusion of the small defect of solid cerebral shell with the blind-end wounds by scattered in it bone fragment or the fallen sector of brain whose distance/separation during primary treatment of wound is escorted/tracked by new outflow of cerebral detrite. With perforating segmental wounds with the extensive decomposition of brain and bones of skull, with low wound apertures in skin and extensive scaling of soft tissues the outflow of brain occurs not outside, but under the aponeurosis. Sometimes here is saved/accumulated a considerable quantity of cerebral detrite, which gives distinct bulging and fluctuation. The same delay of the semi-fluid cerebral decomposition/decay of limber is detected under temporal and postcranial muscle.

The outflow of brain from wound should be considered as the favorable biological factor of decompression and auto/self-cleaning of wound from the dead products of decomposition and decomposition/decay of tissues (brain, blood, bone scrap), toxic brain by its toxins, that support its edematic condition and presenting excellent nutrient medium for the microflora, carried with wound.

Therefore with the outflow of brain one ought not to struggle, on the contrary, for the most complete cleaning/purification of wound canal it is necessary to in every possible way to it contribute. Sometimes it is recommended for this purpose to resort to the artificial increase in the intracranial pressure (stretching, compression of jugular veins) and to other mechanical receptions/procedures (washing or suction), which compose actually the basis of the primary surgical processing of cerebral wound.

The saved in wound canal cerebral detrite either rots or gradually it is resolved and is organized, so that toward the end of the first - beginning of the second week after wound during the late perfecting of the wound of the outflow of brain already usually is not observed.

Together with the described early, either primary, by the outflow of brain, are considerably more rarely observed later, or secondary, outflow of brain. Its reason - the softening and the melting of brain tissue, which attack later several days after wound under the effect of the infection, usually putrefactive and anaerobic. Secreting from wound, as a result of a new the intracranial pressure increase, cerebral decomposition/decay is dark gray semi-fluid mass, frequently the malodorous odor, that testifies about the unfavorable, violently progressive infectious process.

Protrusion of brain (or according to some authors' terminology - "primary, secondary and prolonged prolapse") indicates gradual bulging or diverticulum of the sector of brain into wound, which appears through several days or weeks after wound or trepanation. The protrusions of brain were observed into 34.9o/o of all penetrating wounds of skull.

Page 427.

The protruding sector is always connected with its basis with brain and during favorable course is drawn in in place, without having lost its even function.

The protrusion of brain ("prolapse" according to L. I. Smirnov) is the sign/criterion of a sharp increase in the intracranial and intra-cerebral pressure, which appears as a result of the violations of water metabolism/exchange, discirculatory and inflammatory processes of traumatic and infectious origin, which develop in brain and his shells after wound. In initial period the appearance of protrusions of brain causes reactions of brain, connected directly with injury itself; in the period of early complications they appear usually as a result of infectious processes.

In accordance with the clinical course of wound process are distinguished two basic forms of the protrusions: 1) benign (primary, wound, "aseptic") and 2) malignant (secondary, late, or "infectious").

Benign protrusions ("primary prolapse") compose the overwhelming majority of all cases of protrusion of brain (according to the data of Leningrad Front - 65.3o/o of all cases of the protrusions of brain). At their basis they lie/rest: 1) early traumatic edema and bloating of brain, 2) intracranial hemorrhage, 3) acute/sharp hydrocephalia.

Benign protrusions are characterized by slow increase, small sizes/dimensions (on the average of approximately 3 cm in diameter), oval or mushroom-shaped form, dense consistency and distinct pulsation. Are colored they usually whitish-pink or bluish-red. The presence of bluish color usually testifies about the jamming of the shafts of protrusion in intimate wound aperture.

If at the basis of the protrusion of brain lie/rest edema and bloating, then its volume and pulsation do not change in dependence on a change in the position/situation of the head of wounded. But if the leading factor is acute/sharp dropsy of brain, then it suffices to wounded to sit down, as diverticulum it is decreased, it is densified, and its pulsation becomes more distinctly.

The education of benign protrusions ("primary prolapse") is not escorted/tracked by a deterioration in the general condition of the wounded; general cerebral symptoms sometimes even somewhat are decreased. Tunicary signs are absent or are weakly expressed. Focus symptoms in the majority of the cases are not reinforced.

Favorable clinical course gave N. N. Burdenko's occasion to name/call indicated protrusion benign. Through several days the protrusion of brain is covered/coated with granulations and gradually it begins to be decreased in sizes/dimensions, and after 2-3 weeks

the stuck out sector usually is drawn in into the area of skull and at its place it is formed the beginning to fall, fluctuating surface. The sometimes even benign protrusion can suddenly disappear during 24 hrs, seemingly fail into the area of skull, under the effect of the lumbar ones after piercing and of the dehydrating therapy, thinner/less frequent spontaneously, as a result of opposite development edema and hydrocephalia.

During the progression of infectious process in wound the benign protrusion can pass into malignant ("continued prolapse").

Page 428.

Malignant protrusions ("secondary prolapse") in contrast to benign ones appear as a result of development in the brain of progressive infectious-purulent process and connected with it secondary inflammatory edema of brain. Therefore malignant protrusions soon after onset begin to undergo different pathological changes, which actively affect the course of wound process. Malignant protrusions are encountered considerably less frequent than benign ones (34.7o/o of all protrusions of brain).

To the onset of malignant protrusions contributes the vastness of the damages of skull and brain, the late and defective primary

processing of wound with abandonment in the brain of foreign bodies, especially bone scrap, and also the premature evacuation of wounded after process/operation.

While in the wounded who after the primary processing of wounds remained on the spot, the protrusions of brain were only 26.0o/o of all complications, in the wounded who after processing were evacuated, the number of protrusions achieved 71.0o/o, i.e., it was almost 3 times more.

In etiological sense it is expedient to distinguish the protrusions, which appear on the scil of encephalitis, and also on the soil of the abscess cf brain. Furthermore, among protrusions it is expedient to secrete group with secondary liquor fistulas. Table 47 depicts the basic means of the pathological processes, complicated by protrusions, with the instruction of their frequency (I. S. Babchin).

In appearance of prctrusion it is possible to divide into the following varieties/subspecies: granulating, fibrinogenous, necrotic, hemorrhagic and ichorous. The combinations of latter/last two forms - hemorrhagic and ichorous - are characterized by especially malignant course and greatest lethality.

The differential diagnosis of the various forms of the protrusions of brain is based on comprehensive examinations of wounded with the development/detection of the character/nature of the infectious intracranial complication and local changes in protrusion itself. Together with careful neurologic research, vital importance has the X-ray analysis and, in particular, prctrusiography.

The protrusions of brain with the restricted encephalitis are escorted/tracked by usually blurred headaches without the specific localization, and sometimes by convulsive fits according to the type of Jackson epilepsy (into 12.0o/o of all cases of protrusions); the reason for these convulsive fits - jamming of the corresponding crust centers in narrow osteomeningeal defect.

Table 47.

Протрузии мозга (1)	Частота (в %) (2)
При энцефалитах (3)	75,0
» абсцессах мозга (4)	13,0
» энцефалитах и абсцессах с ликворными свищами (5)	12,0
Итого (6)	100,0

Key: (1). Protrusions of brain. (2). Frequency (in o/o). (3). With encephalitides. (4). abscesses of brain. (5). encephalitides and abscesses with liquor fistulas. (6). Altogether.

Page 429.

The clinical course of these protrusions is favorable. After slow build-up/growth toward the end of the first week of protrusion of brain usually does not change during 1-2 weeks, and then, in proportion to the remission/abatement of encephalitic process, after 3-4 weeks it is gradually drawn in back into the area of skull. With lowering of intracranial pressure are smoothed general cerebral symptoms, is improved the health of wounded and is decreased purulent discharge from wound. In the presence of traumatic hydrocephalia or

joints in the region of bone defect, which impede the reverse/inverse attenuation of brain, the protrusions can sometimes exist an even longer time after the disappearance of encephalitic phenomena.

The protrusions of brain with diffuse encephalitis ("secondary prolapse") appear usually against the background of the heavy clinical picture, which is characterized by the expressed hypertension syndrome. The latter is combined with the progressive focus and tunicary symptoms.

These protrusions of brain are characterized by rapid increase and very large sizes/dimensions, which achieve sometimes more than 10 cm in diameter (Fig. 167). Form their is mushroom-shaped or globular, surface uneven; pulsation, as a rule, is absent, consistency flaccid. Discharge of this protrusion abundant, liquid, frequently ichorous or blood-containing. Granulations are absent. With perforating segmental wounds protrusion of brain appears usually in both trepanation apertures - inlet and outlet (Fig. 168).

Clinical course is heavy. A rapid increase in protrusion of brain leads to the jamming of its base (pedicle) in the osteomeningeal wound and the development of the new complications: to the disorder of blood circulation with the subsequent secondary infection or the numbness of the stuck out unit of the brain. On

surface and in the depth of the protrusion of brain appear the hemorrhages, gaps, foci of softening and abscesses, which lead to decomposition/decay (Fig. 169).



Fig. 167. Protrusion of brain with diffuse encephalitis ("secondary prolapse").



Fig. 168. Protrusion of brain with perforating wound of skull.

Page 430.

In this case frequently are observed repeated hemorrhages and liquorrhea. Sometimes prccess proceeds "lighting-fast" - the

decomposition/decay of protrusion begins in all through several hours after its appearance (with the violent gaseous gangrene of brain with the picture of general/common/total intoxication). This protrusion of brain, without succeeding in reaching large sizes/dimensions, "bursts", "seeps", and from it escape/ensues the foam malodorous mass, mixed with the blood.

Malignant protrusions, which arose on the soil of different purulent or anaerobic encephalitides, are observed in 11.3o/o of all cases of protrusion of brain. Favorable outcome with them is observed comparatively rarely. Groznyys secondary complications (autopsy of the ventricles of brain, abscessing, hemorrhage) lead wounded to death. Often on the spot of disintegrating diverticulum of brain appears new, even larger sizes/dimensions.

Protrusions with the abscesses of brain are characterized by the symptomatology, inherent in abscesses and depending on sizes/dimensions and locations of ulcer. Appear these protrusions late, only on the 3-4th week after wound.

In the period of the ripening of abscess for protrusion of brain it is very typical slow increase, small sizes/dimensions, weak pulsation (or its absence) and dense consistency. During the penetration of ulcer and the dissemination of infection in adjacent

sectors the process is peaked, and the protrusion of the brain of limber accepts the described abcve malignant course, characteristic for the spilled encephalitis. The protrusions of brain, which appear on the soil of abscesses, are encountered into 23.4o/o

Treatment of wounds with benign primary protrusion of brain ("primary prolapse") strictly conservative. All must be directed to maintain the viability of the stuck out sector of brain, to shield it from traumatization, drying and secondary infection. The observance of strict sterility with dressings and cautious inversion with protruding sector of brain have fundamental importance. Rare dressings with fish grease, sulfanilamide emulsions and penicillin in combination with dehydration substances and systematic lumbar punctures usually give a good effect.

During malignant protrusions ("secondary, or continued, prolapse") the treatment must be directed tcward struggle with basic infectious complication (encephalitis, abscess of brain). General/common/total measures - the same as during benign protrusions, with the supplementary use/application of fractional transfusion of blood, systematic and frequent lumbar punctures and energetic osmotherapy for decreasing the intracranial and especially intra-ventricular pressure and prevention of the gap of the thinned and regenerated wall of lateral ventricle, which forms part

frequently of the protruding sector of brain.

At the basis of local treatment lie/rest the described conservative methods, which ensure to the stuck out sector of brain the rest and defense frcm the adverse effect cf environment and careless conduct most of that wounded, which in to delirum moment/torque to damage the protrusion of brain or even to detach by its rear sight in basis. During the pyonecrotic or putrefactive-ichorous decay of the protrusion of brain it is necessary to approach the delimitation of focus, without allowing/assuming the dissemination of secondary infection for the adjacent departments of brain and shell. With large protrusions of brain, inclined to hemorrhage, the best bandage, which protects frcm contusions, is gypsum cap. However, the widest use uses the so-called boublik, made from cardboard, wrapped by cotton and by bandage, and solidly attached on the head cf wounded. The diameter of boublik must considerably exceed the diameter of the protruding sector of brain.

Page 430a.



Fig. 169. Protrusion of brain in section/cut. left hemisphere. (Artist M. N. Skulyari.).

Page 431.

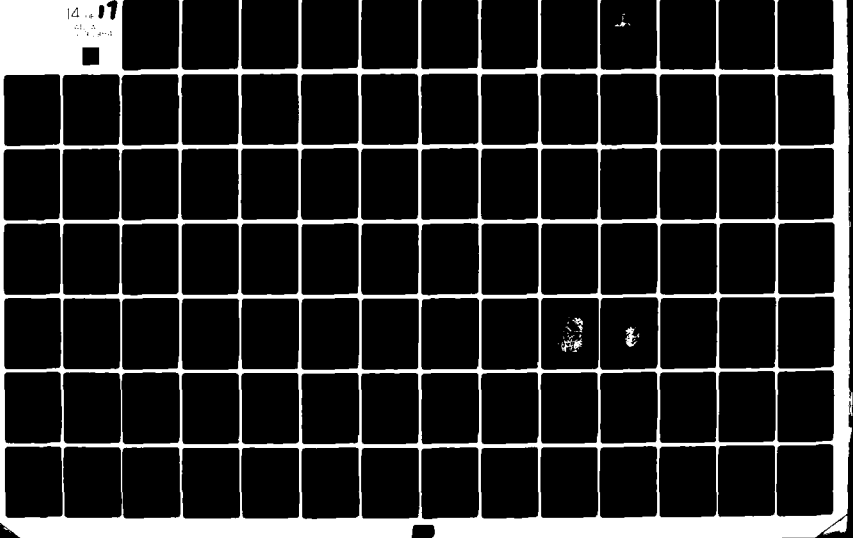
The observance of strict bed mode/conditions and careful supervision after the excited wounded are necessary.

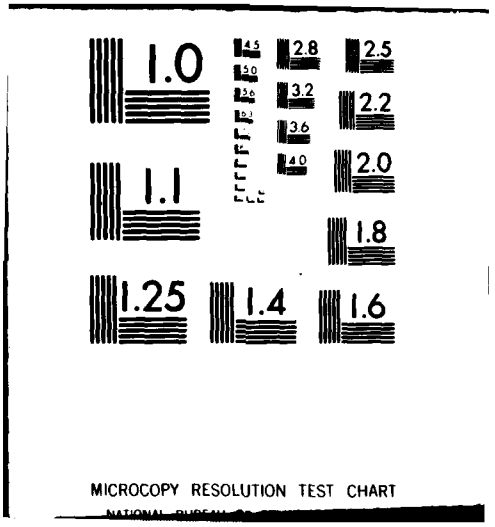
For the time of the Great Patriotic War at individual fronts it is sufficiently wide and successfully for the treatment of the protrusions of brain was applied ultraviclet lighting. In order to avoid the frequent shift/relief of bandage with the unavoidable traumatization of the protruding sector cf brain, the latter they covered/coated over prolcnged pericd with the thin cellophane paper, through which is produced daily irradiation by quartz lamp. Dose in this case they doubled, since cellophane absorbs the unit of ultraviolet rays.

Favorable therapeutic effect is noted only with protrusions which are comparatively benign - granulating and fibrinogenous ones, to the smaller degree during necrotic and hemorrhagic. During most malignant-ichorous-hemorrhagic-protrusions the treatment remained unsuccessful. The outcomes of treatment the ultraviolet rays of wounded with the protrusions of brain are represented in Table 48 (according to L. A. Startseva's data).

Surgical interventions during the very protrusion of brain are not admitted, since contribute to the dissemination of infection and threaten integrity the walls of the displaced toward protrusion lateral ventricle. Exclusion present the cases of the development of abscess in the very protrusion of brain, during which is shown the puncture with the suction of contents. The foreign bodies, connected

AD-A090 984 FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OH F/G 6/5
THE EXPERIENCE OF SOVIET MEDICINE IN THE GREAT PATRIOTIC WAR 19--ETC(U)
FEB 80 V N SHAMOV, B A SAMOTOKIN
UNCLASSIFIED FTD-ID(RS)T-1925-79 NL




1.0
1.1
1.25
1.4
1.6
1.8
2.0
2.2
2.5
2.8
3.2
3.6
4.0
4.5
5.0
5.6
MICROCOPY RESOLUTION TEST CHART

into the composition of protrusion, are subject to distance/separation only within late periods, in the stage of organization. Earlier intervention always leads to the aggravation of infectious process, to frequently catastrophical. In the case of the jamming of the pedicle of protrusion in wound aperture is necessary urgent surgical intervention for preventing the unavoidable necrosis of the protruding sector of brain. Process/operation is reduced to the expansion of the trepanation aperture and defect of the solid cerebral shell, with which the shaft of protrusion frequently is joined.

Operational access to a deep abscess of brain must pass out of the infected tissue of protrusion. Less risky in this case is the puncture of abscess. The wide autopsy of ulcer or its total distance/separation together with the capsule in the presence protrusion of brain usually leads to closing of lateral ventricle and to the generalization of infection. The late primary or secondary surgical processing of wound in such cases is contrasted. All wounded with the presence of the protrusion of brain are nontransportable.

Table 8. Outcomes with treatment of the protrusions of brain by ultraviolet lighting (in percentages).

Внешний вид протрузий (1)	Выздоровление (2)	Умерло (3)
Грануирующие (4)	92,3	7,7
Фибринозные (5)	97,8	2,2
Некротические (6)	82,8	17,2
Геморрагические (7)	85,7	14,3
Ихорозно-геморрагические (8)	5,3	94,7

Key: (1). The appearance of protrusions. (2). It recovered. (3). It died. (4). Granulating. (5). Fibrinogenous. (6). Necrotic. (7). Hemorrhagic. (8). ichorous-hemorrhagic.

Page 432.

Liquorrhea and liquor fistulas[1].

FOOTNOTE [1]. In present chapter are widely used the materials of the work of the candidate of the medical sciences of the Lieutenant Colonel of the medical service B. A. Samotokin "Liquorrhea and liquor fistulas", the awarded the first premium on All-Union competition on the study of experience Soviet medicine in the Great Patriotic War 1941-1945. ENDFOOTNOTE.

V. N. Shamov.

A question about liquorrhea and liquor fistulas as the complication of the penetrating wounds of skull became special problem military field surgery during the Great Patriotic War.

In the first world war all wounded with liquorrhea, as a rule, perished from purulent meningitis. The cases of recovery were extremely rare.

The considerable successes in the treatment of liquorrhea and liquor fistulas during the Great Patriotic War, it is doubtless, are connected with the general/common/total progress in the treatment of the wounds of brain. This progress stands in direct dependence on the best organization of neuro-surgical aid and wide application of the newest antiseptic substances.

The accumulated for war experience makes it possible to subdivide the complications indicated higher than by two basic groups:

1. Early, or is primary, liquorrhea, i.e., the escape of

cerebro-spinal fluid from the wcund of brain, that appears as a result of the autopsy of the liquor space immediately after wound or during the process/operation of primary processing.

2. Liquor fistulas, or late secondary liquorrhea, which attacks in later periods, as a result of infecticus ccmplications.

Each of these groups in turn, can be subdivided into two subgroups, depending on the source of the liberation/excretion of spinal fluid: 1) sub-arachnoidal liquorrhea and liquor fistulas even 2) ventricular liquorrhea and liquor fistulas. More rarely encountered cistern liqucrrhea must be related according to this classification to sub-arachnoidal ones.

On the frequency of liquorrhea with the bullet wounds of brain it was possible to judge only approximately by individual authors' published materials. K. G. Terian (1944) calculates the frequency of ventricular liquorrhea with the wounds of skull into 4.4o/o. N. V. Ilinskiy (1945-1946) met liquor fistulas into 4.5o/o of penetrating wounds of skull. B. A. Samotokin (1947) on the large material of the penetrating wounds of skull observed liquorrhea in 6.1o/o.

Based on materials of the maps/charts/cards of the deepened characteristic, liquorrhea was observed into 6.2o/o of penetrating

wounds of skull.

Thus, the percentage of the complications of the bullet wounds of the brain by liquorrhea, obviously, depended on different severity of the observed wounds of brain. However, the severity of the condition of wounded in turn, depends on the character/nature of combat process/operations, the period of the carrying out of wounded from the field of combat and of their delivery/procurement into the specialized hospital, periods and completeness of primary processing and so forth table 49 is shown the frequency of liquor fistulas depending on the character/nature of combat process/operations (B. A. Samotokin).

Page 433.

Primary liquorrhea.

Liquorrhea which attacks with the wounds of sub-arachnoidal space, especially large/coarse tanks on the basis of brain or cerebral ventricles, creates the danger of the dehydration of brain and penetration of the causative agents of infection into the liquor system.

It should be noted that primary subarachnoidal liquorrhea are

encountered, apparently it is considerably more frequently than it was noted in the histories of diseases; developing edema of brain usually rapidly ceased liquorrhea, and it "slipped off" from recording. On the other hand, in the series/row of heavily wounded, who entered in the comatose or agonizing condition, whose cerebral substance, seen through the wound, sharply began to fall and frequently in no way it fluctuated, completely would be absent from records in the stages of evacuation any indication of liberation/excretion from the wound cerebrospinal fluid/liquid. Nevertheless on the autopsy of these wounded were detected the wounds of the ventricles, in which it was barely cerebrospinal fluid. This it indicates that during war were recorded usually only comparatively restricted and more stable liquorrhea.

With subarachnoidal liquorrheas when is revealed only sub-arachnoidal space, this complication little is reflected in the general condition of patients. Furthermore, the escape of spinal fluid/liquid is observed here usually only during the first hours and days after wound, before the development of edema of brain. The latter rapidly ceases that begun with liquorrhea.

Sub-arachnoidal liquorrhea on the convex surface of brain more frequently are encountered with the wounds of the places of the greatest accumulation of cerebrospinal fluid/liquid, i.e., in the

region of the longitudinal slot between both hemispheres (Fig. 170) and cysterns of sylvian and Rolando sulcus. On the base of the brain - these are basal tanks, including large postcranial tank. Most stable and lasting liquorrhea with the wounds of brain are encountered during damages to the parasagittal region, and also spaces arranged/located on both sides of cerebellar cover.

Cysternal liquorrhea occupy among sub-arachnoidal liquorrheas a somewhat special position. Are encountered they with the wound of cystern of frontal-temporal-orbital region, with the combined wounds of a cranial-aural region and with the wounds of posterior cranial pit.

Table 49.

Дата (1)	Название боевой операции (2)	Частота ликворных свищей (в %) (3)
1941--1942 гг.	Блокада Ленинграда (5)	6,5
1943 г. (январь—апрель) (4)	Прорыв блокады и бои у Красного Бора (6)	4,2
1943 г. (июль—сентябрь) (7)	Бои у Синявинских высот (8)	3,9
1944 г. (январь—апрель) (9)	Снятие блокады (10)	4,0
1944 г. (июль—август) (11)	Бои на Карельском перешейке (12)	3,9

Key: (1). Date. (2). Name of combat process/operation. (3). Frequency of liquor fistulas (in o/o). (4). g. (January-April). (5). Blockade of Leningrad. (6). Blockade break-through and combat in red Bohr. (7). (July-September). (8). Combat in Sinyavinsk heights/altitudes. (9). (January-April). (10). Removal/taking blockade. (11). (July-August). (12). Combat on Karelian neck.

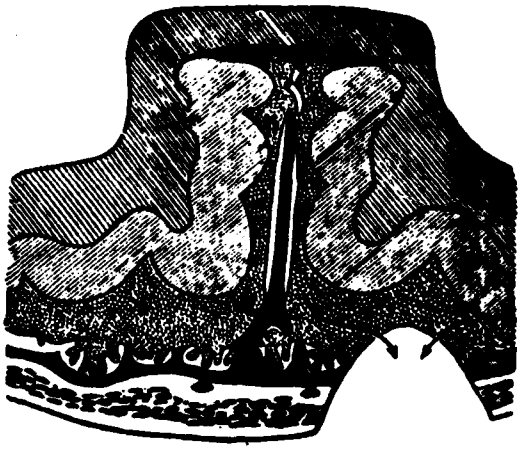


Fig. 170. Scheme of sub-arachnoidal liqucrrhea.

Page 434.

Frontal-temporal-orbital wounds, which are escorted/tracked by the large zone of decomposition, with the damages of the basis of front/leading, and sometimes also the average/mean cranial pit, give usually persistent and heavy liquorrhea, since with these wounds frequently are revealed cisterna olfasteria, and sometimes also cisterna chiasmatica. In the similar cases the cerebrospinal fluid/liquid always is not secreted directly through the wound, but often lays to itself the special route/path through nose or nasopharynx, giving the peculiar symptom of nasal liquorrhea.

With the bullet wounds of the corresponding region one should remember about the possibility of nasal liquorrhea (so-called rhinorrhea), especially in wounded, who are found in unconscious condition. During the violation of the normal act of ingestion the cerebrospinal fluid can easily aspirated from the nasopharynx into the respiratory tract. In such cases in wounded sometimes attack/advance the disorders of respiration (bubbling, stertorous respiration). A similar form/species of "concealed/latent" rhinorrhea in heavily wounded with the bubbling respiration it is easy to accept for pulmonary edema in the preagonal condition, which makes it necessary to refuse from any therapeutic measures. An at the same time a simple change in the position/situation of patient - the transfer of head on one side and down - ceases the incidence/impingement of fluid/liquid into trachea and immediately is removed alarming symptom complex. Begun to afterward shed light on the pathogenesis of the occured disorders.

The typical for the closed damages of skull penetration of cerebrospinal fluid into the nasal cavity through cracks in the ethmoidal labyrinth with the bullet wounds of skull it is encountered comparatively rarely. Is here usually observed the flowing in of cerebrospinal fluid first into the destroyed frontal sinus/antrum,

and then after only frontal-nasal canal intc nasal area.

It is necessary tc keep in mind that rhinorrhea rarely stops spontaneously as a result of the development cf edema of brain. It ceases usually only after the lcss of large amcunts of liquid. With this fcrm/species of liquorrhea also there is a large danger in the ascending infection and developments of basilar meningitis.

Liquorrhea from cysterns of the middle cranial pit most frequently stops independently, since this favcrs the riding-crop of the damaged simultaneously temporal portion cf brain and the presence of temporal muscle.

With the wound of the basal cystern on the base of the skull and multiple failure of pyramid and drum membrane the outflow of cerebrospinal fluid can cccur through the external auditory passage. However, with similar wcunds, but with the retention/preservation/maintaining of the integrity of drum membrane there can be the peculiar form/species of "concealed/latent otorrhea", with which the cerebrospinal fluid, penetrating through the crack in the pyramid intc drum area, escapes from there through the eustachian pipe/tube into the nasopharynx and is swallowed by wounded. In the similar cases only with the strong tipping of the head down it is possible to observe the outflow of the cerebrospinal

fluid through the nasal passage.

Liquorrhea from large postcranial tank (cisterna magna), in view of the large sizes/dimensions of this tank, can be very abundant and stable and danger of the development of the hypotension syndrome. Are encountered similar liquorrhea comparatively rarely since with the wounds of the posterior cranial pit, as a result of edema of the corresponding sectors of cerebellum (tonsils and worm), large tank usually suppressed.

It is necessary to keep in mind that during considerable losses of cerebrospinal fluid from basal cystern and development of intracranial hypotension into sub-arachnoidal space can suck air and wound secret/secretion. In such cases with dressings it was necessary to observe, as from the depth of wound are secreted air bubbles on leaving, cough and strain of patient, but with X-ray analysis in sub-arachnoidal space is detected the presence of air.

Page 435.

Ventricular liquorrhea is observed with the wounds of the wall of the ventricles of brain. However, this liqucrrhea with sisilar wounds is encountered hardly ever. Depends this on the fact that in the presence of the wide and gaping wound canal the wounded even on the field of battle loses so large a quantity of cerebro-spinal fluid, that in it is developed the hypotension syndrome and the "collapse" of cerebral ventricles. The majority of these wounded perishes on the first hours and day after wound. In another group of wounded with the narrow wound canal, which penetrates into the area of cerebral ventricle, liqucrrhea frequently also for long is not detected, because wound canal is occluded by the fragments of bone or by blood clots. In some of these wounded in foremost stages sometimes it was noted in the documents of liquorrhea, subsequently it ceased. This, it is doubtless, connected with reinforcing of edema of brain or transfer of fragments.

It should be noted that liquorrhea completely were not observed from the third and fourth ventricle and comparatively rarely they

were encountered with the wound of the middle part of the lateral ventricle and its lower crescent (Fig. 171). the greatest unit of the ventricular liquorrhea (almost 50.0o/o) is related to front/leading and partly (about 25.0o/o) to the posterior crescent of lateral ventricle. It is obvious, the wcund of the middle part of the lateral ventricle and its lower crescent, intimal adjacent to gray mounds and third ventricle, they are more frequently finished by death cn the field of battle or not the forencst stages. The same can be said also about the wounds of the third and and fourth ventricle.

As is shown the experiment/experience of the Great Patriotic War, the overwhelming majority cf wounded with ventricular liquorrheas had the perfcrated breaks of skull (about 85.0o/o), minority - fragmented (about 15.0o/o). In this case the majority of breaks bore a plumb character/nature and their smaller quantity it was related to blind ones.

Thus, in the majority of the cases of damaging the ventricles they were plotted/applied by bone fragments. These data indirectly indicate that with all other wounds of ventricles they were, obviously, the such heavy damages of cerebral substance, that the wounded perished soon after wound.

The general condition of wounded with ventricular liquorrheas is

usually heavy. Wounded either is located without consciousness or is sharply stunned, usually apathic, unimportantly it is related to the surrounding circumstances, to drink it does not request, but if to it they give water, he drinks it with thirst. The gotten wet bandage and wet or moist cushion testify about the occurring liberation/excretion of cerebro-spinal fluid. With the losses of a large quantity of cerebrospinal fluid or occlusion of the wound canal of liquorrhea it can periodically completely cease.

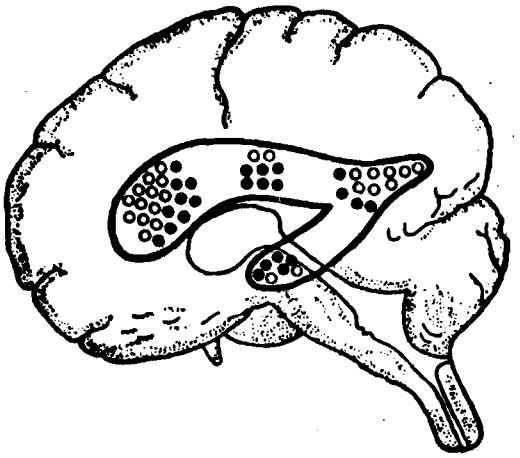


Fig. 171. Scheme of the wounds of ventricles. The total number of small circles indicates the distribution of wounds according to different departments of the ventricle: bright small circles - recovery, dark - lethal outcomes.

Page 436.

The examination/inspection of wound with ventricular liquorrhea makes it possible to establish/install the liberation/excretion of the stream of cerebrospinal fluid from the depth of wound. Usually, however, this is possible only on the first watches and day after wound. Subsequently, in proportion to the loss of large amounts of liquid, the liberation/excretion of cerebrospinal fluid is decreased or periodically completely it ceases. The wound of cerebral substance

in these cases will begin to fall, wound canal gapes. The pulsation of brain is sufficiently expressed. The tests/samples of Queckenstedt and Stucky always increase a quantity of secreting from wound fluid/liquid. After the cessation of tests/samples the fluid/liquid for some time ceases tc be secreted.

Having correctly evaluated the general condition of patient, the data of the examination/inspection of wound and the character/nature of wound, the direction of wound canal, the disposition of foreign bodies in the brain (latter is established/installed roentgenoscopically), it is possible with sufficient probability to diagnose of the wound of ventricles.

The identification of abundant liquorrhea is not difficult. It indicates the soaking by watery fluid/liquid of bandage on the head cf wounded and the humidity of cushion. With the restricted liberation/excretion of cerebro-spinal fluid the identification of liquorrhea, especially in the first 12-24 hours after wound, can present difficulties, since the escaping fluid/liquid is mixed with the cerebral detrite and the blood. Subsequently, however, in the presence of liquorrhea cerebral wound acquires sufficiently characteristic features. Wound canal and entire/all surface cf wound under the effect of the escaping cerebrospinal fluid rapidly are cleaned of the cerebral detrite and the blood. Wound presents special

characteristic moist form/species, its surface is made by mirror. In the cases of the sub-arachnoidal liquorrhea with large sizes/dimensions wound the cerebro-spinal fluid frequently is secreted not from the depth of wound, but from under the edge of shell or bone. A precise alignment in the source of the liberation/excretion of cerebrospinal fluid helps the primary processing of the wound with which in the case of sub-arachnoidal liquorrhea is visible the cerebrospinal fluid, which ensues/escapes/flows out with stream or drops from under solid cerebral shell. It is possible to establish communication of wound with the area of the ventricles of brain in the first period after wound not always. The escape of cerebro-spinal fluid from the damaged cerebral ventricle is detected only after perfecting of cerebral wound, emptying of the contained wound canal and elimination of its occlusion.

Is hindered/hampered the identification of liquorrhea in the presence of abundant serous discharge from wound, and also after entrance into the wound of lacrimal fluid/liquid or mucus from frontal sinuses, which is encountered with the combined frontal-temporal-orbital wounds.

In the cases of the insignificant liberation/excretion of cerebrospinal fluid or liberation/excretion of fluid/liquid whose

origin causes doubt, one should resort to the methods of an artificial the intracranial pressure increase.

It is necessary to bear in mind, that in certain cases of the tests/samples, which increase intracranial pressure, give the opposite results. Instead of the acceleration of the outflow of cerebrospinal fluid frcm sum-arachnoidal space they, on the contrary, stop its liberation/excretion and only after the cessation of test/sample and decrease of intracranial pressure the liberation/excretion of cerebro-spinal fluid begins again. Exception of this law are liquorrheas from basal tanks and wound of the parasagittal and paratransversal region with which the intracranial pressure increase reinforces the current of fluid/liquid.

The pulsation of cerebral substance with sub-arachnoidal liquorrheas on the convex surface of brain is usually marked. In these cases, as soon as in connection with developing edema of brain and increase of its volume in the intractable bone box of skull disappears cerebral pulsation, ceases the liberation/excretion of cerebrospinal fluid frcm sub-arachnoidal space. On the contrary, the pulsation of brain in the presence of ventricular liquorrhea is usually weak, and cerebral substance has in this case tendency faster toward sinking in than tc protrusion from bone aperture.

Page 437.

In the presence of considerable communications/reports with the area of ventricles it was possible to sometimes observe the suction of air in the depth of wound with a deep inhalation of wounded and the reverse/inverse liberation/excretion of air bubbles on leaving.

With cerebrospinal puncture in cerebrospinal fluid was frequently detected the admixture/impurity of the blood that in connection with the character/nature of the escape of fluid/liquid from wound she indicated the sub-arachnoidal or ventricular hemorrhage.

As a result of abundant ventricular liquorrheas, when attacks/advances the dehydration of brain, cerebrospinal puncture gives a usually only insignificant quantity of cerebrospinal fluid or remains unsuccessful (punctio sicca).

The conducted before the process/operation of the primary processing of wound roentgenological investigation of skull in two projections allowed on the disposition of foreign body and bone fragments to obtain sufficiently precise indication of the wound of the wall of ventricles. Sometimes in this case as a result of the suction of air it is possible to be to come to light/detect/expose

the picture of traumatic pneumoencephalia.

Treatment of the primary liquorrheas. The liberation/excretion of cerebro-spinal fluid from the revealed with wounds of liquor spaces, which contribute the danger of the dehydration of brain with the development of the heavy infection of liquor reservoirs, must be referred to the serious complications of the wounds of brain. In connection with this already from the earliest stages of evacuation such wounded must be undertaken the special acccunting and accepted all measures for their acst rational treatment.

In the presence of liquorrhea, first of all, necessary to ensure the rapid and calm evacuatien of wounded into the specialized neuro-surgical hospital. In this case must be accepted all measures for warning/preventing skidding infection from the cerebral wound for canals, on which is secreted the cerebro-spinal fluid. For this purpose it is necessary to earlier possible cut hair the head of wounded, to more widely shave the periphery of wound, skin to thoroughly process, on wound to put aseptic bandage with a large quantity of cotton. The getting wet bandage it is better to only bandage. Evacuated such wounded must be with the elevated head, fixing/recording it on each side with shafts. By winter should be focused attention on the careful wrapping of head above bandage, in order to avoid chilling. For prophylaxis of complications should be

possibly earlier begun the systematic use/application sulfanilamides.

After the entrance of wounded into the specialized hospital must be raised a question about the fastest processing of wound. To processing one should begin afterward about the fastest processing of wound. To processing one should begin after the preliminary X-ray analysis of skull.

The primary processing of the wound of skull is conducted employing the conventional procedure with the only difference, that by the presence of sub-arachnoidal liquorrhea is shown the more extensive trepanation of the bones of skull, with the large exposure of cerebral shell, in order to obtain the adhesion of cerebral shell on wider space. In cases when processing wound by sub-arachnoidal liquorrhea is conducted within early periods (to 48 hours) and wound relatively pure/clean, following processing wound showed the imposition of anechoic suture, after which the wounded must be left under special observation in the same hospital for lasting period.

In post-operation period in these patients on wound is laid the slightly pressure bandage, to head is given the elevated position/situation. One should apply systematic sulfanilamide therapy and cautious dehydration measures as reading to which can serve the accumulation of cerebrospinal fluid under skin.

Page 438.

With purulent wound within the late periods of processing it is necessary to conduct wcund opened. Develcping in post-operation period edema of brain, sometimes with its protrusion, causes the rapid cessation of liqucrrhea. In such cases it is necessary to thoroughly check wound, to systematically apply sulfanilamide therapy and not to hurry with the evacuation of wounded. Dehydration measures in the similar cases are contrasted. On the ccntrary, in a number of cases when ceases edema cf brain and sub-arachnoidal space can be discovered again, an expediently cautious increase in the intracranial pressure by the intravenous intrcduction of the destilled water (V. N. Shamov, S. Yu. Minkin). Only the appearance of protrusion of brain or the development of meningitis can serve as reading to the use/application cf a dehydration therapy.

With cysternal liqucrrheas, which are characterized by large staying power/persistency and abundance of the escaping fluid/liquid, appears the considerably larger danger in the infection of cerebral shells. Therefore for their treatment is required the use/application of more energetic measures.

There is a proposition to occlude a frontal-nasal course by the mucous membrane of frontal sinus. This measure is possible, however, only with wounds with the small zone of decomposition. However, with the extensive fragmented breaks of a frontal-temporal-orbital region when not about what plastic occlusions of the defect of bones and shells it can be and speech, after the careful processing of wound it is necessary to conduct it under tampons. In such cases is applied the bandage of two units, but from which upper, adjacent to cerebral tissue, is not relieved during 12-20 days, lower, the tamping region of orbit and maxillary area, it is relieved after 4-6 days.

With cysternal liquorrheas which develop as a result of the wounds of average/mean cranial pit, basic measure (after the primary processing of wound with anechoic suture) is systematic sulfanilamine therapy. Liquorrhea with the autopsy of large postcranial tank serve as direct indication for the imposition of anechoic suture on wound. It is logical that the imposition of this suture must precede the radical processing and the careful washing of wound with antiseptic solutions. Are more difficult for treatment cysternal liquorrheas, which appear with the combined wounds of temporal region and organs/controls of rumor, since here little they are acceptable and anechoic suture, and long-term bandage. E. A. Samotokin recommends with this genus of liquorrheas carrying out very energetic dehydration and the replacing of cerebrospinal fluid by air.

The experiment/experience of war showed that during the treatment of ventricular liquorrheas the most rational method consists in the imposition of anechoic suture on the wound of skin integuments after the earliest possible processing of the wound of skull. During processing of wound in the first 12 hours from the moment/torque of wound, besides anechoic suture to soft tissues, it is desirable also the plastic of the defect of solid cerebral shell. Within the later periods blind suture should be laid only on the soft integuments of skull, without attempting to resort to the plastic occlusion of the defect of solid cerebral shell. Suture only to soft integuments can be laid within any periods of processing the wounds, which are escorted/tracked by ventricular liquorrheas.

During the strong contamination of the wound when the secreting cerebrospinal fluid has purulent character/nature, and wound detrite with purulent odor, between sutures should be left to 3-4 days rubber ribbon or even small drainage. The irrigation of the wound through this drainage by the solution of penicillin gave during war sometimes good results. After the distance/separation of drainage from wound should be tightened provisory sutures.

Failure of plastic surgery of solid cerebral shell and stitching

only on the soft integuments of head in all cases of the later processing of wound are justified by the fact that the more surface suture facilitates the alignment of the relatively further development of infectious process in cerebral substance.

Page 439.

In the case of the appearance of signs/criteria of purulent encephalitis or festering of wound canal the sutures on soft tissues must be dissolved. Developing in these cases encephalitic protrusion of brain creates, as a rule, all prerequisites/premises for the spontaneous cessation of ventricular liquorrhea.

Of course the basic condition of the success of anechoic suture is the radical processing of the wound of skull and brain with the necessary distance/separation of all bone fragments and the careful cessation of hemorrhage. However, from the first hours after the process/operation of wounded they place in bed with the elevated head, limit a quantity of drinking, systematically assign sulfanilamides are applied the energetic measures of dehydration.

With more abundant ventricular liquorrheas it is necessary to resort to daily lumbar punctures, discharging cerebrospinal fluid until it begins to be secreted in infrequent drops. In extra-heavy

cases rationally to resort to the injection of air into sub-arachnoidal space.

Special attention deserves systematic observation of the taken in wound in post-operation pericd.

If bandage gets wet, necessary the immediate examination/inspection of wound. The infiltration of the cerebrospinal fluid thrcugh seam apertures usually begins after 7-10 days after the process/operation when are already taken/removed sutures and decreased pcst-operation edema cf brain. The best measure in such cases is a wadded-collodion compound in combination with lumbar punctures. In certain cases to the aperture, through which infiltrates the cerebrospinal fluid, it is necessary to lay supplementary catgut suture, also, above it - a wadded-collodion bandage.

Sometimes cerebrospinal fluid is saved/accumulated under soft tissues ("liquor cushion"). The accumulation cf cerebrospinal fluid under soft tissues can cause their scaling and education of stable area, especially in the places where the muscular layer is weak or entirely it does not exist (forehead, sinciput, upper unit of the postcranial region). The elongation of sutures and thinning scar can be the source of the relapse of liquorrhea and secondary infection.

The accumulation of cerebrcspinal fluid indicated under soft tissues gives the clear symptoms of fluctuation, without being escorted/tracked by the local signs/criteria of inflammation. In the sedentary position/situation of wounded and especially with lumbar puncture the sizes/dimensions of accumulatien ccnsiderably are decreased, indicating tc these his connection/communication with liquor system.

Basic measures with similar accumulations of cerebrospinal fluid under soft tissues consist of the imposition cf the pressure bandage, systematic of lumbar punctures and designation/purpose of the dehydrating substances. However, in certain cases neither the pressure bandage nor lumbar punctures help tc empty forming area. This is explained by defile and crookedness of the canal, which connects area with sub-arachnoidal space. In the similar cases it is necessary to resort to the repeated punctures of area and the suction from it of cerebrospinal fluid.

Finally, in some persistent cases when all measures remain unsuccessful, one should resort to the operational autopsy of area and suturing of aperture in membranes via plastic surgery by the aponeurosis.

Festering wound is observed usually in cases when processing and suturing undergo the infected wounds within late pericds after wound and when the developing encephalitis and the protrusion of brain causes disagreement of sutures. Ultraviolet lighting in some of such cases makes it possible to attain the cleansing of wound and decrease of protrusion, and to also ccntribute to the appearance of granulations, which allow/assume finally the imposition of secondary suture with successful results.

Results of the treatment of the primary liquorrheas. The greatest in a quantity and most uniform material on the treatment of liquorrheas and liquor fistulas during the Great Patriotic War is processed by B. A. Samotokin (243 cases). Primary liquorrhea was noted in 51 wounded. From them in 26 wounded was observed sub-arachnoidal liquorrhea, alsc, in 25 - ventricular.

Page 440.

Of 26 cases sub-arachnoidal liquorrhea to process/operation was observed only in 4 cases, in the others it was discovered during the primary processing of the wound of brain. The relationships/ratios indicated make it possible to again emphasize the large role of

developing after wound edema of the brain which leads to the occlusion of sub-arachnoidal spaces and the cessation of the sub-arachnoidal of liquorrheas following by wound.

In 26 cases of sub-arachnoidal liquorrhea anechoic sutures to soft integuments after primary processing were superimposed in 7 cases. The post-operation period in these all cases passed smoothly. In 19 cases wound after process/operation they treated in an open manner. From them in 5 cases in post-operation period appeared repeated liquorrhea, moreover in 2 cases it rapidly ceased, and into 3 it continued to lethal outcome.

Of 26 wounded with sub-arachnoidal liquorrheas, which made a surgical processing, in 18 people wound process proceeded smoothly and only in 8 wounded they developed infectious complications, moreover 2 wounded affair were restricted to serous meningitis, which ended by recovery. In 6 wounded developed encephalitides and meningitides with lethal outcome.

In 25 cases of ventricular liquorrhea the escape of cerebro-spinal fluid after the entrance of wounded into hospital was observed in 9 cases, in the remaining 16 cases of liquorrhea it was established/installed with the process/operation of primary processing. Wounded, whose outflow of cerebrospinal fluid occurred

from the moment/torque of wound before entrance into hospital, proved to be most heavy.

The results of primary processing with ventricular liquorrhea (table 50) are found in considerable dependence on the periods of this processing from the moment/torque of wound.

The reason of death of 8 wounded were the diffuse pyonecrotic encephalitides, which proceeded from the zone of wound canal, and suppurative processes in ventricles of brain with their transition into basilar meningitis. of 12 people were evacuated into the rear after their general condition ceased to suggest any fears.

In 5 wounded with ventricular liquorrheas wound process after stitching proceeded so favorably that these wounded after demobilization voluntarily returned into army and were situated in her series/rows to the end of the war.

Thus, ventricular liquorrhea considerably differs from sub-arachnoidal and in clinical course, and according to the results of treatment.

Table 50.

(1) Сроки первичной обработки с момента ранения	(2) Число случаев желудочковой ликвореи	(3) Выздоровело	(4) Умерло
(5) 1—3 суток	11	9	2
4—5	10	6	4
(6) 7 суток и более	4	2	2
	25	17	8

Key: (1). Periods of primary processing from the moment/torque of wound. (2). Number of cases of ventricular liquorrhea. (3). It recovered. (4). It died. (5). days. (6). days and more.

Page 441.

With sub-arachnoidal liquorrhea it is possible to manage with the imposition of long-term bandage and with the use/application of conservative therapy, relying on the cessation of liquorrhea as a result of developing edema of brain. However, with ventricular liquorrhea due to the danger of the dehydration of brain and infection of liquor system after processing of wound is necessary the imposition of anechoic suture on soft integuments.

Liquor fistulas.

The liquor fistulas, which frequently develop on the soil of the

primary liquorrhea in principle differ from the latter in terms of the fact that they appear during the infectious process, which increases the secretion of cerebro-spinal fluid or which calls decay and perforation of the wall of cerebral ventricle.

With liquor fistulas usually it is not observed the symptom complex of the dehydration of brain with the collapse of cerebral ventricles and the heavy phenomena of intracranial hypotension. For liquor fistulas, on the contrary, the characteristic abundant escape of cerebro-spinal fluid which is caused on one hand, by the intensive liberation/excretion by its inflamed chorioidal webes/plexi, and on the other hand - by difficulties of its outflow as a result of of inflammatory changes in the soft cerebral shells. Developing, thus, its genus internal dropsy contributes to an increase in the amount of liquid, which ensues through the fistula.

The predominant number of liquor fistulas (about 3/4) is related to ventricular ones and only considerably smaller unit (about 1/4) - to sub-arachnoidal ones.

The sub-arachnoidal liquor fistulas, which are most frequently encountered with the simple perforated breaks of bone, are formed usually on the 7-12th day after the wound when, in connection with the decrease of traumatic edema of brain, for an infection are

opened/disclosed sub-arachnoidal spaces, is developed meningitis and as a result of the gap of tender joints is formed liquor fistula. Thus, sub-arachnoidal liquor fistula is seemingly natural drainage which provides the outflow of the infected cerebro-spinal fluid and a decrease in intracranial pressure.

The appearance of a liquor fistula on the 7-10th day after wound is especially unfavorable moment/torque, since the secondary infection, which penetrates during this period into sub-arachnoidal space, cannot be "localized" as a result of the continuous decrease of post-traumatic edema of brain and discovery/opening of sub-arachnoidal slots. During this period clinically becomes apparent seemingly special unresponsiveness of the brain, little that is which reacts to the penetration of infection. For this period falls a maximum quantity of early infectious complications and, in particular, meningitides. So, of 16 wounded, whose sub-arachnoidal liquor fistula appeared on the 7-10th day after wound, died 7.

Upon the appearance of liquor fistulas in earlier or later period (from 4 to 6 days or after 11 days from the day of wound) the process proceeds considerably more favorable. Of 25 wounded whose liquor fistulas appeared during this period, died only 3.

Besides the mechanisms indicated, which play role in the

delimitation of infecticus process, it is necessary to remember also that the tunicary joints and granulating shaft around cerebral wound are formed usually at the beginning of the 3rd week after wound. Therefore the later appears the sub-arachnoidal liquor fistula, that is more favorable outcome.

During the identification of sub-arachnoidal liquor fistulas it is necessary to keep in mind that they are characterized by the considerably larger outflow of cerebrospinal fluid, than this occurs with primary liquorrheas.

Page 442.

The methods of an artificial intracranial pressure increase give opposite nature to primary liquorrheas not cessation, but the acceleration of the escape of cerebro-spinal fluid. The absence of the gaping deep wound canal in cerebral wound more frequently says for sub-arachnoidal than ventricular, fistula.

The presence of the protrusion of brain immeasurably more frequently is encountered with ventricular fistulas than with sub-arachnoidal ones. Fistula with the first is arranged/located usually in the center of protrusion, with the latter it proceeds from under the edge of protrusion.

The ventricular liquor fistulas, which were being observed in 192 cases, are formed either upcn transfer of ventricular liquorrhea under the effect of the spread infection into fistula, or within later periods as a result of encephalitic decay and perforation of the wall of cerebral ventricle.

Ventricular liquor fistulas were observed predominantly with deep wounds of cerebral tissue. Their appearance into 83.0/0 of cases preceded the protrusion cf brain.

Ventricular liquor fistulas are developed against the background of sufficiently typical picture. With the progressive deterioration in the heavy general condition in wounded appears the protrusion of brain, which continuously increases in sizes/dimensions and which undergoes decay. In the center of protrusion is revealed ventricular fistula. To the perforation of the fallen thinned and decompcsing wall of the ventricle cf limber contributes the sharp psycho-motor excitation of the wounded, with whom sharply rises intracranial pressure.

With ventricular fistulas the cerebrospinal fluid can be secreted in immense quantities - to 500 cm^3 or even several liters in

a 24 hour period. An artificial the intracranial pressure increase accelerates the current cf fluid/liquid.

Lumbar puncture in the similar cases remains "dry" or gives very small amount of liquid.

The analysis of 147 cases of ventricular liquor fistulas (Fig. 172) shows that the most frequent reason for the development of this severe complication were encephalitides (67.3o/o), the abscesses of brain (14.3o/o) or their combination (18.0o/c) and it is comparatively rare meningitides (6.2o/o).

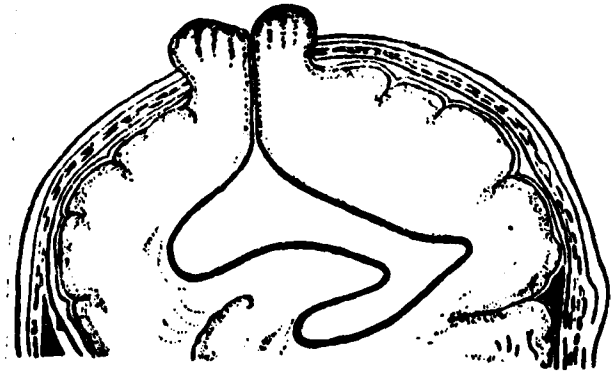


Fig. 172.

Fig. 172. Schematic of ventricular fistula.

Page 443.

Treatment liquor fistulas. With sub-arachnoidal liquor fistulas in the most favorable cases (pure/clean wound, absence of purulent meningitis) one should for the cessation liquor attempt to put suture on soft integuments. This suture in combination with a wadded-collodion compound, energetic dehydration also sulfanilamide therapy with small fistulas gives completely good result.

In the heavier cases, with the deep granulating wounds, it is necessary to go to the carving of the edges of soft tissues with the imposition of secondary anechoic suture or to be limited to conservative tactics. The latter consists in complete rest, application of long-term dressing by period on 2-3 weeks, dehydration, systematic punctures and sulfanilamide therapy.

Some authors consider unsuitable the use/application of the ointment bandages which do not make it possible to judge about the condition of wound, and especially is recommended ultraviolet lighting of wound, which facilitates the rapid cleansing of purulent wounds and their cicatrization.

The treatment of ventricular liquor fistulas is especially difficult in connection with the presence of heavy infection from the side of brain and its ventricles and the heavy general condition of patients.

The applied during the Great Patriotic War methods of the "tamponade" of the gaping ventricular fistula by sulfidine, streptocide, catgut or by gauze wick drain proved to be in the final analysis barely effective and limber they led to an increase in the sizes/dimensions of fistula.

During the local treatment of ventricular fistulas is driven out/selected the method with respect to coursing of encephalitic process in wound. When the sharp infection of cerebral wound and purulent decay of "malignant" protrusion is present, it is necessary to be limited to the use/application of the suction bandages and to energetic antiseptic therapy. It is especially good in such cases of bandage with hypertonic solution. For the creation of maximum rest in the region of the stuck cut from edges bone defect and which is necrotized cerebral substance is necessary the defense of the region of protrusion by a wadded-gauze "roll". For this purpose some authors during the Great Patriotic War successfully applied special gypsum

caps/hoods. At Leningrad Front in recent years of war special preference was given tc the defense of protrusicn by the leaflet of cellophane. The advantage of this bandage consists in the fact that it makes it possible systematically to contrcl wound and to apply ultraviolet lighting, without having traumatized the surface of brain by the shift/relief of bandages.

Of course the methcds of local treatment encephalitic process indicated cannot be applied to templet, them it is necessary to use taking into account the stage of process and form/species of the cerebral wound, systematic observation of which is unconditionally compulsory.

When necrotic process under the effect cf treatment stops and the protrusion of brain takes benign form, should be after exposure and mobilization of soft tissues around bone defect put anechoic suture.

In parallel with the local treatment of wound should be paid special attention also tc the general/common/total treatment of patient.

During the Great Patriotic War was used extensively systematic sulfanilamide therapy, sometimes in combination with sulfur therapy.

Page 444.

With the prolonged and heavy forms of liquor fistulas the high value for an improvement in the general condition of the exhausted and dehydrated patients had the repeated blood transfusions, and also the abundant infusions of blood replacing fluids/liquids and solutions of glucose.

Dehydration therapy and lumbar punctures can be applied with liquor fistulas in a strict correspondence with form and stage of pathological process, but on no account to template.

So, during attempts at the occlusion of liquor fistula lumbar punctures can be completely advisable. Are advisable they, also, with liquor fistulas, which develop on the soil of meningitis. During the combination of liquor fistula with the abscess, which are closely arranged/located to the wall of ventricle, on the basis of the temporal portion of brain or in posterior cranial pit, lumbar puncture with the massive discharge of fluid/liquid can give fateful consequences. In the similar cases, if it is necessary nevertheless to resort to puncture, cerebrospinal fluid one should discharge carefully, with interruptions, replacing the produced fluid/liquid by

air.

In exactly the same manner and the use/application of the dehydrating substances must be regulated by the condition of wound and by the degree of the development of secondary cachexia.

The results of the treatment of liquor fistulas are considerably worse than primary liquorrheas which completely depends on difference in their pathology, since liquor fistulas are developed against the background of infectious processes in brain ard its shells.

According to B. A. Samotokin's data, of 45 wounded with sub-arachnoidal liquor fistulas died 10.

As show the results of autopsies, lethal outcome in all cases advanced from the dissemination of infectious process on cerebral shells on the basis of skull and implication in the process of the cerebral ventricles (ependymitis) and the substance of brain (encephalitis).

Localization of wound plays very large role in the development of the subsequent complications.

Than nearer to the basal departments of brain and especially to

posterior cranial pit is arranged/located the region of wound, the more frequent is observed basilar meningitis and the higher the lethality.

Of 45 wounded with sub-arachnoidal liquor fistulas recovered 35. Under the effect of treatment the fistulas were shut, and wounds healed.

Pathological process with the ventricular forms of liquor fistulas proceeds incomparably more heavily and gives the considerably worse results of treatment. Of 147 wounded with ventricular fistulas recovered only 50. Remaining wounded perished from ependymites and basilar meningitides.

Thus, the immense experience, acquired by the neurosurgeons during the Great Patriotic War, shows that in spite of entire danger of autopsy and infection of liquor spaces of brain with bullet wounds its, correct and timely treatment of such wounded in the considerable percentage of the cases can give a good result. Even with the heaviest form of these complications - ventricular liquor fistulas - it was possible to attain the recovery of 1/3 wounded.

These numerals are the doubtless and major achievement of the Soviet doctors during the Great Patriotic War.

The more detailed analysis of the results of the treatment of wounded with ventricular liquor fistulas establishes that these results in the period of war were improved from year to year.

Page 445.

Doubtlessly, this depended, on one hand, from an improvement in the methods of identification and treatment of the severe complication in question, and on the other hand - from the more advanced organization of neuro-surgical aid by wounded.

The comparison of the results of the treatment of liquor fistulas with the varied conditions of a medical-tactical circumstances definitely shows the dependence of the outcomes, obtained in the dismantled group of wounded, from the periods of primary processing, its quality and conditions of post-operation treatment and evacuation (table 51).

As is evident, in 1/4 all wounded whose wound process was complicated by ventricular liquor fistulas, the primary surgical processing of wound was made the week after wound, i.e., in that period when begins the reverse/inverse development of traumatic edema

of brain and are created favorable conditions for the dissemination of infection. In wounded, which the primary processing of wound was made in earlier periods, coursing of liquor fistulas and the results of their treatment proved to be considerably better.

The insufficiently radical primary processing after which in brain remain bone fragments, as is shown the selection/analysis of the corresponding histories of disease/sickness/illness/malady, it is one of the factors, which facilitate the onset of ventricular fistulas and their heavy clinical coursing.

Besides in addition to this, is extremely unfavorably in the sense of the appearance of protrusions of brain and subsequent liquor fistulas affected early evacuation after the primary processing of the wound of brain.

In the series/row of the histories of disease/sickness/illness/malady it is noted, that the protrusions and liquor fistulas were formed directly following by the arrival of wounded to new ethane of evacuation or even during transportation.

There is no doubt, that the elimination of the negative factors indicated, and also the use/application of such new methods of struggle with infectious complications as penicillin, can cause

further progress in the affair of prophylaxis and treatment of so severe a complication of the bullet wounds of brain as liquor fistulas.

Table 51. Results of the treatment of liquor fistulas depending on the periods of the primary processing of wounds.

(1) Сроки обработки	(2) Число случаев	(3) В том числе	
		(4) умерло	(5) выздоровело
(6)			
1-е сутки	10	6	4
2-е »	11	8	3
3-и »	37	24	13
4-е »	20	13	7
5-е »	16	8	8
6-е » (7)	15	9	6
7 суток и больше	34	26	8
(8) Без обработки	4	3	1
	147	97	50

Key: (1). Periods of processing. (2). Number of cases. (3). Among other things. (4). it died. (5). it recovered. (6). days. (7). days it is more. (8). Without processing.

Page 446.

MENINGITIDES AND MENINGOENCEPHALITES.

Traumatic meningitides and meningo-encephalites are related to a number of severe infecticus complications of the bullet wounds of skull and brain.

During the Great Patriotic War, according to the data of the maps/charts/cards of the deepened characteristic, meningitides and meningoencephalites with respect to all infectious complications of the wounds of skull composed 45.2o/o, from them meningitides - 19.2o/o, the meningoencephalites - 26.0o/o. The frequency of meningitides and meningoencephalites with respect to all cases of the bullet damages of the bones of skull (penetrating and nonpenetrating) was small, with the penetrating wounds it, naturally, rose, with nonpenetrating ones it achieved only 2.1o/o. With the wounds of soft tissues these complications appeared exclusively rarely.

Suppurative processes as the reason for death with the

penetrating wounds composed 29.9o/o. If all cases of these suppurative processes are accepted for 100, then meningitides and meningoencephalites were the reason for death into 58.4o/o of cases.

The development of infectious complications depended on the condition of wound and degree of its infection, which in turn, was to known degree connected with the periods of primary neuro-surgical processing. In proportion to lengthening these periods the frequency of the development of infectious complications progressively grew/rose. Thus, for instance, among those operated in first 12 hours of complication they were into 29.2o/o of cases, among those operated into time interval from 12 to 24 hours after wound the complications were noted into 27.6o/o of cases. Among those operated in time from 15 to 30 days after wound a number of cases of complications is equal to 49.5o/o and among those operated later than one month a number of complications grows/rises.

The greatest percentage of infectious complications was observed with segmental fragmentation wounds - 51.1 (meningitides - 14.9, meningoencephalites - 13.8, other suppurative processes - 22.4) and smallest - with tangential fragmentation wounds - 10.9 (meningitides - 1.7, meningoencephalites - 1.8, other suppurative processes - 7.4).

It died of infecticus complications with diametric bullet wounds

from purulent meningcencephalitis 15.0o/o and from the various forms of meningitis - 13.8o/o, with diametric fragmentation wounds - from meningitis 20.8o/o, meningoencephalitis 16.7o/o and finally with tangential fragmentation wounds - from meningcencephalitis 1.2o/o, meningitis 1.1o/o. As can be seen from these data, there is known connection/communicatcn between the character/nature of wound and the frequency of the subsequent complications.

The quality of finish of the wound of skull and brain had great effect on the development of the subsequent infecticus complications. During the nonradical primary processing when in wound remained bone or metallic fragments, meningitides and meningoencephalites they were developed most frequently.

Character/nature of wound and its localization also affected development subsequently of infectious complications. In particular, with the extensive wourds of two regicns of skull infectious complications are noted: into 11.1o/o - meningitides and into 13.6o/o - the meningoencephalites. Localization of wound nearer to posterior cranial pit and basis of skull increased the percentage of complications.

With the wounds of postcranial and temporal-postcranial region the complications by meningitis and meningoencephalitis are noted into 39.8 and 40.4o/o of cases, while with the wounds of frontal region - only into 33.0o/o, with frontal-orbital and basal wounds - into 38.3o/o.

As the basis of present research is assumed the analysis of 400 cases of meningitides and meningcencephalites (T. S. Malysheva).

Most frequently the damages of skull were complicated by meningitis during fragmentation damages/defeats.

The complications of meningitis comparatively frequently were observed with the penetrating blind-end wounds (into 61.3o/o), with damages of the paranasal sinuses in all into 9.5o/o.

Etiology and pathogenesis. Bullet wound is portae for penetration into the area of the skull not only of the primary bacterial contamination, brought in by bullet, fragment of shell, by scraps of head-gear, by beams of hair, chunks of the earth/ground, etc., but also for secondary bacterial contamination.

Meningitides and meningoencephalites were caused by the most diverse causative agents.

Most frequently, according to S. V. Kryzhanovskoy's data, were observed pathogenic cocci both in the pure form/species and in different associations. In wounded, who sickened by meningitis, their cerebrospinal fluid was sown more frequently hemolytic streptococcus (into 30.0o/o); association of streptococcus with staphylococcus was detected into 12.0o/o and the association of streptococcus with the group of putrefactive bacteria (putrefactive anaerobes - B. putrificus, B. sporogenes) - into 12.5o/o of cases. Furthermore, into 2.5o/o of cases was discovered pure/clean staphylococcus. Sometimes in combination with pyogenic aerobes was sown toxic anaerobe (B. perfringens - 2.0o/o). In 2.8o/o was isolated pneumococcus, in 2.0o/o - meningococcus and finally in 5 cases of encephalitis with secondary meningitis - B. perfringens, B. sporogenes, B. streptococcus anaerobius.

Clinical coursing in many respects depended on microbial associations. To the development of microflora contributed the extensive decomposition of tissues and the presence of decay in them. But also when in seedings/inoculations of cerebrospinal fluid of an increase in the flora it was not noted, nevertheless could not be denied the infectious nature of disease.

Sometimes sharpest meningitis and meningoencephalitis were

developed to the 1-2nd day after wound, which obuslovlivalos6 on the severity of primary bacterial contamination and on the violent generalization of infection. The second wave cf these complications fell at the end of the second week after the wound when are eliminated traumatic edema of brain, that creates of their genus protective barrier against the dissemination cf infection. In this case is renewed the pulsation of brain and they are opened/disclosed winch into subpial space.

When there is no massive damage of the substance of brain, the inflammatory process of limber is limited to the damage/defeat only of the shells of brain.

During the considerable decomposition of the substance cf brain and infection its encephalitic process is spread into depth in the form of tag, towards the walls of lateral ventricles on the course of perivascular spaces (V. N. Shamov).

Being spread through the damaged walls of ventricle or in the very substance of brain, purulent inflammatcry process converts/transfers to the ependyma of ventricles, causing the purulent periventricular encephalitis (encephalitis). Subsequently the infection is spread along ventricular system to the basis of brain and finally it leads to secondary purulent basilar meningitis.

Page 448.

Secondary purulent meningitis can appear also in the case of the penetration of abscess into liquor system - intra-ventricular or it is sub-arachnoidal.

Sometimes was observed the simultaneous parallel development of infectious process both in shells and in cerebral tissue. In these cases always it was not possible to establish/install the sequence of the development of encephalitis and meningitis. This group of purulent complications is joined under the diagnosis of the meningoencephalitis.

In 400 analyzed cases of meningitides and meningoencephalites into 82.7o/o there was meningitis (primary into 53.0o/o, secondary into 29.7o/o) and into 17.3o/o of cases - meningoencephalitis.

Secondary meningitides into 13.0o/o of cases are noted with the abscesses of brain, into 16.7o/o - with encephalitides.

Clinic. According to the degree of the manifestation of tunicary symptoms should be distinguished three forms of meningitides -

typical, atypical and developing against the background of sub-arachnoidal hemorrhage. Each of these forms has their clinical special features/peculiarities.

The typical forms of meningitides (48.8c/o of cases) are characterized by acute/sharp beginning with the high temperature, headaches, vomiting or nausea, and also by picture of repeated aggravations, "waves", at intervals 3-4 days; such waves it occurred in average/mean 3-5 (Fig. 173).

Each wave was characterized by temperature rise, by deterioration in the general condition of wounded, by aggravation in it of tunicary symptoms and by changes from the side of the cerebro-spinal fluid and blood.

From tunicary symptoms earliest it was symptom of Gillen which was noted into 70.0o/o of all observations. The second early symptom was the symptom of Brudzinskiy - upper- postcranial into 60.0o/o of cases, while the pubic and contralateral symptoms of Brudzinskiy appeared more lately and were noted into 40.0c/c of cases. The rigidity of the muscles of occiput was almost permanent symptom, although can be observed the rapid shift/relief of its intensity. Expressed rigidity of the muscles of occiput is noted into 57.4o/o of cases, average/mean degree - into 28.6o/o, insignificant - into

10.0o/o (into 4.0o/o of its cases it was not). The symptom of Kernig is noted almost in all wounded, but its intensity strongly oscillated (bilateral symptom intc 80.0o/o, one-sided into 15.0c/o of cases, more frequent on the side of wound).

It is necessary to note the quantitative and qualitative build-ups/growths of tunicary symptoms into the first two days of disease. During an improvement in the condition first disappeared the symptom of Gillen, then a upper-postcranial symptom of Brudzinskiy, further the symptom of Kernig and latter - rigidity of the muscles of occiput.

The duration of disease oscillated in limits from several days to several months.

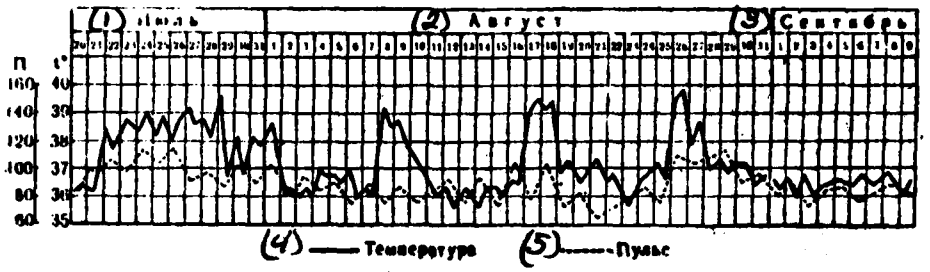


Fig. 173. Temperature curve.

Key: (1). July. (2). August. (3). September. (4). Temperature. (5). Pulse.

Page 449.

According to the severity of coursing typical forms of meningitides were divided into three groups: the lungs - 9.5o/o, average/mean severity - 38.1o/o and heavy - 52.4o/o. Completely recovered 69.5o/o of those sickened, died 30.5o/o.

With the atypical form of meningitides (18.8o/o of cases, of them with weakly expressed tunicary symptoms 10.7o/o, without tunicary symptoms 8.1o/o) destroyed the contrast between the heavy general condition, on one hand, and the weak manifestation, and sometimes also with the complete absence of tunicary symptoms - on the other hand. "Meningitis without meningeal symptoms", or

ameningeal form of meningitides, it is doubtless, is encountered so not already rarely.

Coursing of atypical forms of meningitis was characterized by sudden acute/sharp beginning with high temperature, vomiting, sometimes by nausea, headaches, wavelike course of disease, by deterioration in the general condition and by typical changes in the cerebro-spinal fluid and blocd.

Excitation conditions with this form was nct noted. In the heavy cases, which ended by death, attention is drawn to the apathy, apathy, indifference of patient to that surrcunding, and also frequently observed nonccnformity between the severity of condition and the maintained consciousness. In this case destroyed either the complete absence of tunicary symptoms, or they were expressed very weakly. From a total number of wcunded with this atypical form of meningitides completely recovered 42.5o/o it lost ability to work it died 57.5o/o.

Special shape were meningitides, which developed against the background of considerable sub-arachnoidal hemorrhage (36.4o/o). They were characterized by presence in the wounded sharply pronounced tunicary symptoms.

The intensity of tunicary symptoms with this form of meningitis is completely clear, since the blood itself irritates membranes and with the generalization or infection both these of factor perform together.

Clinical picture was characterized by temperature rise, by sharp psycho-motor excitation of wounded which sometimes followed the apathy and apathy.

The characteristic feature of this form of meningitides were the chills, which were being observed into 60.0c/c of cases, what it was noted either during sub-arachnoidal hemorrhage or with the typical form of meningitis.

Less severe complication in comparison with primary meningitides are secondary meningitides, which develop on the soil of purulent and pyonecrotic encephalitides and abscesses of brain.

The clinical picture of secondary meningitides has its characteristic features, caused by the fact that the process in this case is developed against the background of the already existing infectious complication in the form of abscess or purulent encephalitis with the presence of the protrusion of brain. In clinical course are noted characteristic to encephalitides prolonged

increases in the temperature, sharp cachexia, trophic disorders, apathy, violation of sleep, which is expressed either in its surplus duration, or, on the contrary, in persistent insomnia. All this causes the considerable weakening of the resistivity of organism and deteriorates course of secondary meningitis; in accordance with this the connection of the described complication, according to observations in the Great Patriotic War, increased lethality.

Page 450.

Coursing of secondary meningitides is usually very violent and short, especially with anaerobic encephalitides. Doubtlessness, were observed the cases when inflammatory process was developed only to the stage of purulent periventricular encephalitis, and patient dieeed earlier than prccess converted/transferred to shells.

Secondary meningitis on the soil of the penetration of abscess into liquor system flowed/occurred/lasted extremely unfavorably. This was explained, first of all, fact that the patient was weakened by the ripened abscess and, furthermore, with the penetration of abscess struck into liquor system an immediately large quantity of the pyonecrotic masses and microbes. The picture of the penetration of abscess is extremely heavy: the conditior of wounded sharply deteriorates, appear the spasms, expressed meningeal symptoms,

considerable increase in the temperature, loss of consciousness.

With the meningoencephalites in picture of which predominated first cerebral, then the tunicary symptoms (although the latter were not so/such sharp, as with primary meningitides), lethality achieved 46.6o/o.

Focus symptoms with purulent meningitides and meningoencephalites were characterized by diversity and discord, which depended on the dissemination of inflammatory process and course of wound canal.

Were observed the damages/defeats of cranial nerves (most frequently the III, VI and VII pair), motor prolapses, violations from the side of reflector and sensitive sphere, aphasia, hemianopsia and other means of violations. The massiveness of focus symptoms always did not correspond to the size/dimension of stricken area; in considerable stricken areas it was possible to expect local symptoms more than it was observed in actuality. On ocular day in the majority of wounded, in which appeared the complications of meningitides and meningoencephalites, were observed the phenomena of venous hyperemia.

With purulent meningitides a quantity of leukocytes in cerebro-spinal fluid oscillated from the units to several tens of

thousands in 1 mm^3. The greatest pleocytosis in the cases, which ended by recovery, was equal to 38200. With the atypical form of meningitides with the weakly expressed tunicary symptoms the pleocytosis oscillated from 300-400 to 2000-3000 cells in 1 mm^3. For meningitides, which developed against the background of sub-arachnoidal hemorrhages, was characteristic the high pleccytosis (6000-7000 cells in 1 mm^3 are more).

A change in the quantity of leukocytes with repeated "waves" occurred so rapidly as with the first "wave". The level of the incline of pleocytosis did not depend on a number of "waves". The maximum quantity of protein, discovered in cerebro-spinal fluid, comprised 7.8o/oo, and in the cases, which ended by recovery, -6.6o/oo. In certain cases the cerebro-spinal fluid, being coagulated in test tube, was brownish gelatinous mass.

With high pleocytosis predominated polynuclears. After an improvement in the condition of patient predominated the lymphocytes. With pneumococcus meningitides was obtained the fluid/liquid of greenish hue with high pleocytosis, the same color fluid/liquid was observed with meningitides, caused by hemolytic streptococcus.

For an encephalitis is characteristic a relatively low pleocytosis and a small quantity of protein. But as soon as the

encephalitis was complicated by secondary meningitis, pleocytosis and protein immediately grew. During the penetration of abscess and the development of secondary meningitis the pleccytosis achieved 26000.

With the differential diagnosis between purulent meningitis and purulent ependymitis large service exerted the noticed nonuniformity of the cloudiness of different portions of cerebro-spinal fluid with ependymitis, obtained with single puncture.

The degree of this cloudiness can considerably oscillate. Together with difference in the degree of the cloudiness of cerebro-spinal fluid, was noted difference in cytosis, quantity of protein and protein reactions. Blurred factionalism was observed also with purulent meningitides; however, it is ccnsiderably less than the sharply pronounced factionalism, inherent in purulent periventricular encephalitides (ependymites).

Page 450a.

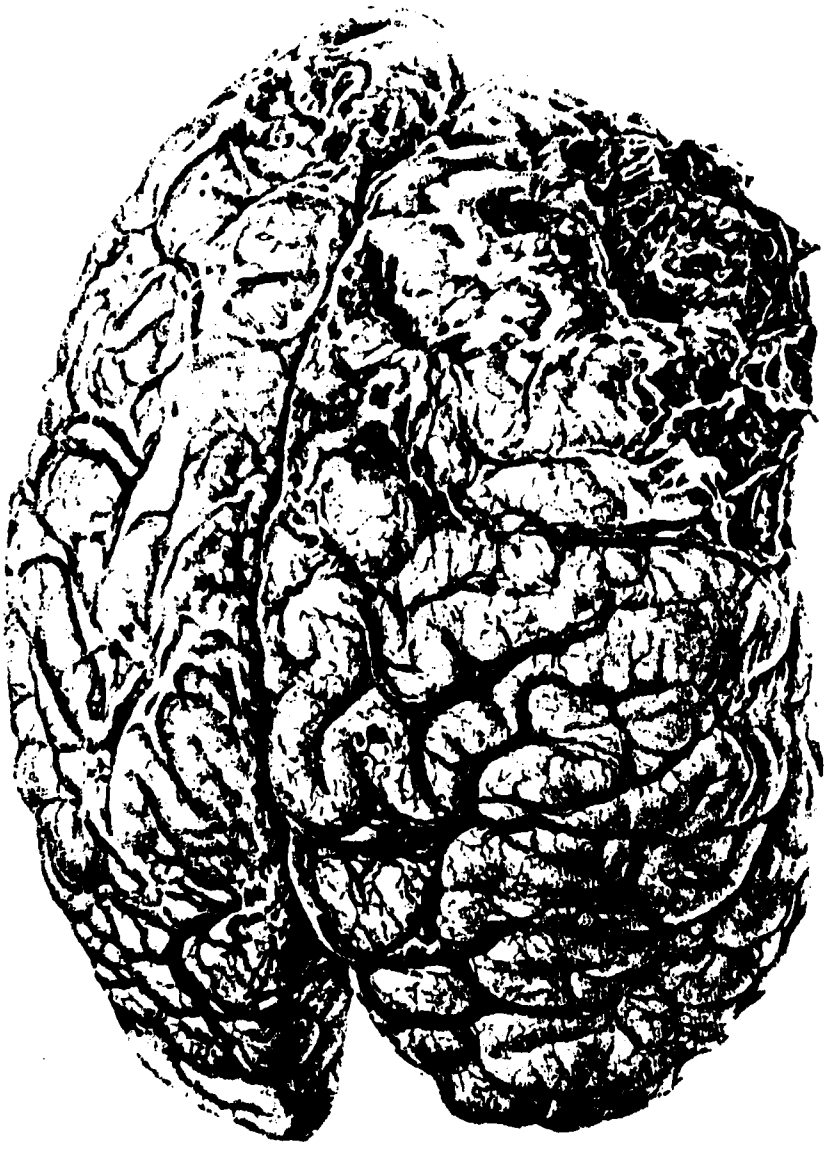


Fig. 174. Perforating fragmentation wound of frontal portions of brain. Purulent leptomeningitis. (Artist of T. V. Belyayev).

Page 450b.



Fig. 175. Purulent leptomeningitis after tangential fragmentation wound of postcranial portion with sub-arachnoidal hemorrhages. (Artist L. P. Miloradovich).

During the development of process in the walls of ventricular system are created favorable conditions for settling pus, than is explained, apparently the nonuniformity of the cloudiness of different portions of fluid/liquid.

With a deterioration in the condition of wounded was noted the appearance of a protein-cellular dissociation that it served as prognostically unfavorable sign/criterion. In the predominant majority these cases ended with death, and on autopsy was detected the picture of spilled purulent meningitis and meningoencephalitis.

A quantity of sugar in cerebro-spinal fluid changed inversely proportional to the severity of the condition of patient. The combination of heavy meningeal symptoms, together with the increase of a quantity of sugar in cerebro-spinal fluid, she indicated the development of the meningoencephalitis. However, a quantity of chlorides in cerebro-spinal fluid with a detericration in the condition of patient was decreased. Similar oscillations/vibrations were noted also in the content of sugar, but so/such not sharply. The picture of the blood was characterized by sufficiently considerable leukocytosis, reaching to 25000 with the shift/shear of formula to the left. In the heavy cases was observed the absence of eosinophils,

frequently leukopenia and lymphopenia. ROE frequently achieved 50-70 mm an hour.

Analysis of the lethal cases. Most frequently mortality was observed in the group of wounded with the clinically atypical form of meningitis, with which in section was noted diffuse purulent meningitis.

In the second place on the severity of outcomes proved to be the group of meningitides, which developed against the background of sub-arachnoidal hemorrhage (45.5%).

In section, besides diffuse or basal meningitis, they were noted also: subdural hemorrhages (5.4%), sub-arachnoidal hemorrhages (10.3%), epidural hematomas (1.0%), hemorrhages into ventricles (1.6%) and finally hemorrhage into the substance of brain (8.2%). As an example let us give some pathoanatomical findings with meningitides (Fig. 174 and 175).

With secondary meningitides, which were connected to encephalitis, the lethality was almost two times higher than with primary meningitides.

The study of the materials of autopsies shows that to the

development of diffuse purulent encephalitides and meningoencephalites frequently contributed the hemorrhages.

The presence of purulent periventricular encephalitis with the "penetration" of the abscess of brain was observed in 11 cases of 52, moreover subsequently was developed basal purulent meningitis. In 5 cases with the abscess of brain there was focus purulent meningitis, moreover in 2 cases in the hemisphere, contradictory/opposite from the location of abscess.

Treatment. For the treatment of meningitides in the Great Patriotic War were applied in essence chemotherapeutic substances - sulfanilamide preparations both in the pure form/species and in combinations, and also in combination with sulfur therapy and urotropin.

These substances many clinicians applied in the following form: 1) 30.0 sulfidines inside to course within 6 days, 2) 65 cm^3 10o/o solution of sulfidine is intravenous to course in 3 days, 3) 23.0 sulfazoles in 5 days, 4) 50.0 white streptocide in 9 days. Were applied also the following combinations: 1) sulfidine with white streptocide, 2) sulfidine with urotropin vnutr6 or 40o/o solution of urotropin is intravenous, 3) sulfazole with white streptocide, 4) sulfidine and streptocide with the appropriate form/species of serum

in obtaining of positive sowings in spinal cerebral fluid/liquid.

In the first place on effectiveness and the speed of therapeutic action stood sulfidine. The best results exerted the course of treatment by sulfidine which was carried out during 6 days on the following scheme: the first day of 7.0 sulfidines (first reception/procedure by 2.0, and then on 1.0 after 4 hours), to second and third day 6.0, to fourth and fifth 4.0 and for six days 3.0. With subsequent "waves" of meningitis the course was repeated.

Page 452.

Temperature at this treatment, as a rule, fell critically in the first twenty-four hours (see temperature curve, Fig. 176). In some sulfidine-resistant cases the temperature did not fall (see temperature curve, Fig. 177).

The decrease of tunicary symptoms was noted to the second day, their disappearance - to third- fourth day. During the first day of sulfanilamide therapy the pleocytosis from several thousand descended to several hundred, while a quantity of protein was decreased more slowly. The disappearance of causative agent in cerebrospinal fluid usually was noted to the second day. In the blood fell leukocytosis, grew lymphocytosis and appeared ecsinophils. The speed of the

reverse/inverse development of the symptoms of the damage/defeat of nervous system directly depended on the period of the beginning of treatment - than earlier it began, the better there was the result.

Incidental phenomena from sulfidine, which was being applied inside, besides the transient phenomena of dyspepsia and light cyanosis, usually it was not noted. However, from a total number of wounded in 8 cases vomiting was so/such persistent, that it forced to end treatment by sulfidine; in 2 patients was noted the delay of urine, which was continuing about 12 hours.

Sulfidine wounded must accept through the defined time intervals both day and by night, i.e., not to interrupt/break receptions/procedures for entire duration of days.

Intravenous introduction to 10o/o of solution of sulfidine was applied on the following scheme: the first day - the first injection 5 cm^3 of solution, the second after 12 hours - 10 cm^3; the second day - two injections on 10 cm^3 of solution with gap/interval 12 hours; the third day - three injections on 10 cm^3 with gap/interval 8 hours. In all were introduced 65 cm^3 by 10o/o of solution of sulfidine during the three-day course of treatment.

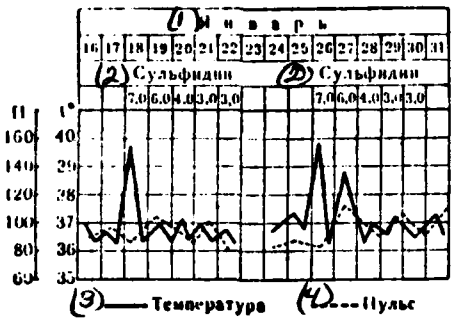


Fig. 176. Temperature curve.

Key: (1). January. (2). Sulfidine. (3). Temperature. (4). Pulse.

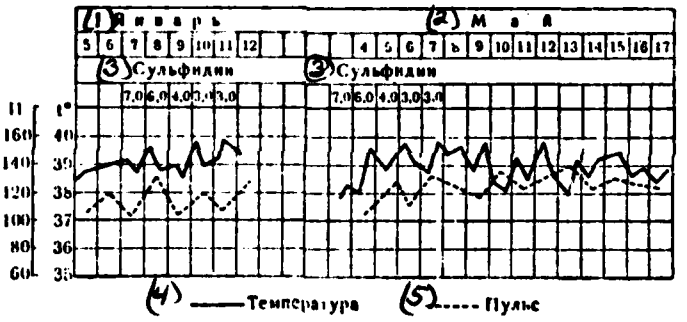


Fig. 177. Temperature curve.

Key: (1). January. (2). May. (3). Sulfidine. (4). Temperature. (5). Pulse.

Page 453.

The positive sides of the intravenous introduction of sulfidine

consisted to the possibility of its use/application in cases when wounded could not swallow due to heavy condition. In this case was observed more rapid therapeutic effect, although sulfidine it was intravenously introduced almost 5 times less than with internal administration. However, intravenous introduction requires care due to possible complications - thrombosis of veins, collapse, education of necrotic foci during the incidence/impingement of preparation into subcutaneous cellular tissue, pains in hand and numbnesses in extremities at the moment of introduction.

Sulfidine concentration in the blood on the average achieved 2.83o/o by mgo/o, in cerebro-spinal fluid - 2.75 mg o/o, moreover sometimes it reached in the blood to 5.0 mg c/o and in cerebro-spinal fluid to 4.5 mg o/o. The presence of sulfidine in the blood and the cerebro-spinal fluid was noted after only 2 hours after internal administration first portion (2.0) of sulfidine. Disappeared sulfidine from the blood and the cerebro-spinal fluid three days after the termination of the course of treatment. Latter/last observation is of practical use with the designation/purpose of repeated courses of sulfidine.

The use/application of sulfazole most effective proved to be on the following scheme: the first day - 7.0 sulfazoles inside the second day - 6.0, the third day - 4.0, the fourth day - 3.0, the

fifth day - 3.0. Sulfazcle performs soft than sulfidine, causing a lytic temperature drop during 2-3 days. Changes in the tunicary symptoms, the cerebro-spinal fluid and blood were the same as during treatment by sulfidine, but they attacked/advanced more slowly. No incidental phenomena, besides vcniting, was ncted.

Treatment by white streptocide was carried out usually cn this scheme: the first and second day - on 8.0 streptocide internally, the third, fourth and fifth day - on 6.0, sixth- tenth day - on 4.0 inside. Altogether 50.0 streptocides to the ccurse of treatment. Streptocide performed less effectively, than sulfidine; temperature fell gradually (Fig. 178). Tunicary symptoms weakened to the fifth-sixth day, and they disappeared to seventh-eighth day. A descent in the pleocytcsis in cerebro-spinal fluid was noted to second- third day. Causative agent from cerebro-spinal fluid disappeared usually cnly tc third- fourth day.

The enumerated antiseptics were applied usually in accordance with the specific readings, manufactured in the process of observation of patients. With the easily flcwed/occurred/lasted forms of meningitis was applied the treatment by white streptocide or sulfazole. With a deterioration in the condition it was necessary immediately to convert/transfer tc sulfidine. With meningitides, which developed against the background of sub-arachnoidal hemorrhage,

it was shown, furthermore, energetic dehydration, and also combined treatment by sulfanilamides (in the same metering, as during the treatment of purulent meningitides) with intravenous introduction to 40o/o of solution of urotropin (on 10 cm³ during 6 days). With the purulent and pyonecrotic encephalitides, complicated by secondary purulent meningitis, high value acquired, besides sulfanilamides and urotropin, the repeated transfusions of blood on 50-100 cm³, penicillin therapy, and also ultraviolet lighting of encephalitic protrusions and wide dehydration. With sulfidine-resistant meningitides were necessary the more massive blood transfusions, the shift/relief of antiseptic preparation, transition to the combined methods of treatment or to antibiotics, in particular, to the massive doses of penicillin.

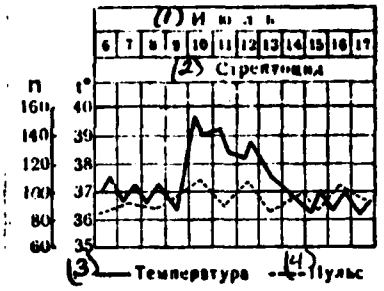


Fig. 178. Temperature curve.

Key: (1). July. (2). Streptocide. (3). Temperature. (4). Pulse.

Page 454.

In cases when in seedings/inoculations of cerebro-spinal fluid was detected an increase in the bacterial flora, the best effect is exerted the combined treatment (sulfidine + serum of the corresponding type). In particular, in the presence of hemolytic streptococcus in seeding/inoculation of cerebrospinal fluid favorable results gave white streptocide with the appropriate serum.

The combined method of treatment especially is recommended in the cases of pneumococcus meningitis. With this method it was given inside; the first day - 12.0 sulfidines it was introduced under skin of 26000 units anti-pneumococcus serum, the second day - 8.0 sulfidines and 30000 units of sera, the third - 6.0 sulfidines and

40000 units of serum, into the fourth day - 4.0 sulfidines and 96000 units anti-pneumococcus serum.

The effectiveness of this method of treatment is confirmed by the recovery of 4 patients of 11, who suffered pneumococcus meningitis of bullet origin.

Antibiotics during the Great Patriotic War were applied in the very restricted quantity and that only in the very end of the war.

It is necessary to be stopped at the proposed by N. N. Burdenko method of the treatment of the infectious complications of the wounds of skull and brain by the intracarotid introduction of sulfanilamides and penicillin. Method this is designed for the possibility of rapid creation in brain, in the focus of infection, high concentration of antiseptics and antibiotics according to the principle of "deep antiseptics." quantity of that introduced in one step by 10o/c of solution of sulfidine oscillated from 10 to 40 cm^3. By a similar intra-carotid method was introduced penicillin. Its one-time dose was 10000 units. The uniform procedure of the intra-carotid method of introduction and treatment toward the end of the war yet it was not manufactured. The works of a number of the Soviet authors confirm the effectiveness of the intra-carotid introduction of sulfanilamides and penicillin during the treatment of some infectious complications of

the wounds of skull and brain. It should also be noted that for maintaining the high concentration of penicillin N. N. Burdenko proposed to simultaneously introduce to wounded the intravenously hypertonic solution of sodium chloride.

The intra-carotid introduction of antiseptics and antibiotics is, apparently, the active method of the treatment of most severe infectious complications with the wounds of brain. Indicating to the large therapeutic effect of sulfanilamides used and penicillin. N. N. Burdenko emphasized that they are not panacea and so that they would give the success, it is necessary to premise to them the timely surgical processing of wound.

Treatment with secondary meningitides, which developed against the background of encephalitides, and also with the meningoencephalites is similar to treatment with primary meningitides.

Should be only noted again that in the cases of the predominance of encephalitic symptoms, besides sulfanilamide preparations, should be used extensively urotropin and blood transfusions, but sometimes also penicillin.

High value has also the symptomatic therapy: heart substances,

banks, vitaminization, care of bedsores.

Serious effect on cutcome exerts the rational treatment of the infected wound of skull and brain.

Page 455.

To the very effective methods of the treatment of meningitides should be related also cerebrospinal puncture. It is especially shown with meningitides, which developed against the background of the sub-arachnoidal hemorrhage where together with cerebro-spinal fluid are driven out the issuing from blood, products of its decay and vital activity of micrctes.

Contraindication tc lumbar punctures must be considered the conditions in which it is possible to suspect not increase, but lowering intracranial pressure.

With purulent meningitis or purulent meningoencephalitis is shown the late primary surgical prccessing cf the wound of skull and brain for the creation of outflow and cautious distance/separation from the cerebral wound of the available bone fragments and cther soiling wound foreign bodies. By this prccessing is conducted loose tamponade of wound.

The advisability of similar tactics is illustrated by observations of the group of wounded to which is not made the primary processing of wounds and whose wound process was complicated subsequently by meningitis and meningoencephalitis.

In the same cases where, together with sulfanilamide therapy and other methods of the medicinal treatment of these complications, was produced the late primary processing of wound, lethality composed altogether only 33.0o/c.

With one medicinal therapy without the late surgical processing of wound the percentage of lethality from meningitides and meningoencephalites was increased.

Thus, the surgical processing of wound not only does not make the outcomes worse of meningitis, but, on the contrary, it considerably improves them, as about this he wrote into 1905 more V. A. Oppel's. Surgical intervention is shown not during the first day of the development of meningitis, but after 2-3 days after energetic therapy by sulfanilamides.

The analysis of the outcomes of the purulent complications of

the wounds of skull and brain is given in Tables 52 and 53.

As can be seen from Table 52, most favorable results are noted with the typical form of purulent meningitis. The smallest percentage of complete recovery is noted with atypical form. The third form of meningitides, which arose against the background of sub-arachnoidal hemorrhage, occupies intermediate place. The general/common/total percentage of recoveries with primary meningitides was satisfactory.

Table 52. Outcomes with primary meningitides (in percentages) (T. S. Malysheva - specialized front line evacuation hcspital).

(1) Формы менингитов	(2) Полностью выздоровело
(3) Типичная	69,5
(4) Атипичная	42,5
(5) Менингиты, развившиеся на фоне субарахноидального кровоизлияния	54,5

Key: (1). Forms of meningitides. (2). Completely it recovered. (3). Typical. (4). Atypical. (5). Meningitides, which developed against the background of sub-arachnoidal hemorrhage.

Page 456.

Outcomes with seccndary meningitides, which developed after encephalitis, are unfavorable. The percentage of recoveries is considerably lower than the percentage of reccveries with primary meningitides. With the meningoencephalites, according to T. S. Malyshevoy's data, complete recovery is noted into 53.6o/o of cases.

General/common/total percentage of recoveries with all complications (purulent meningitides prisary and secondary, meningoencephalites) during the Great Patriotic War considerably authors' higher than data foreign.

The special conditicns of Leningrad Front made it possible to sufficiently long observe those wounded the skull and the head brain, up to their recovery. On the average the wounded remained on the cot of 58 days, and of the group of dead persons - 23 days. The severe conditions of blockade, it is doubtless, had an effect on course and cutcome of complications.

With prognosis in each case should be been cautious and taken into consideration clinical and laboratory data, and also effectiveness of the therapy used. In preventive sense, besides early operational processing, high value it had sulfanilamide therapy, that was beginning immediately after processing cf wcund and continuing during 3 days (on 4.0 sulfidines in a 24 hour period).

In conclusion it is necessary to note that the problem of the therapy of purulent complications with the bullet wounds of skull and brain is to a considerable extent the prcblem of their early diagnosis and prophylaxis.

Table 53. Outcomes of secondary meningitides (in percentages).

(1) Формы вторичных менингитов	(2) Полное выздоровление
(3) Вторичные менингиты при энцефалитах	16,4
(4) Вторичные менингиты при абсцессах	23,0
(5) Итого . . .	19,7

Key: (1). Forms of secondary meningitides. (2). Complete recovery. (3). Secondary meningitides with encephalitides. (4). Secondary meningitides with abscesses. (5). Altogether.

ENCEPHALITIDES.

The encephalitides, which develop on the soil of the bullet wounds of brain, are such severe and frequent infectious complications as meningitides and abscesses of brain. Meanwhile the clinic of bullet encephalitides is studied much weaker than clinic of other infectious complications. The reason for this - tendency of the larger unit of the encephalitides soon after onset either to undergo the restricted purulent melting and limitation and to convert/transfer into the abscesses of brain (restricted abcess-forming form), or, being spread in the parenchyma of brain, to convert/transfer to sub-arachnoidal spaces or walls of lateral ventricle (spilled) and, being complicated by secondary meningitis or, it is thinner/less frequent, ependymitis, to give the clinical picture of the meningoencephalitis.

Page 457.

In the smaller unit of the similar cases the complication flows/occurs/lasts as pure form of encephalitis, which becomes apparent by typical pathcanatomical changes and characteristic clinical picture.

The onset of the exercise about encephalitis is related at the beginning of the past century when to this co'cept was given the very wide interpretation, which united on its pathogenesis and clinical picture different diseases of brain. Further study contributed to the refinement of the concept of encephalitis as the inflammatory disease of the brain, called by different etiological factors. About the severity of encephalitis wrote already N. I. Pirogov during Crimean campaign, indicating that all wounded with prolapse of of brain died.

Half a century after our compatriot O. M. Khol'bek in Russo-Japanese war of 59 the wounded from protursion of brain noted lethal outcomes in 32 people.

V. N. Shamov and N. N. Petrov in the first world war focused

attention on the heavy and hopeless infectious softenings of brain, leading to penetration into the area of cerebral ventricles.

In war with White Finns 1939/40 g. the frequency of encephalitides on the soil of the bullet wounds of skull and brain comprised, according to the data of Leningrad neuro-surgical Institute, 12.9o/o, and the protrusions of brain - 27.9o/o.

According to pathomorphological research on the same material, purulent encephalitis was developed usually in the sectors of the crushed brain tissue, in which hit the ground bone fragments and infected particles of head-gear.

In the Great Patriotic War the encephalitis in essence was considered together with that mixed groups of the meningoencephalites, which occupied the first place on frequency and severity among the infectious complications of the penetrating wounds of brain. This fact together with different interpretations of the concept "encephalitis" extremely impeded the explanation of the necessary clinical and statistical data about its pure forms, making it necessary to use the materials of the individual authors and installations. After war during the analysis of these maps/charts/cards of the deepened characteristic it was possible to explain that in the group of dead persons from suppurative processes

in brain and shells with the penetrating wounds the encephalitides composed 16.1o/o, with exception of taken intc consideration separately meningoencephalites. In this group of encephalitides they were included: the spilled encephalitides - 4.8o/o, the abcessed encephalitides - 0.9o/c and encephalitides together with ependymitis - 10.4o/o.

In the development of encephalitides kncwn role played the form/species of the wounding shell, mechanism the wounds and the character/nature of wound canal. Encephalitis relatively more frequently was developed with perforating bullet wounds - segmental and diametric, than with blind-end fragmentation and tangential wounds. The same impression was obtained during the analysis of different means of the blind-end wounds of the skulls with which in the portion of segmental ones and diametric also fell a great quantity of heavy encephalitides in ccmparisen with less traumatic forms/species - simple and radial.

It should be noted that during the Great Patriotic War were proposed different classificatens of the clinical forms of encephalitides. Together with the previously isolatable forms of the encephalitides: purulent, pyonecrotic, abcessing, phlegmonous encephalitis and meningcencephalitis, was alsc isolated the new form of anaerobic encephalitis by the name of the gaseous gangrene of

brain (1942 - N. I. Grashchenkov, P. P. Saxarcv).

Different authors differently classed the encephalitides of bullet origin, taking for basis one or several principles during the separation of the forms of encephalitis.

Page 458.

More detailed develcpment and special study of materials showed that, besides the purulent and pyonecrotic forms of encephalitides, were observed the even pyo- hemorrhagic and ichorous forms. As the basis of present chapter are assumed the data of the analysis of 100 specially selected cases where the penetrating wounds of skull were complicated by the heavy encephalitis, which ended in the majority of the cases by lethal cutcome.

By the extent of prccess all encephalitides were divided into those restricted (66) and spilled (34). According to the character/nature of process are isolated: purulent and abscessing encephalitides (41), pycnecrotic (22), pyo- hemorrhagic (11) and ichorous (26). On etiological factor leading were usually gyogenic cocci both in the pure form/species and in different associations. Most frequently it was secreted hemolytic streptococcus (28), associations of streptococcus with staphylococcus (20), pure/clean

staphylococcus (4), asscciation of streptococcus with the group of putrefactive bacteria (3), of meningococci (1), anaerobic infection (5)and, etc.

According to the type of the wounding weaponry, in spite of the absolute predominance of fragmentation wounds above bullet ones, the latter nevertheless were encountered in this group more frequently than among all groups of those wounded the skull. According to the character/nature of wound attention is drawn to the relative frequency of perforating wounds in comparisen with tangents and blind ones. On the vastness of the zone of wound rushed into eyes the predominance of the wounds of two and three regions of skull (55) above one region (45).

Encehpallitic process was spread, as a rule, on the course of wound canal and is only exclusively rare the isolatien or far from wound canal, it is more frequent in area of one of the poles of large hemispheres, on the spot for its contusien from shock/counterblow.

Ventricular fluid fistulas were encountered in 33 cases of encephalitides. The presence of the protrusien of brain is noted in 82 cases.

In the cases of the gaseous gangrene of brain was observed the

gangrenous decay of cerebral tissue with the liberation/excretion from it of ichorous and gas bubbles with sharp putrefactive odor. In the similar cases were expressed edema of brain, progressive build-up/growth of protrusion its and early meningitis. The latter flowed/occurred/lasted with blurred changes in the cerebro-spinal fluid, with weak xanthrochromia, small cytosis and increase in the quantity of protein. In the unit cases from fluid/liquid it was isolated by V. perfringens. In wounded, who suffer the gaseous gangrene of brain was the picture of the severe general/common/total intoxication: strong headaches, stupor, quickened and weak pulse at low temperature. Leukocytosis increased insignificantly, but was noted high ROE and lymphokpenia. Rapid lethal result attacked/advanced usually 2-4 days after wound with the picture of the overall anaerobic sepsis, which proceeded from cerebral wound.

Vital importance for the characteristic of the dismantled group of encephalitides have the data about the primary surgical processing of wounds.

From a total number of wounded with encephalitis in 9 cases of no surgical processing it was made. The others 91 were operated, but in the majority of the cases the early periods of process/operations were passed (process/operation to 1-3 days after wound was produced only in 36 cases, on 4-9 days - into 34, to the 7-12th day - in 21

cases).

The clinical picture of encephalitis stored/added up usually from general brain, focus and tunicary symptcss. The first signs/criteria of the ripened ccmplicatien were noted by limber, already beginning with the 2nd and to the 10th day after wound. Earliest and permanent symptom was the headache, which bore either diffuse or local character/nature, with respect to the focus of inflammatory process. Headache was frequently escorted/tracked by nausea and often by continuous vomiting. The violations of consciousness in the cases of average/mean severity usually was not noted.

Page 459.

In the heavy cases of encephalitis was observed sometimes the nonconformity between the heavy general conditicn of wounded and his undarkened consciousness. A sharp detericration in the condition led in the very heavy cases to sleepiness or sopcr. The penetration of encephalitis focus into the system of the ventricles of brain was characterized by comatcse condition. The changes in the pulse and the respirations, connected with inner cranial pressure increase, were characterized by inconsistency and changed during disease in dependence on coursing cf process.

Changes on ocular day in mild cases usually it was not noted, whereas in the heavy cases they were expressed to different degree (from the insignificant expansion of veins tc stagnant ones it was mammillary inclusively).

The mental condition of wounded was characterized by general/common/total depression - the absence of complaints, apathy and indifferent relation to that surrounding. However, against the background of this general/common/total apathy began the periodic attacks/seizures/paroxysms of the sharp psychc-motor excitation, during which the wounded were seen in bed, jumped up, to tear away bandage.

Temperature was usually subfebrile, sometimes it, gradually growing, it achieved high numerals. This coincided with the connection of purulent meningitis (Fig. 179). Sometimes in temperature curve were noted large spreads/sccpes. In certain cases the temperature achieved 40° and even it is higher, which characterized a deep violation of heat-control centers of brain (Fig. 180).

One of most characteristic for an encephalitis symptoms was

pathological somnolency, which converted/transferred into surplus prolonged, limber almost continuous sleep, which was continuing many days and alternated sometimes with persistent insomnia, which was not yielding even action of narcotics.

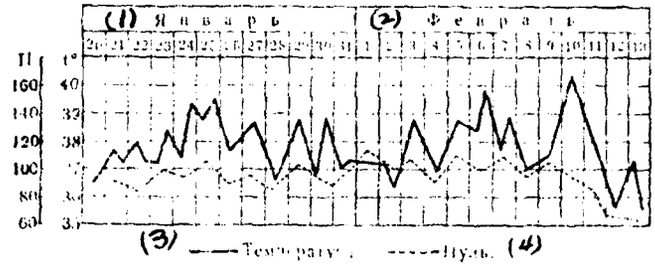


Fig. 179. Temperature curve.

Key: (1). January. (2). February. (3). Temperature. (4). Pulse.

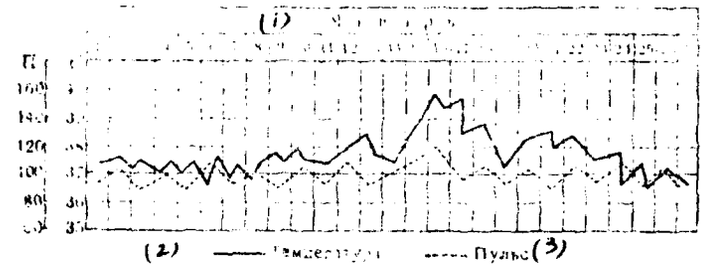


Fig. 180. Temperature curve.

Key: (1). January. (2). Temperature. (3). Pulse.

Page 460.

Appeared the pathological emaciation of wounded - cerebral or encepalytic cachexia gradually grown and reached the extreme degrees. Some wounded reminded mummy with the dried, covering/stretching skeleton skin, fragile nails, feverish bright maculae on the sharply

become emaciated face, with the deep, extensive, irrepressible growing bedsores on sacrum, large , spatulas, etc. Meanwhile the appetite in such wounded was usually sharply increased.

Focus symptoms were characterized by diversity and colorfulness, depending on localization and sizes/dimensions of the destroyed cerebral tissue, course of wound canal and dissemination of inflammatory process in train.

Were very frequently observed changes in the pupil phenomena, paresis and paralyses of oculomotor and discharge nerves, central paresis of face nerve, etc. Hemiparesis, hemiplegia and even tetraparesis were characterized by the early advancing/attacking contractures with the presence of the increased tendinous and periosteal reflexes, clonuses and pathological reflexes. To typical motor disorders should be related the tremor of hands and face musculature, usually extrapyramidal character/nature. The degree of the violations of surface and deep sensitivity was different. The diverse forms of aphasias which are observed during the damage/defeat of left hemisphere, frequently were combined with different forms/species of hemianopsia with the wounds of postcranial portions.

The organic damages/defeats of nerve system with encephalitides usually destroyed with their massiveness, especially in the diffuse

farms/trusses of encephalitis. Focus symptoms in proportion to the aggravation of disease grew and, on the contrary, they were decreased with recovery.

Meningeal syndrome frequently was combined with the appropriate changes in the cerebro-spinal fluid. Changes these consisted in low pleccytosis and increase in the quantity of protein and oscillated depending on character/nature and degree of the dissemination of process. Fluid/liguid usually had a blood-ccntaining-purulent color. Most frequently from it was sown hemolytic streptococcus.

Vital importance in clinic of encephalitides had the relationships/ratios between the absolute numerals of pleocytosis and the percentage of protein. While a quantity cf cellular elements/cells showed degree of the damage/defeat of cerebral shells, the percentage of prctein was directly ccnnected with the degree of the manifestation of encephalitic. Upon transfer of process to shells were reinforced meningeal symptoms, in cerebrospinal fluid grew/rose a quantity of protein and cellular elements/cells. If the development of encephalitic process occurred towards ventricular system, then tunicary symptoms were decreased, while the sanitation of cerebrospinal fluid it did not attack/advance. On the contrary, pleocytosis to a quantity of prctein is continued to grow and appeared the characteristic for purulent periventricular

encephalitides nonuniformity of the cloudiness of different portions of fluid/liquid with the appropriate changes from the side of pleocytosis and protein. With transition of process to the basis of brain tunicary symptoms violently grew, moreover simultaneously disappeared the sharply pronounced factionalism of cerebro-spinal fluid.

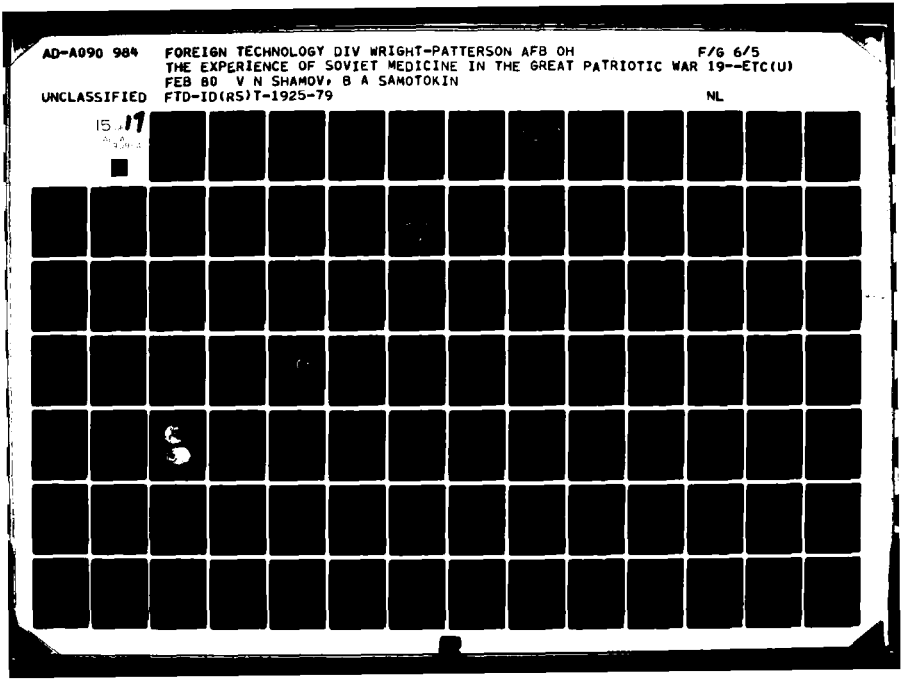
Changes in the cerebrospinal fluid with encephalitides had not only diagnostic, but also forecasting importance. The high content of sugar (sometimes to the level of the content of sugar in the blood) indicated the unfavorable development and the dissemination of encephalitis.

Page 461.

With meningitides, as is known, the increase of sugar in cerebrospinal fluid is, on the contrary, prognostically contributory factor. a Belkov-cellular dissociation in cerebrospinal fluid was observed sometimes and with encephalitides; therefore during the identification of complications in brain it was necessary to consider all clinical and laboratory data.

Characteristic with encephalitides they were and changes of the blood, especially acceleration ROE. Leukocytosis was not permanent

AD-A090 984 FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OH F/G 6/5
THE EXPERIENCE OF SOVIET MEDICINE IN THE GREAT PATRIOTIC WAR 19--ETC(U)
FEB 80 V N SHAMOV, B A SAMOTOKIN
UNCLASSIFIED FTD-ID(RS)T-1925-79 NL




A
098

sign/criterion. The formula of the blood was characterized by lymphopenia, neutrophilia and eosinophilia. In the heavy cases was noted a descent in hemoglobin.

The treatment of encephalitides was the complex problem whose successful decision/solution depended not only on character/nature and coursing of this complication, but also from the totality of the series/row of measures, beginning from the selection of the methods of treatment and ending with the organization of feeding and care of wounded.

Energetic medicinal treatment by sulfanilamides and antibiotics (especially by penicillin) was combined with surgical intervention. The latter usually consisted of the cautious distance/separation of the shallow arranged/located, easily attainable bone and metallic fragments, supporting an infectious-inflammatory process in brain, and also in the emptying of ulcers or the expansion of a bone-tunicary annulus, if in it were pinched the protrusions of brain.

The practicing during war medicinal therapy of encephalitides consisted in the designation/purpose of sulfanilamides usually in half metering in comparison with the schemes of the treatment of meningitides, but under the condition of the introduction of

urotropin.

Favorable results it was possible to obtain in the following scheme of treatment: the first day - sulfidine and urotropin alternately on 1.0 through 3 hours, second and third day - sulfidine and urotropin through 4 hours, fourth and fifth day - sulfidine and urotropin after 6 hours.

Sulfidine was replaced sometimes by streptocide or sulfazone. Regularly were done the blood transfusions on 50-200 cm^3, endolumbarly were introduced 0.8o/o solution of streptocide on 20-25 cm^3. Was applied serous treatment with respect to causative agent (by especially antigangrene serum during the anaerobic infection of brain). In recent years the drugs began to introduce intra-carotid (according to N. N. Buredenko). Results proved to be good even in the very heavy cases of encephalitis.

Antiseptic therapy usually was combined with the use/application of the dehydrating substances. The latter contributed to the decrease of inflammatory edema and to the reverse/inverse development of the protrusion of brain. Systematic lumbar punctures served not only diagnostic, but also therapeutic purposes. Turned serious attention to the defense of the protrusion of brain.

The nourishment of wounded consisted of the easily available and high-energy food with abundant alkaline drinking. Were carried out careful general/common/total care mouth, skin, and bedsores, for preventive and therapeutic targets were assigned the banks, heart, somniferous and other symptomatic substances.

The pathoanatomical research of sectional material showed that with encephalitides into inflammatory process easily are involved other, adjacent sectors of brain, moreover is formed the whole net/system of different complications. Encephalitis frequently is combined with diffuse or purulent basilar meningitis. The perifocal encephalitis, which was being developed around abscess, with penetration into ventricle led to ependimitis and basilar meningitis.

Page 461.

Basilar meningitis in combination with encephalitis is discovered in 52 cases, diffuse meningitis - into 26, restricted purulent meningitis - into 22. Furthermore, were noted other complications, in particular, ventricular fistulas - in 33 cases, the penetration of purulent encephalitic focus into ventricle - into 33, edema of brain - into 38, the combination of the abscess of brain with encephalitis - in 40 cases.

To the development of encephalitides they contributed hemorrhage: subdural, subarachnoidal, epidural, intracerebral, ventricular.

In 5 cases of anaerobic encephalitis cerebral substance was represented by very edematic, soft and variegated, with the phenomena of sharp decay and melting, without the clear boundary between the healthy/sound and casualty brain tissue.

Pneumonia, usually bilateral, fine focal/acinous, was discovered in third of cases. Sharp general/common/total cachexia was observed in 10 wounded. Constantly were noted degenerative processes in heart, liver and other parenchimatous organs/controls.

Prophylaxis of encephalitides consisted mainly in the early and full-valued primary processing of the wound of skull and brain, prolonged hospitalization and systematic sulfanil amide therapy at preventive doses (4.0 sulfidines) during the first three-five days after process/operation.

EARLY ABSCESSES OF BRAIN.

Among the severe infectious complications of the bullet penetrating wounds of skull and brain, that were being observed in

the Great Patriotic War, one of the first places occupied the abscesses of brain. The abscesses of brain [1] composed 26.7o/o of all cases of the infectious complications, which were being observed with the wounds of skull.

FOOTNOTE [1]. The frequency of the abscesses of brain is somewhat overstated, since the data of the maps/charts/cards of the deepened characteristic include not only the early abscesses, but also the unit cases of late abscesses. ENDFOOTNOTE.

The value of the abscesses of brain is determined not only by their frequency and severity. The exceptional interest, exhibited to them in all wars, is explained by two additional facts.

First, the abscesses of brain are the most typical infectious complication of the bullet penetrating wounds of skull. In the second place, their frequency to a considerable degree depends on the quality of the organization of neuro-surgical aid by wounded. Sharp predominance during the Great Patriotic War of mine fragment wounds above bullet ones and the blind types of the wound canal above through ones contributed to an increase in the number of abscesses of brain.

On the other hand, an improvement in the quality of the

specialized neuro-surgical aid by that wounded into skull and wide preventive use/application of sulfanilamides, an increase of the envelopment of wounded by timely and full-valued primary processing wounds decreased the frequency of the abscesses of brain.

As the illustration of these positions/situations can serve the following data: with the wounds of skull by fragments the abscesses of brain were developed into 12.7o/o of cases, and with wounds by bullets - into 10.2o/o. With blind-end wounds the abscesses were observed into 13.3o/o, with tangents - into 12.5o/o, with segmental ones - into 9.8o/o and with diametric ones - only into 7.7o/o of cases.

Page 462a.



Fig. 181. Festering wound canal. (Artist V. S. Chumanova.).

Page 463.

It would seem that the predominance in the Great Patriotic War of blind-end fragmentation wounds must considerably increase the frequency of the abscesses of brain in comparison with past wars. However, actually during comparison with the preceding/previous wars rushes into eyes a very considerable descent in the number of cases of abscesses. Thus, for instance, in the first world war the abscesses of brain, according to the data of individual authors, were observed in 70.0o/o of all wounded with the penetrating wounds of skull, and in the Great Patriotic War - only in 12.2o/o. The

frequency of the abscesses of brain on the individual years of this war steadily fell: intc the first year - 15.9c/o, in the second year - 15.7o/o, in the third year - 11.1o/o, in the fourth year - 9.6o/o.

The steadily progressive drop in the frequency of the abscesses of brain during the Great Patriotic War vividly shows the exceptional value of good organizatien of the specialized neuro-surgical aid in front, since the abscess of brain is soundly considered the as most typical index of quality of the primary processing of the wounds of brain.

The development of the abscesses of brain depends not only on quality, but also on the periods of processing wound, which is distinctly evident frcm table 54.

Thus, the frequency of the abscesses of brain continuously grows together with the pericds of the primary prccessing of the wounds of skull and brain, moreover the first sharp jump is noted in the cases of the processing 6 days after wound and it is later.

In a descent in the frequency of the abscesses of brain played the significant role nct only the percentage of envelopment by the surgical processing of those wounded the skull and its quality, but also the periods of processing wound.

In the pathogenesis of the bullet abscesses of brain the primary meaning has the primary bacterial contamination, introduced into brain by the wounding shells and foreign objects (Fig. 181). One cannot fail to consider also value and the secondary microbial contamination, which penetrates into cerebral wound already after its infection by the wounding shell, predominantly from the insufficiently thoroughly processed in periphery skin integuments.

However, the leading role in the onset of the early abscesses of brain, which are encountered in army and front line area, belonged to the bone fragments, lying usually in the surface and contaminated unit of the wound canal. Much smaller role in this case played the metallic foreign bodies, which were being located, as a rule, in the deeper and less traumatize and more contaminated unit of the wound canal in brain.

When in area of localization of the abscess of bone fragments and metallic foreign bodies it was not detected, in section frequently it was possible to find in the walls of abscess bone and metallic dust.

Table 54.

(1) Сроки обработки ран	(2) До 12 часов	(3) 12 часов — сутки	(4) 1—3-и сутки	(5) 3—6-е сутки	(6) 6—10-е сутки	(7) 10—15-е сутки	(8) 15-е сутки — 1 месяц	(9) Свыше 1 месяца
(10) Частота абсцессов в процентах к числу обработанных в каждый из указанных сроков	8,6	6,5	8,6	9,0	17,5	27,4	43,8	34,2

Key: (1). Periods of processing wounds. (2). To 12 hours. (3). 12 hours - days. (4). 1-3-and days. (5). 3-6th day. (6). 6-10th day. (7). 10-15th day. (8). 15th day - 1 month. (9). It is more than. (10). Frequency of abscesses in percentages to number of those processed into each of periods indicated.

Page 464.

However, during more detailed study is established/installed interesting facts: the abscesses, which appear in area of localization of bone fragments, were developed almost exclusively within early periods after wound (in the first weeks and months), while the abscesses whose onset was connected with metallic foreign bodies in brain, they were developed usually only into later, and sometimes within the very distant periods after wound.

The capability of the bullet abscesses of brain to be developed

first into early ones, then within later periods after wound, together with other, less important and characteristic features, it served as basis for their division into two basic forms - early and late.

Early abscesses of brain. Under the early abscesses of brain should be understood such abscesses which are usually developed soon after wound, they flow/occur/last sharply with diverse pathoanatomical and very complicated clinical picture and with difficulty they are differentiated. The methods of the treatment of these abscesses are inadequate, outcomes little favorable. In terms of the enumerated basic properties the early abscesses differed from late ones, which it was also the very severe complication of the bullet penetrating wounds of skull, on they were developed into more favorable - late periods after wound, frequently against the background of complete health, with the solidly healed wound or to the stabilized picture of residual symptoms.

Under the early development of abscess should be understood the onset of this complication in that period of wound process when the infected wound of brain is still opened or did not have time still to finally and solidly cicatrize. As is known, this period for wounds with small killing zone continues approximately one 1^1_2-2 months, and for most extensive ones - 2^1_2-3 month after wound. Authors'

majorities to early abscesses belonged all abscesses, which appeared in the first three months after wound, in contrast to all remaining, late abscesses, which were being developed are later this period when the wound of skull outside already healed. Thus, early abscesses, as a rule, were developed and were observed in wounded, who were being located in the specialized hospitals of army and front line area, and late abscesses - in therapeutic institutions of the near or deep rear and even in postwar period.

The frequency of early abscesses oscillated at different fronts of the Great Patriotic War from 13.0 to 8.3o/o, moreover in their total quantity it was considerably more than late abscesses.

Among those operated apropos of cerebral abscess into 73.3o/o of cases the latter will arise in the first 3 months after wound (early form); into 26.7o/o of cases abscess will arise in time from 3 months to 3 years after wound (late form). The total data of rear hospitals draw another picture: 39.0o/o of early ones and 61.0o/o of abscesses of brain.

The development of early abscesses on periods from the moment/torque of wound in the limits of three-month period proceeded usually unevenly: to 3 weeks - 24.5o/o, from 3 to 6 weeks - 45.2o/o and from 6 weeks to 3 months - 30.3o/o of all cases of the early

abscesses of brain. Thus, approximately/exemplarily into 70.0o/o of cases early abscesses were discovered in the course of the first 1-1½ months after wound, moreover to the first 3 weeks (beginning with earliest period - the end of the first week) came fourth of all cases.

Meanwhile the beginning of the formation of the capsule of traumatic abscess, which was responsible for the very concept of abscess, is planned only since the beginning of the third week and is completed usually to the sixth week and it is later (to 3 months).

Page 465.

Thus, with respect to the earliest group of acute/sharp abscesses (1 and of 2 weeks) appeared the legal doubts of the validity of diagnosis.

Actually/really, the least explained and most disputable/most debatable point/post in the problem of the early abscesses of brain was a question about the pathoanatomical nature of those pyoinflammatory processes which became apparent already within the earliest periods after wound by the clinical picture of acute/sharp abscess, although such, actually speaking, in the majority of the cases yet there did not exist. Besides the rarely encountered

authentic abscesses with the distinctly outlined capsule which in the exceptional cases was formed already after 6-7 days after wound, or by the clear packing/seal of cerebral tissue in periphery, under the diagnosis of abscess greatly frequently flowed/occurred/lasted the cases of the restricted purulent and abscess encephalitis, which one ought not to have identified with early abscesses, or the ordinary festerings of wound canal in brain with the random delay of the outflow of pus. Together with the insufficient clarity of the pathoanatomical picture of the early abscesses of brain, it was necessary to be convinced also of the insufficient study of symptomatology and weak elaboration of the differential diagnosis between the true early abscess of brain and the series/row of other forms of acute/sharp suppurative processes in cerebral tissue.

Localization of abscesses in brain in essence coincided with localization of the wounds of skull. However, in the first place in the frequency of the discovered abscesses stood the combined damage/defeat of two regions: sincipital-temporal region (16.5%) and temporal-postcranial (16.4%), and only following by them went frontal region (13.5% of all cases of abscesses). The frequency of the damages/defeats of temporal region with the abscesses of brain could be explained by the larger complexity of structuring of wound canal and its processing here, and also by the difficult conditions of the draining of cerebral wound due to the presence of massive

muscular layer.

On location the abscesses of brain were distributed as follows: crust - 11.3o/o, subcortical - 68.5o/o, paraventricular - 10.1o/o, basal - 9.7o/o. Furthermore, in the protruding from wound sector of brain were discovered abscesses into 0.4o/o. Thus, in the greatest number of cases abscesses hit the ground in subcortical region (two thirds of all cases) and is less frequent in regions, close to fluid routes/paths (crust, paraventricular and basal abscesses). This fact, it is doubtless, laid its typical impression on clinical coursing of complication. Subcortical abscesses were characterized more prolonged and by latent development, and crust, paraventricular and basal, on the contrary, by the early connection of bright tunicary symptoms with rapid complication of process purulent ependymitis and meningitis.

Value which is not smaller for a clinical picture, a diagnosis and the treatment of the abscesses of brain had their disposition in relation to to wound canal. In quite wound canal the abscess of brain was arranged/located into 29.3o/o of cases, next to wound canal - into 59.8o/o and far from it - into 10.9o/o of cases. Thus, in the zone of quite wound canal abscesses were arranged/located in a considerably smaller number of cases, than about wound canal and hereabout from it.

Page 466.

In the latter/last cases the abscess was develcped in finest cracks and offs-shoot of wound canal and only rarely far from it, usually on the spot of contusion focus of softening and hemorrhage, in area of one of the poles of this or even contradictcry/opposite hemisphere.

Comparatively rarely among the early abscesses of brain were observed the paired or multiple abscesses, located near or far from each other. The frequency of multiple abscesses, according to individual authors' data, oscillated from 2.0 to 4.9o/o.

In value and building/structure early acute/sharp abscesses differed from late chronic ones usually in terms of smaller sizes/dimensions and one chamber (Fig. 182). The sizes/dimensions of abscesses oscillated from the value of cherry to chicken/gallinaceous egg.

The clinical diagnosis of the early abscesses of brain is very complicated, since the symptomatology of the sharply developed early abscess frequently effaced by the common picture of the recent bullet injury of brain. The focus symptoms of the ripening abscess,

sometimes differing in no way from the symptoms of the restricted purulent or abscessing encephalitis, were frequently camouflaged with the existed focus symptoms. All this strongly effaced the symptomatology of early abscesses, extremely impeding diagnosis. Therefore special importance acquired the composite diagnosis, based not on individual symptoms or even symptom complexes, but on the totality of an entire clinical picture of disease and especially on the dynamics of its development. At the same time, the significant role played different auxiliary research, both clinical, and laboratory.

From general cerebral symptoms most frequently with early abscesses of brain were noted the headaches and changes in the psychics/psyche of wounded.

Headaches usually were by the constants, intense, diffuse which burst open, sometimes fluctuating, with the sharp periodic interlocks; they especially were reinforced into morning hours. Vertigoes were observed not in all cases. Local and percutor pains were expressed considerably weaker, were observed more rarely and had the topic value, especially with surface localization of abscess beside surface strata wounds.

The following typical symptom of the already matured early

abscess was the sharp, rushing into eyes change of the psychics/psyche of wounded, his conduct and reaction to that surrounding. The wounded who already, it seemed, moved out the heavy condition of initial and early period, was made by that animated, lively it reacted to that surrounding, suddenly sharply it were changed - it became silent, apathetic, inert, stunned it dive-submerged in the condition of pathological somnolency from which it although with difficulty, nevertheless it was possible to derive. Similar wounded answered with conversation with retardation, even then only the persistent questions, assigned in energetic form. Responses/answers were characterized by extreme monosyllabism and interruption. Similar wounded not on what usually complained, besides as to the strong headache and that not always, never nothing requested, even foods which is left by usually intact. Sometimes this torpid and depressive mental syndrome was relieved by violent psycho-motor excitation with delirum, hallucinations, motor restlessness/anxiety and general/common/total tangled nature of consciousness. The latter most frequently was observed with frontal either temporal localization of abscesses and it was faster the focus manifestation of disease, than cerebral or as assume/set some authors, by toxic.

Page 466a.

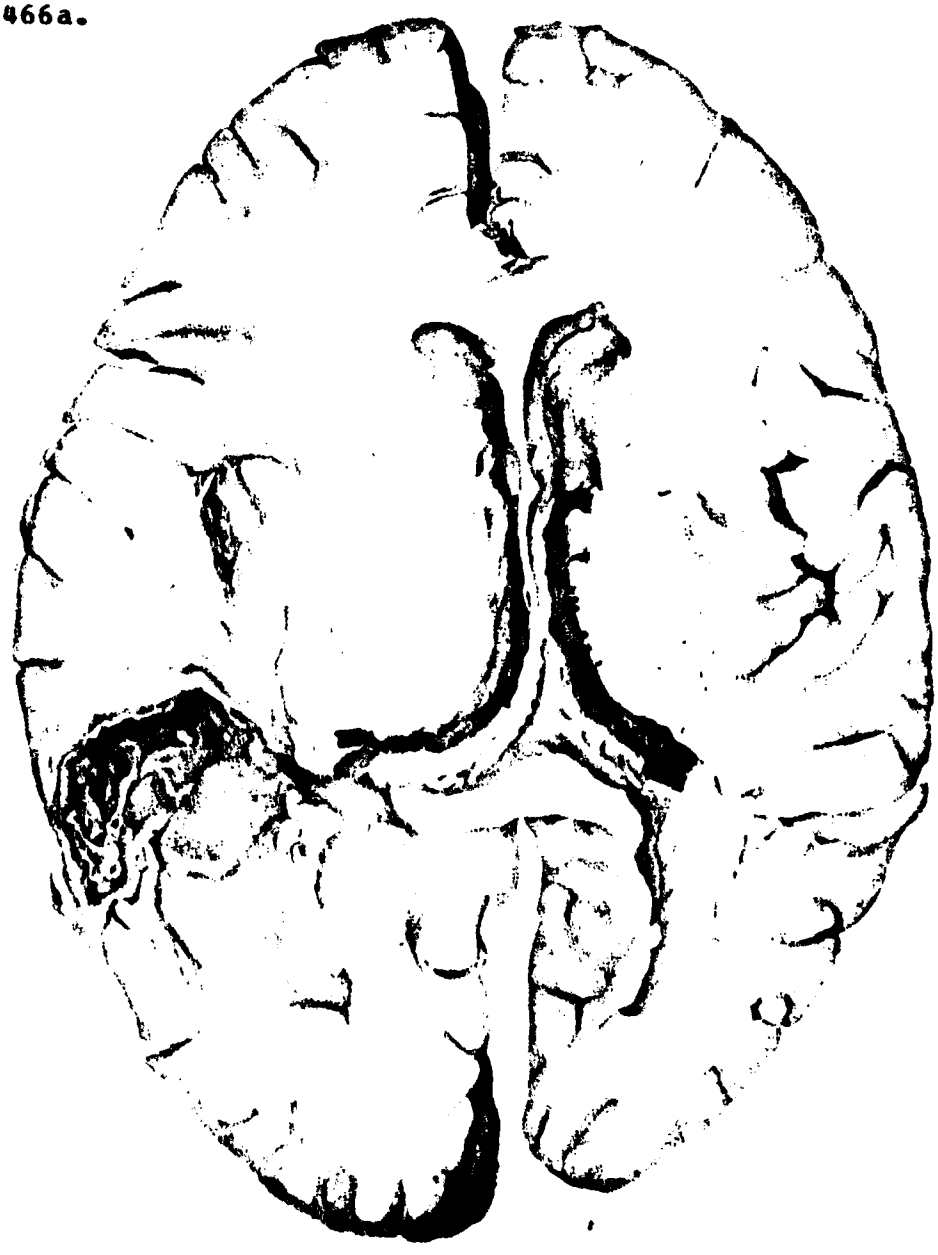


Fig. 182. Early abscess of left temporal portion on its boundary with

occipital. (Artist S. A. Moiseyeva.).

Page 467.

Vomitings and nausea with the early abscesses of brain are observed not always (approximately only in one fourth of all cases), but they can, however, be very strong, especially at the height/altitude of headaches and in the initial phase of complication.

Bradycardia, so/such characteristic and permanent with the abscesses of otogenic origin, with early bullet abscesses it is encountered considerably less frequent, approximately in half of the cases, and it is not always sharply proncunced; frequently it can be revealed/detected only during comparison with temperature.

Changes on ocular day with the early abscesses of brain (stagnant nipples or venous hyperemia) are observed frequently and rapidly grow. According to different data, the changes on ocular day are observed approximately into 1/2-3/4 all cases. Vital importance has asymmetry of these changes with the earlier and sharper development of stagnation on the side of abscess in the

initial stage of disease. Subsequently the asymmetry usually is smoothed.

All enumerated general cerebral symptoms are different by the degree of manifestation, they are variable and depend not only on the sizes/dimensions of the early abscess of brain and degree of its partial periodic auto/self-emptying through the fistula course, but to a considerable extent, also, from the sizes/dimensions of the bone and tunicary defect of skull. This latter in the majority of the cases plays decompressive role, descending, but sometimes also bringing to naught individual hypertension syndromes and even entire symptom complex as a whole.

Focus symptoms with the early bullet abscesses of brain usually concealed themselves and were camouflaged in the initial stage of development already previously with the existed "syndrome of wound canal". Therefore diagnostic value they acquired only in the case of distinct build-up/growth the previously existed symptoms or the appearances of new ones. However, judge about this can only doctor, who personally observes after wounded from the moment/torque of wound or that having available the careful documentation of the general and neurologic condition of wounded.

The development of tunicary symptoms testified, as a rule, about

the approximation/approach of abscess to cerebral ventricle or sub-arachnoidal space. The Kernig symptom in this case was more frequent expressed on the side of abscess, even in the absence of paresis on opposite side.

To a number of most characteristic focus symptoms, which played usually the significant role in the setting of the diagnosis of early abscess, one should relate growing paresis and paralyses of extremities with localization of wound in sincipital and in smaller measure in adjacent with it frontal and temporal regions. With crust localization of abscess paresis and paralyses sometimes were combined with the attacks/seizures/paroxysms of Jackson epilepsy. General/common/total convulsive fits were observed with frontal and temporal localization of abscesses.

Growing aphasia was the reliable symptom of the ripening abscess in left frontotemporal region, just as growing hemianopsia - in postcranial.

Appearance in wounded typical "frontal psyche" and euphoria, previously been absent or already smoothed, testified about the development of abscess in the damaged frontal portion, just as the appearance of different hallucinations and delirum it suggested about his development in temporal portion.

Page 468.

Essential auxiliary role in diagnostics of early abscesses played general infection symptoms in the form of temperature reaction and changes in the picture of the blood for which, in contrast to other infectious complications (meningitis, encephalitis), were typical insignificant shifts/shears, that already alone acquired differentially diagnostic value.

The subfebrile or normal temperature with sharp incline with penetrations in ventricle or sub-arachnoidal space was ordinary phenomenon with early abscess of brain. Normal or slightly increased leukocytosis (to 10000-12000) in moderate lymphopenia and absence of eosinophils, with high, as a rule, ROE (30-50 mm an hour) it gave grounds in the doubtful cases to be inclined to the diagnosis of the early abscess of brain and to reject encephalitis.

In cerebro-spinal fluid in the majority of the cases was somewhat increased the content of protein and cellular elements/cells. According to the data of a number of the authors, for the abscesses of brain was typically the fallout of reaction with colloid gold (paralytic curve).

Finally, special importance for the diagnosis of the early abscesses of brain had the surgical symptomatology of wound. Since the early abscesses of brain almost in the half the cases were "open", i.e., were escorted/tracked by the open fistula, which were being communicated with the area of abscess, cessation the liberations/excretions from it of pus, i.e., the occlusion of fistula, it was escorted/tracked, as a rule, by a sharp deterioration in the condition of wounded and by the development of the clinical picture of the abscess of the brain which thus far flowed/occurred/lasted asymptomatically. Along with this, was changed the appearance of wound. Appeared usually small protrusion and ceased in the overwhelming majority of the cases the existed previously distinct pulsation of brain. Only sometimes in the presence of a deep abscess the pulsation of brain was retained. Granulations on the surface of wound during the development of the abscess of brain sometimes acquired a somewhat edematic and stagnant form/species.

Exceptional value for the diagnosis of the early abscesses of brain had in the Great Patriotic War the X-ray analysis of skull and brain. The presence of the radiographically established/installed bad quality of the primary processing of cerebral wound, presence in the brain of foreign bodies and especially bone fragments laid always at

the suspicion about the possibility of the develcpment in this case of the early abscess of brain. Localization of early abscess, as a rule, corresponded to localization of bone fragments, also, in the considerable minority of a case-isolated/insulated in the depth of metallic fragment. During the comparison of a series of X-ray photographs it was possible to make conclusion about the possibility of ripening in the neighborhood of the early abscess of brain as a result of the considerable displacement of foreign bodies in brain.

Exceptional value in a number of difficult and unclear cases acquired contrast X-ray analysis (encephalo-, abscess and fistulography).

Encephalography with the suspicion the early abscesses of brain, in spite of the restrained attitude toward it of the individual authors, it was nevertheless in a number of cases of unavoidable. The severe complications, which develop sometimes during the use/application of this method, were usually the consequence of the defects of technology and nonobservance of its basic rules/handspikes.

Page 469.

In view of the inevitability of reinforcing even without that

existing inflammatory jet edema of brain, the sub-arachnoidal introduction of air must be to comparatively small ones, compulsorily matched with the degree of the manifestation of the hypertension syndrome and the value of the trepanation defect in bone, which plays decompressive role. With the observance of this condition the wounded usually easily transferred intervention. Then one should speak also about abscessography via the injection of air into the area of abscess (according to A. N. Bakulev) or introduction of liquid contrast preparations (by analogy with fistulography). And this manipulation, as a rule, wounded they transferred easily, independent of the degree of manifestation and development of capsule of abscess. However, is irrefutable the fact that later several hours after encephalo- or abscessography, which refined the diagnosis of abscess, its localization and sizes/dimensions, general condition of wounded sometimes deteriorated. Have hence already have long ago been the conclusion is made that the use/application of these very valuable and in series/row cases of the necessary auxiliary diagnostic methods is allowable only under condition as more immediate (it is compulsory during the same day) process/operation in the form of decompressive trepanation for unloading of edematic brain and corresponding intervention on abscess itself (at neurosurgeon's discretion). Then one should speak also about the preliminary test puncture of abscess, which played prominent role not only in diagnosis, but also in for wounded with

acute/sharp abscesses of brain. Basic condition also for them is the presence of the wide decompressive window, which frees wounded from the acute/sharp development of severe jet edema and hypertension syndrome, which attacks, as a rule, after only several hours after the puncture of abscess. After this puncture is vitally shown the urgent process/operation, which consists in the expansion of the small trepanation aperture to the necessary sizes/dimensions.

The strict and steady observance of this rule/handspike allowed neurosurgeons' series/row widely, also, with benefit to apply during the proper readings very valuable, but risky auxiliary methods indicated above of research for the diagnosis of the early abscesses of brain.

The treatment of the early abscesses of brain as the treatment of abscesses generally, consists in distance/separation from the area of the abscess of accumulated pus, in the creation of conditions for further emptying of ulcer and abating of inflammatory process in cerebral wound and its surrounding tissues. Only under these conditions happiest possible healing of wound, and also fast and full-valued and functional sense the recovery of wounded. This is achieved, first of all, by timely and proper surgical intervention.

In view of the acute/sharp character/nature of early abscesses

and permanent presence with them of active inflammatory process in brain with its labile dyshemic and circulatory disorders and those violently developing with edema, stagnation and hydrocephalus, the duration with process/operation to the moment/torque of the greatest ripening of abscess and its clinical syndrome is very dangerous. Especially this is dangerous with the small diameter (3-4 cm) of the trepanation defect such as occurs in the majority of blind perforated and plumb breaks, with which are observed most frequently the abscesses of brain.

Somewhat more calmly flows/occurs/lasts process with extensive tangential and segmental wounds with large defects in the bones, with which the abscesses are encountered, as is known, considerably less frequent. However, also in these cases one ought not to wait with surgical intervention, since, due to the decompressive activity of defect and presence of massive ones, usually neurological, the symptoms of abaissement, the existing abscess is distinguished very late, almost in terminal phase.

Page 470.

Thus, operated the early abscess of brain should be immediately, as soon as is established/installed diagnosis, even with the presence of one only, the substantiated suspicion. M. B. Krol's admonition in

the relation to the abscesses: "to await more days - means to await more deaths", especially correctly still and because in the cases of the g-force of the personnel of the specialized hospitals of army and front line area the observation of these wounded always cannot be sufficient to attentive and complete ones.

The operational methods of the treatment of the early abscesses of brain completely depend on special features/peculiarities, pathoanatomical structure and character/nature of acute/sharp suppurative inflammatory process in wound. The open infected wound with active inflammatory process, with the accumulation of fresh pus, the presence of bone fragments and other foreign bodies and inclusions/connections, with the weakly expressed even more inflammatory demarcation and unformed capsule in the periphery of abscess limits the selection of the method of process/operation. In these cases barely let us use the most radical method of the total extirpation of abscess together with the capsule, which did not have time to still be formed. However, in the exceptional cases with crust or polar localization it was possible to make sequestration of capsule and very early abscess; in this case the capsule after emptying almost spontaneously was scaled from its bed. So/such random were the carvings of unripe ones, latent ones, on encysted ulcers. These abscesses usually were detected in the even fresher tunicary-cerebral scars, removed on the 2-3rd month after wound with

purpose of prophylaxis of late abscesses around the remaining bone and metallic fragments.

The paracentetic method of the treatment of abscesses according to A. I. Bakulev, who proved to be so/such attractive in the practice of peacetime, who was being partially applied in war with White Finns, during the Great Patriotic War proved to be barely suitable for the effective treatment of the early abscesses of the brain - with this method was noted the very high lethality, achieving, according to the data of the maps/charts/cards of the deepened characteristic, 53.1o/o. However, after losing its independent and leading value, puncture widely was applied as auxiliary and temporary/time method, allowing in the special cases rapidly, also, with minimum injury to empty ulcer and to take wounded away from the threatening condition. Independent therapeutic value remained after the paracentetic method only with deep basal and paraventricular abscesses, the open access to which is very dangerous, and the conditions of draining are extremely unfavorable. In these cases with the aid of puncture it was possible to obtain stable recovery, true, only under the condition of the absence in area of the abscess of foreign bodies.

The open method was, thus, as before basic operational method of the treatment of the early abscesses of brain. At "open" fistula

forms the emptying of abscess was achieved by the periodic expansions of fistula, or throat of abscess, with the aid of the ordinary clamp of Pean. Permanent drainage these abscesses in majority the cases did not require.

The closed abscesses were revealed after preliminary test puncture, usually on needle, and after careful emptying and washing of area with anticeptic solutions they were drained with the aid of several strips of glove rubber.

Page 471.

Rubber tubes strongly traumatized brain, without giving no advantages, and them therefore they used. The duration of the stay of drainage and the periods of its shift/relief depended on sizes/dimensions and depth of abscess and degree of the storage in it of pus.

However, early abscesses require in the majority of the cases of prolonged and continuous draining during 2-4 weeks, moreover drainage gradually, in proportion to neglect of abscess, is shortened. The shift/relief of drainage, in the opinion of some authors, it must be conducted not earlier than after 10 days, until around drainage has time to be formed granulating shaft in the form of the condensed

annulus or neck/journal. The distance/separation of bone fragments and foreign metallic bodies from the limits of the area of abscess was conducted without the damage of its capsule.

The proposition of the individual authors (A. P. Bakulev) about the careful processing of the emptied ulcer with the subsequent sewing up of tissue tightly did not find during the Great Patriotic War of a large number of supporters.

Some authors' proposition to fill up the area of abscess by sulfanilamides and different hypertonic and anticeptic mixtures, like sugar with chloramine, also found to itself few supporters. The significant role in the treatment of the early abscesses of brain played widely applied in all forms of sulfanilamide therapy. In bacterial flora of the early abscesses of brain always predominated pyogenic cocci, predominantly streptococci from which in the first place they stood hemolytic streptococci with Staphylococcus aureus, frequently in risky associations. In the latter/last cases were developed different purulent damages/defeats, which gave high lethality. Most favorably flowed/occurred/lasted the abscesses, caused by the pure/clean culture of Staphyloccccus aureus or by more favorable association. The outcomes of the surgical treatment of the early abscesses of brain must be acknowledged barely satisfactory.

Lethality among the operated wounded with bullet abscesses within the time of the Great Patriotic War was comparatively high. Ability to work after the transferred complication and process/operation was retained in a small number of wounded. Different authors' data about lethality during the surgical treatment of the early abscesses of brain are characterized by considerable colorfulness (Table 55).

Table 55. Frequency of the operated early abscesses of brain and lethality.

(1) Автор	(2) Число оперированных в абсолютных цифрах	(3) Число умерших в абсолютных цифрах
М. М. Филыштинский (ГВА) (4)	250	66
К. Г. Тэриан (ГВФ) (5)	240	80
В. А. Никольский (специализированный ХППГ) (6)	50	9
Г. И. Корнянский (специализированный ХППГ) (7)	30	7
(8) Всего	570	126

Key: (1). Author. (2). Number of those operated in absolute numerals. (3). Number of dead perscns in absolute numerals. (4). M. M. Fil'shtinskiy (GBA). (5). K. G. Terian (GBP). (6). V. A. Nikol'skiy (specialized KhPPG). (7). G. I. Kornyanskiy (specialized KhPPG). (8) Total.

Page 472.

This difference of results of treatment it is possible to explain by the expanded treatment by some authcrs of concept "early abscess", and also by the varied conditions in which worked these authors. Average/mean lethality according to this total data is small - 22.1o/o.

The basic reason for death with the early abscesses of brain were the severe spilled infectious complicatcns (purulent

encephalitis, chorioependymitis and meningitis), which appeared as a result of the "penetration" of abscess into ventricle or into sub-arachnoidal space. Somewhat less frequent the reason for death was acute edema of brain.

LATE ABSCESSES OF BRAIN.

To the late abscesses can be attributed those of them that clinically are detected not earlier than 3 months after wound.

According to the total data of the hospitals of the rear of one of the military districts, the late abscesses of brain among other complications of the penetrating wounds of skull had large specific gravity/weight (Table 56).

As can be seen from Table 56, the percentage of the late abscesses of brain, which are encountered in hospitals of the rear, with respect to all penetrating wounds of skull begins with the second year of war sharply to be decreased; at the same time the percentage of abscesses with respect to all complications (meningitides, meningoencephalites, cysts of brain, epilepsy, osteomyelitis, etc.) increases from year and year.

The decrease of the general/common/total percentage of the

abscesses of brain in rear hospitals, beginning with the second year of war, it is explained by the improved from year to year primary processing of the wound of brain and by the more lasting hospitalization of wounded after process/operation in army and front line area. By this fact should be explained the fact that the percentage of abscesses among other complications of the bullet wounds of skull increased from year to year. The fact is that in the course of war for rear hospitals began to be headed for recuperation only the contingents of heavily wounded, who needed prolonged treatment and departure/attendance. It is logical that among these groups of heavily wounded a visible place occupied late abscesses of brain.

The distribution of abscesses according to hemispheres and portions of brain corresponds to the frequency of the wounds of the latter. Abscesses in right hemisphere were observed in 53.0o/o, in left - in 47.0o/o of cases.

In the first place will cost the abscesses of sincipital portion - 39.0o/o, then go the abscesses of frontal portion - 35.0o/o, postcranial portions - 14.0o/o, temporal portions - 11.0o/o and cerebellum - 1.0o/o.

Bullet wounds were in 14.0o/o, and wounds by fragments - in 86.0o/o of cases.

Table 56.

(1) Год войны	(2) Процент поздних абсцессов мозга по отношению ко всем проникающим ранениям черепа	(3) Процент поздних абсцессов мозга по отношению ко всем осложнениям при проникающих ранениях черепа
Первый (4)	7,2	16,0
Второй (5)	3,8	15,0
Третий (6)	4,7	20,0
Четвертый (7)	3,5	30,0

Key: (1). Year of war. (2). Percentage of late abscesses of brain with respect to all penetrating wounds of skull. (3). Percentage of late abscesses of brain with respect to all complications with penetrating wounds of skull. (4). The first. (5). By the second. (6). The third. (7). The fourth.

Page 173.

The data of Sverdlovsk neuro-surgical hospital tell about the fact that in 46.0o/o of cases the abscesses were formed around bone fragments in cerebral tissue, in 13.0o/o - around metallic foreign bodies (by larger unit of the fragments of mines), in 11.0o/o - around bone and metallic fragments, and in 30.0o/o of cases abscesses were developed in the sectors of the brain where neither on process/operation nor in X-ray photographs it was discovered nor bone nor metallic fragments. In third of latter/last cases the

abscesses were formed arcund bone and metal dust.

With late abscesses in the hospitals of the rear into 40.0o/o of cases were observed the fistulas. Only in a small number of wcunded these fistulas could be connected with ostecmyelitis of skull, whereas in essence the fistulas were communicated with the area of abscess by the very narrcw courses, which did not pass sometimes even thin probe.

Especially frequently the fistulas appeared when abscess was developed around bone fragments.

Microflora of late abscesses consists in essence of staphylo and streptococci. Much more rarely are encountered anaerobes.

The development of the abscess of brain in late period can, in the opinion of some authcrs, depend on festering in scar tissue as the consequence of the aggravatica of the calmed down suppuration or from regional metastastic spreading on intraadventitial and intertissue slots. Many auto-you ccnsider alsc that the capsule of abscess begins to be fcrmed usually with the 5-7th day of the onset of abscess and the rate/tempo of its development depends on many reasons, in particular, from form/species and degree of the virulence of causative agent, frcm the immunobiologic properties of brain, from

the general/common/total resistivity of organism, etc.

In the majority of the cases of the late traumatic abscess of brain already is well formed capsule (Fig. 183).

However, 5-6 months after wound on autopsy were discovered the cases when the expressed capsule either it did not prove to be or it was insufficiently formed. Frequently this was explained by the vastness of necroses in the cerebral tissue, surrounding abscess, which, together with other moments/torques, disrupt the reactivity of mesenchymal and gliosa elements/cells, which in turn, weakens/attenuates and holds up the formation of the durable pyogenic membrane/diaphragm.

The capsule of the abscess of late period consists in essence of three layers: internal, it is direct in the periphery of purulent area, average, fibrous or collagenic, layer and finally the skin of capsule, which is transfer to the healthy/sound unit of the brain.

It is necessary to note that the cerebral tissue around abscess sharply changes. This depends both on the perifocal encephalitis and on local circulatory disorders with a decrease in the barrier functions of mesenchyme and gliosa apparatus. The latter creates favorable conditions for the development of regional multiple

abscesses and for the penetration of abscesses into sub-arachnoidal spaces or into the ventricles of brain.

These pathogenetic mechanisms, morphological special features/peculiarities of building/structure of capsule and jet phenomena of cerebral tissue determine, naturally, clinical picture and coursing of traumatic late abscesses of brain.

Page 474.

Clinical picture. Regarding P. Ye. Snesarev, the abscess of brain is "viable formation", since in it there is a local blood circulation system, constantly occurs supply of interior layer of capsule by nutrients and by oxygen, by word, in abscess there are all conditions for metabolism, and therefore the ulcer of brain as neoplasm, is converted into parasitic education. This position/situation is correct not only from pathomorphological and pathophysiological side, on and from the point of view of evaluation of the clinical picture of the abscess of brain.

General cerebral symptoms with late abscesses are expressed as not sharply as with neoplasms and metastatical abscesses, which is explained by the presence of the defect of bone and solid cerebral shell. However, this natural decompression only decreases force and

definition of the series/row of general cerebral symptoms, but almost never completely removes them. One should in this case consider that the phenomena of perifocal encephalitis frequently close over this natural decompression and from their side reinforce the series/row of general cerebral symptoms.

By most frequent symptoms with the late abscesses of brain, just as with early abscesses, they were: headache, vertigo, vomiting, bradycardia (especially during the attacks/seizures/paroxysms of head pain), meningeal symptoms (with the complication of abscess of secondary meningitis) and epileptic fits.

According to the data of Sverdlovsk hospital, epileptic fits were observed in 21.4% of cases, of them into Jackson type two thirds. General/common/total epileptic fits usually are related to general cerebral symptoms of neoplasm or abscess of brain. In the attitude of Jackson fits are two points of view: one they consider that Jackson fits are focus symptom, others assume that they can be symptom distant or general cerebral.

The early development/detection of changes in the psychics/psyche with the late abscesses of brain has important value for a diagnosis. The work of the Soviet psychiatrists and neuropathologists within the time of the Great Patriotic War

introduced much that is new into the study of mental violations with the penetrating wounds of skull, and, in particular, with the abscesses of brain.

Inherent mental background with the abscess of brain consists of lowering of emotional tone, general/common/total depression and of retardation, somatic and mental asthenia, apathy and apathy. With left-side localization of abscess to this general/common/total mental background can be connected the aphatic and agnostic disorders, which considerably complicate mental violations. During the damages/defeats of frontobasal cortex were encountered the specific changes in the individuals, which are characterized by disinhibition, euphoria, suggestibility, carelessness. With abscesses in these wounded was observed reinforcing of the symptoms indicated up to motor excitation, but in the periods of a sharp deterioration in the general condition of these sick mental symptoms of local crder/formation they were suppressed by sharp retardation, apathy and asthenia. Authors' unit indicates that for abscesses should be considered characteristic the presence of dissociation between enctional retardation and motor disinhibition, which attacks with the relapses of latent abscesses or at the moments of a deterioration in the condition of wounded with traumatic abscess.

The considerable and rougher mental disturbances were observed

with the abscesses of the frontal portions; these disturbances are less expressed with localization of abscess in parietal lobes. The mental changes, called by injury itself, becase apparent usually considerably weaker than with growing abscesses.

Page 474a.

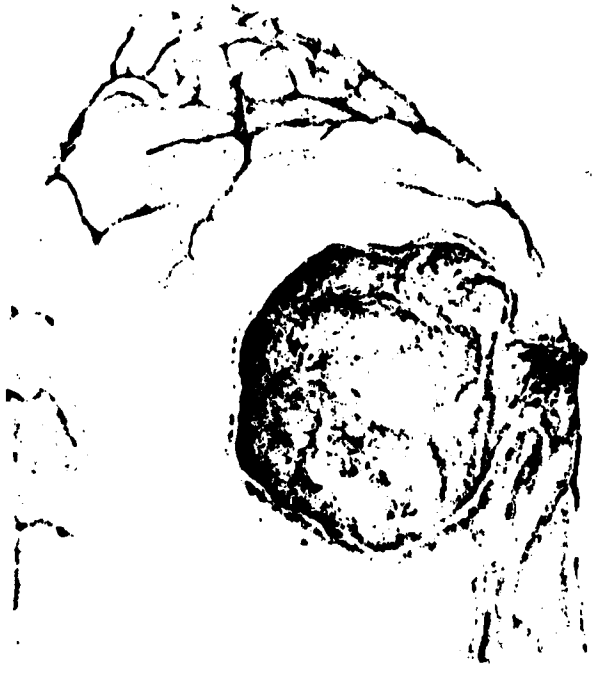


Fig. 183. Late abscess of left postcranial portion of brain, which complicated blind-end fragmentation wound. (Artist V. S. Chumanov).

Page 475.

The manifestation of general cerebral symptoms with traumatic abscesses is considerably less than with neoplasms and metastatical abscesses. However, with traumatic abscess are less are sharply pronounced not only general cerebral, on symptoms removed and in the

neighborhood and in a number of cases even focus symptoms.

This fact is explained, in the first place, by the presence of natural decompression as a result of the defect of bone and solid cerebral shell, which decreases the level of the intracranial pressure increase; in the second place, by the presence of fistula in a considerable number of cases, which gives the permanent, although small outflow of pus from the area of the abscess; and finally thirdly, thereby that the applied during the Great Patriotic War in wide sizes/dimensions sulfanilamide therapy considerably decreased the virulence of microbial flora of abscess, that also held up the speed of an increase in the abscess, and was decreased the general/common/total toxic action of this purulent focus on brain and on entire organism.

The facts indicated are also the reason for the fact that during the Great Patriotic War was observed a considerable number of asymptomic abscesses. However, in spite of the series/row of the conditions, which decrease the intensity of general cerebral symptoms with traumatic abscess, they nevertheless play the leading role in clinical picture of the late abscess of brain. Focus symptoms are encountered more rarely than general cerebral.

In clinical picture and diagnosis of abscess plays role not so

much the presence of focus symptoms, as their build-up/growth as a result of an increase in abscess and development of perifocal encephalitis. High value have the focus symptoms, which gradually develop in hospital in the wounded who has the foundation for suspecting the abscess of brain. Frequently it was observed, as in patient with certain retardation and small headaches they appeared weakness in extremities, the disorder of sensitivity, light aphatic disorders, Jackson fits or began to be developed some vegetative violations. Furthermore, in the series/row of patients rapidly grew available hemiparesis, sometimes was increased the frequency of fits or were reinforced aphatic disorders. In those and in other cases during prolonged observation and in the presence of some general cerebral symptoms must arise the suspicion to the abscess of brain. With the abscesses of the brain of frontal localization almost always grows mental stupor, apathy and somatic asthenia.

Special importance in the clinical picture of the late abscesses of brain have the symptoms, which appear in the neighborhood. In these cases a question already occurs about an increase in the abscess with capture in process either with the compression of the new sectors of brain or about jet phenomena and perifocal encephalitis in the adjacent with abscess departments of brain.

Changes in the eyeground with late abscesses are noted by

different authors in 15.0-60.0o/o of cases.

On the material of Sverdlovsk hospital with late abscesses are discovered the changes on the ocular day of different character/nature only into 51.0o/o of cases (stagnant phenomena into 22.0o/o, hyperemia it is mammillary visual nerves in one or the other degree in 23.0o/o residual phenomena after the former hemorrhages into retina into 3.0o/c and the phenomenon of neuritis of visual nerves into 3.0o/o of cases). Stagnant nipples into 3/4 cases were bilateral, and in 1/4 one-sided. The one-sided phenomena of stagnation, as a rule, were expressed only on the side of localization of abscess, in other eye was noted usually hyperemia.

Page 476.

Further, it was possible to establish that the changes in cerebro-spinal fluid with late abscesses (pleccytosis and increase in the quantity of protein) are the sign/criterion of the presence of inflammatory or purulent process in the tunicary or crust department of brain wound. With headling of surface cerebral wound there is particular decrease in pleocytosis. In the period of late complications during deep disposition of purulent focus the picture of cerebrospinal fluid is not changed, on in the cases of the entrance of pathological products from the depth of the brain (as with the approximation/approach of suppuration to the surface of cortex) can

again appear changes in cerebrospinal fluid.

Part of Soviet authors indicates that with late abscesses the content of protein increases to 0.6o/o, and the pleocytosis - from 10 to 125. Pleocytes in cerebrospinal fluid usually grow with the formation of abscess, moreover are important so much absolute data contents of protein and cytosis with single puncture, as dynamics of changes. There are also observations, that in the initial phase of abscesses was increase of the cells and protein in the half all cases; whereas with late abscesses an increase of cytosis it indicated usually the incipient necrosis of the wall of abscess and the possibility of its penetration. Furthermore, a number of Soviet authors indicates that with the late abscesses most frequently is protein-cellular dissociation in the cerebrospinal fluid; however there can be the cases of abscess, when in cerebrospinal fluid of cytosis achieves 100-150 cells with large quantity of protein. This tells about jet phenomena from the side of cerebral shells.

Temperature at the abscesses of a brain is usually of incorrect type, most frequently - is subfebrile. Normal temperature at late complications after the penetrating wound of skull does not give grounds to refuse from the diagnosis of the abscess of brain. However, high temperature or its sudden increase it always speaks about the complicated abscess, which is escorted/tracked either by

spilled purulent meningitis or in penetration into ventricle.

Picture of the blocd with late traumatic abscesses in brain. Is typical dissociation between ROE and quantity cf leukocytes: with a normal quantity of leukocytes ROE is accelerated.

According to the data of Sverdlovsk hospital, in 76.o/o of cases of the uncomplicated abscesses a quantity of leukocytes reached to 8000, in 20.0o/o of cases - tc 10000 and only in 4.0o/o - to 12000. At the same time in 24.0o/o of cases ROE it was located at the level from 15 to 30 mm an hour, in 33.0o/o of cases - from 30 to 40 mm, in 25.0o/o of cases - from 40 to 50 mm and in 18.0o/o of cases - it is above 50 mm.

With the complicated abscess the dissociation indicated disappears, and is observed high leukocytosis and acceleration of ROE. Changes in the formula of the blood, besides certain shift to the left, with the uncomplicated abscesses it was not noted.

Coursing of traumatic abscesses of brain in many respects differs from coursing cf the abscesses, not connected with injury (otogenic and metastatical), for which, as is known, are characteristic four stages - initial, latent, stage of explicit symptoms and terminal. During the Great Patriotic War also were done

attempts at the liberation/excretion of the corresponding periods of coursing of abscess. The accumulated experience makes it possible to secrete the following basic groups of the traumatic abscesses of brain in dependence on the time of onset, coursing and symptomatology.

Page 477.

1. Suddenly advancing/attacking heavy clinical picture of abscess (10.2o/o). In a comparatively happy condition of patient, with the not healed another wound or, which more frequently is with the shut wound with fistula or without it suddenly appear sharp headaches, vomiting, grow or again appear hemipareses, sometimes epileptic fits. Limber patient inflows into unconscious condition or sets in epileptic status. Brain sharply protrudes through the bone defect and does not fluctuate. In the blood is observed the dissociation between RCE and quantity of leukocytes. In liquor - frequently protein-cellular dissociation. Meningeal symptoms are at first expressed often, then they grow. This suddenness of the appearance of heavy clinical picture is explained either by the approximation/approach of abscess to the wall of ventricle or by the penetration of pus into the area of ventricle, or finally by the phenomena of edema and floating of brain with the education (most frequently with the shut wound) of the jamming of barrel. In these

cases the initial period of the education of abscess passed by that notd notice. The immediate emptying of pus of limber temporarily improves the condition cf patients.

2. Slowly developing, gradually growing clinical picture of abscess was observed into 75.6o/o of all late abscesses. In wounded with the healed wound with fistula or without it appears certain stupor and retardation. Gradually every day is reinforced headache, rarely there is vomiting. There advance focus symptoms, appear or somewhat are repeat/quickened epileptic fits. Temperature is subfebrile, often bradycardia. The condition cf patient gradually deteriorates. The repeated research of the blcod shows dissociation between ROE and quantity of the leukocytes; in cerebrospinal fluid is detected blurred protein-cellular dissociation. Grow changes on ocular day. There are almost no meningeal symptoms. In the X-ray photograph are revealed usually bone fragments, considerably less often - metallic foreign bodies. The pulsation cf brain in the region of bone defect gradually becomes flaccid. This gradual, slow development of the clinical picture of abscess corresponds tc a usually sufficiently slow increase in the capsule with the education in it of powerful/thick middle, fibrous and collagenic layer, microflora of abscess has low or average/mean pathogenicity, phenomena of perifocal encephalitis often. In the unit of the cases of this group (about 10.0o/o) when in essence a slow deterioration in

the condition of wounded is present, was noted the intermittent build-up/growth of all symptoms. During similar flow during of several hours or whole day appear the attacks/seizures/paroxysms of head pain, vomiting, bradycardia, temperature rise to 38-39°, patient is sharply slowed and stunned. Attack/seizure/paroxysm usually soon is passed, and patient again returns to her previous condition. This paroxysmal build-up/growth of symptomatology against the background of a gradual deterioration in the general condition of wounded can be caused by temporary/time disturbances of liquor dynamics or by jammings of the barrel of brain as a result of short-term edema.

3. Asymptomic abscesses were characterized usually by presence of fistula (14.2o/o of all cases of abscess), from which was secreted small quantity of pus. Fistula was narrow fistulous channel, leading into the purulent area depthward of brain. Sometimes even on process/operation it seemed that the fistula course did not have connection/communication with abscess, since through it hardly is passed thin probe. Patients in such cases sometimes complain about light headache. In a considerable number of these cases the temperature proves to be not elevated, the picture of blood - normal. Neurologic symptomatology either is in no way expressed or it does not have tendency toward build-up. In the region of bone defect is noted the pulsation of brain. In X-ray photograph in the substance of brain frequently are determined bone or metallic fragments.

Page 478.

Process/operation usually is undertaken apropos of the long not healing fistula and with purpose of the distance/separation of bone and metallic fragments. In the similar cases on process/operation randomly is detected the abscess. The capsule of abscess in this case is sometimes sufficiently dense and well organized. This asymptomicity can be explained by the permanent, although small outflow of pus from the area of the abscess through available fistula, by the lowest possible virulence of causative agent and by the presence of a large quantity of antibodies in the blood and the cerebrospinal fluid. One would think but that similar asymptomic abscesses do not give expressed symptomatology only until the specific time, subsequently, especially upon the elimination of fistula, they undoubtedly convert/transfer into one of the groups enumerated above. It is characteristic that in proportion to an improvement in the procedure of the examination/inspection of patients, as began to turn more than attention to changes psychics/psyches, a quantity of asymptomic abscesses decreased.

Thus, the diagnosis of traumatic late abscess is not easy/light, especially in the relation to localization of process, but its limber

and in relation character/nature, moreover with the different forms of coursing of abscess and in different stages of its development it is necessary to know how to differ abscess from other forms/species of the complications of the traumatic damage/defeat of brain.

Suddenly the advancing/attacking clinical picture of abscess one should almost always differentiate from acute purulent meningitis and from the penetration of abscess into the ventricle of brain. With suddenly developing meningitis, as with abscess, are noted sharp headache, general heavy condition, but in this case in contrast to abscess with meningitis is not observed the build-ups/growths of focus phenomena and epileptic fits. The Kernig symptom and the rigidity of occiput are expressed sharply without dissociation which frequently is with abscesses. Eyeground usually is normal. Finally, high temperature, bradycardia, absence of dissociation between ROE and quantity of leukocytes into sketch, and also purulent cerebrospinal fluid make it necessary to solve a question in favor of meningitis.

To considerably with more difficulty distinguish the penetration of cerebral abscess of meningitis. It is known that the penetration of cerebral abscess can occur as a result of the developing perifocal encephalitis and the approximation/approach of capsule of abscess to the wall of the ventricle, and then connection with ventricle by

means of the sometimes even small slit-shaped aperture, sufficiently which is rapidly expanded. The incidence/impingement of pus into ventricle causes suddenly appearing and violently developing clinical picture: appears sharp heavy headache, vomiting, psycho-motor excitation with the tangled nature of consciousness, and thereupon unconscious condition.

According to the data of the hospitals of the rear, the penetration of the abscess of brain into ventricles was observed into 4.0-5.0o/o of cases.

The clinical picture of the penetration of abscess into ventricle is much heavier than with ordinary purulent meningitis. In contrast to meningitis before the penetration was observed the rapidly growing unconscious condition, a sharp descent in tendinous and skin reflexes, the absence of pupil reaction to light and, frequently already during the first day of penetration, purulent turbid with greenish hue spinal fluid/liquid. With meningitis the lumbar puncture gives alleviation, while with the penetration of abscess into ventricle in the condition of patient usually is not noted even short-term improvements.

Page 478a.



Fig. 184. Abscess of cerebellum, ventriculography.



Fig. 185. Abscess of frontal portion, filled with air.

Page 479.

Frequently is necessary to differentiate the abscess of brain (especially during the intermittent build-up/growth of clinical picture) from relapsing/recidivism/recidivist/recidivity purulent meningoencephalitis. For both these complications are characteristic the build-up/growth of focus phenomena and expressed general cerebral symptoms. Although with meningoencephalitis the epileptic fits, in particular, Jackson type, are encountered rarely, eyeground is normal, in the blood usually is noted leukocytosis and acceleration of ROE, in cerebrospinal fluid - an increase the squirrel and pleocytosis however to differentiate abscess from meningoencephalitis is nevertheless very difficult.

With the slowly developing abscesses clinical picture resembles sometimes the picture of the traumatic cyst of brain. The cysts of brain in a considerable number of cases are formed out of any connection/communication with bone and metallic fragments, with them almost there are no changes in ocular day. Focus clinical symptomatology with cysts is expressed very weakly or entirely it does not exist.

For a more precise topic diagnosis with late abscesses of brain was applied the pneumo-encephalography also abscessography. Some authors give the preference ventriculography, others do not apply the injection of air by the lumbar route/path (Fig. 184).

The injection of air by abscesses must be conducted with the same precautions, as with neoplasms, due to the danger of edema of brain or jamming of the barrel of brain in Bichat's slot. To avoid complications it is necessary to operate wounded immediately after the injection of air.

Abscessography frequently gives clear representation about value and localization of abscess, which frequently predetermines the selection of the method of surgical intervention (Fig. 185).

Great assistance with the diagnosis of abscess they can show/render the research vegetative asymmetries. The experiment/experience of instrument/tool of study of the condition of the sense organs and vegetative nervous system shows the importance of these methods in the diagnosis of the abscess of brain. During war in the series/row of hospitals was applied the series/row of the simple and easily feasible tests (ultraviolet erythema, hydrophilic

test/sample, skin temperature, blood pressure, etc.), which gave representation about the side of localization of abscess and frequently about its localizatien in one or the other portion of brain.

Research of the biocurrents of brain did not give thus far sufficiently clear instructions for the topic diagnosis of abscess, since the biocurrents cf brain for a long time remain changed as a result of injury itself.

During setting cf the diagnosis of the late abscess of brain in all cases is necessary surgical intervention.

During the Great Patriotic War were applied the following basic methods of the surgical treatment cf the abscesses of the brain: 1) the puncture of abscess, sometimes repeated, with washing of its area with different disinfecting solutions/openings, sulfanilamides and penicillin; 2) the total distance/separation cf abscess together with the capsule; 3) autopsy and draining of the area of abscess. Experiment/experience showed that observed during the first years of war contrast of these methods or preference one of them must not have the place: each method has its readings and contraindications, depending on the series/row of conditions.

The frequency of the use/application of different methods of surgical intervention with the late abscesses of brain and lethality with them, according to total, data of a number of the authors, who worked in GBP and rear hospitals, are given in Table 57.

In 3.5o/o of cases condition of wounded with the abscesses of brain was inoperable.

Comparing the procedure of the surgical treatment of abscesses during the Great Patrictic War with the methods of the treatment of abscesses in the period of the first world war, it is possible to note that the tested method of the treatment of abscesses via the autopsy of area with its subsequent draining was no longer only and was applied less than in the half the cases.

The distance/separation of abscess together with capsule they began to for the first time use extensively during the Great Patriotic War (1/3 all cases). In a number of cases of puncture they applied either independently or as additional method with autopsy.

All this tells about the fact that the Soviet neurosurgeons during the Great Patrictic War in the treatment of the abscesses of

brain did not go by the old, beaten routes/paths, but were utilized new methods, modifying them and generating indices for them.

The method of the puncture of the area of abscess as the independent operational method of the treatment of the abscesses of brain did not use success. The value of this sparing method of the treatment of the abscesses of peacetime considerably descends during the treatment of the abscesses of wartime, since into 70.0o/o of cases in wounded, who are located in the hospitals of the deep rear, abscess is formed around bone or metallic fragments and therefore the distance/separation of pus from area without the extraction of fragments is only half-measure. Some authors indicate that with the puncture of the area of abscess the relapses are noted into 60.0-65.0o/o of cases. In wartime this method is shown only during deep disposition of abscess and that limber only as preparatory stage to autopsy or extirpation of abscess subsequently.

During the second and third year of the Great Patriotic War and especially in last year many neurosurgeons made the attempts to postpone large surgical intervention or to plot process/operation in acute/sharp period, having and to form/species, that also in the course of late abscess are waves of aggravation and remission/abatement. Sulfanilamides sometimes gave the possibility to plot/deposit intervention for certain period. Therefore also they

were adopted the puncture of abscess with its subsequent autopsy, i.e., to carry out the treatment of abscess at two moments/torques: the first moment/torque - puncture which frequently ejected patient from heavy condition and it made it possible to postpone the large process/operation; the second moment/torque - autopsy of abscess.

Table 57.

(1) Методы оперативного вмешательства	(2) Частота применения (в %)	(3) Летальность (в %)
(4) Пункция абсцесса	4,6	56,7
(5) Вскрытие абсцесса	48,5	39,8
(6) Пункция + вскрытие абсцесса	9,6	46,1
(7) Удаление абсцесса с капсулой	33,8	24,1

Key: (1). Methods of surgical intervention. (2). Frequency of use/application (in o/c). (3). Lethality (in o/o). (4). Puncture of abscess. (5). Autopsy of abscess. (6). Puncture + closing of abscess. (7). Distance/separation of abscess with capsule.

Page 481.

This method deserves attention, especially with the shut wound; in this case the condition of patient is improved, and during deep disposition of the abscess of capsule frequently it approaches a surface of cortex.

Wide distribution during the Great Patriotic War obtained the method of the total distance/separation of abscess together with capsule. As can be seen from summary table, this method in the hospitals of the rear and in front line area was used into 33.8o/o of cases (with respect to all other methods) and it gave minimum

lethality.

However, the method of full of distance/separation abscess with capsule is applicable far not in all cases. As limitations serve the following moments/torques: 1) localization of abscess at large depth, especially in left hemisphere, 2) the absence of the dense, well formed capsule, 3) the intimal proximity of abscess to the ventricle of brain, and 4) multicellularity of abscess. In spite of such limitations, in the year of the Great Patriotic War the method of the total distance/separation of abscess was for the first time in the history of neurosurgery used in wide sizes/dimensions and it gave on the whole the best results, than all other methods of the surgical treatment of the abscesses of brain.

The most widely used (48.5o/o of cases) method of surgical treatment in hospitals of the rear was classical old method - autopsy of the area of abscess with its subsequent draining. In the majority of neuro-surgical installations the method indicated was not only leading, but also almost only.

The autopsy of the area of abscess after its preliminary puncture is best to produce with electric knife or sharp instrument on needle. After the distance/separation of pus should be thoroughly inspected the area of abscess, in order to determine, are there no

daughter ulcers, individual chambers/cameras or flows, and also bone and metallic fragments. Then area is washed in one of the antiseptic solutions/openings and is drained. From fluids/liquids for the washing of the area of abscess they were applied: chloramine, Rivanol, 1o/o solutions/openings of streptocide, sulfidine, and at the end of the war the penicillin; sometimes into area they poured and left there 15-20o/c solution/opening of the emulsion of streptocide and sulfidine, sound-recording emulsions of the combinations of different sulfanilamides, etc. Use/application of those supplied with sound of emulsion from the combinations of different sulfanilamides, etc. Use/application of the sound-recording emulsions, which contain fractional molecule, gave, in the opinion of some authors, considerably best effect, than the ordinary emulsions of sulfanilamides.

For a draining applied gauze graduates, catheters, thin rubber cases, rubber ribbons, etc. As the best ones of them should be recognized thin rubber strips. Draining continues not less than 2-3 weeks with the rare shifts/reliefs of the ribbons; whereas drainage small tubes frequently caused bedsores in brain tissue and frequently they were plugged up with pus and by emulsion.

During war was developed/processed also a question also about anechoic suture after surgical intervention with the abscess of

brain. There is no need for proving, that the dead suture is the ideal completion of surgical intervention. Hcwever, it is feasible only when abscess is driven out tctally together with capsule. With this method of intervention is laid anechoic laminar suture on skin wound with rubber graduate. With the autcpsy cf abscess with the subsequent draining anechoic suture is not shcwn, but in this case one should try to more possible shut skin salt water, after creating, of course, conditions fcr the permanent cutflcw of pus.

In post-operation period during 8-10 days it is necessary to assign sulfanilamides, as far as possible in combination from penicillin.

Page 482.

Special value has the intra-carotid introduction of sulfanilamides and penicillin (N. N. Burdenko).

The outcomes of the surgical treatment of the late abscesses of brain during the Great Patriotic War are considerably better than during the first world war when lethality among those operated achieved 70.0o/o and it is above. Lethality, according to reference data of the hospitals cf the rear and frcnt line area, during the Great Patriotic War was lowered 2-3 times. This sharp descent in the

lethality is the result of the correct organization of neuro-surgical aid in Soviet army, wide application of sulfanilamide preparations and finally by the result of an improvement in the diagnosis and operational technology, and also development of the new methods of surgical intervention with the late traumatic abscesses of brain.

Ependymitis.

The individual cases of the penetration of pus from the area of abscess into lateral ventricles with the fatal results are described by a whole series of the authors of almost one hundred years ago (Kalinkovskiy, 1850; N. I. Pirogov, 1853; Yatsenko, 1866;, etc.). In the period of Russo-Japanese war the autopsy of abscess into the ventricles of brain noted O. M. Khol'bek and I. A. Delyatitskiy. In the period of first world war (1914-1918), in connection with the study of the pathogenesis of basilar meningitides of bullet origin, a number of the authors was indicated the possibility of the penetration of purulent infection into the area of ventricle with the "progressive" encephalitis. For the infection of the ventricles of the brain through the liquor ventricular fistula indicated V. N. Shamov (1916) et al.

Purulent intra-ventricular complications as the special section of the exercise about the wound of brain the Soviet authors for the

first time began to study in the year of the Great Patriotic War.

Ependymitis (periventricular purulent encephalitis) as complication after the wound of brain is individual nosologic form.

Primary purulent ependymitis is developed as a result of the direct recording of microflora onto the ventricles of brain with foreign bodies or bone fragments at the moment of wound. The majority of wounded with the damage of the ventricles of brain dies on the field of battle or into the first hours after wound. Only small unit of them lives longer. In these cases purulent intra-ventricular infection rarely is located in the calm condition; in this case sufficiently soon the casualty sector of ventricle, usually front/leading or posterior crescent, it is delimited by the commissural process from the remaining unit of the ventricular system it is converted into a cyst-like formation.

The cases of recoveries with liquor fistulas, which were being escorted/tracked ependymitis, are presented in chapter "Liquorrhea and liquor fistulas". Present chapter is dedicated in essence to the analysis of material, confirmed sectionally.

Wounded with primary purulent ependymitis perished frequently in time from 3 to 13 days and were located from the moment/torque of

injury without consciousness. Temperature achieved 39° and it is above. Pulse is quickened. Violently were develcped meningeal phenomena. With lumbar puncture was detected turbid cerebrospinal fluid, sometimes with the admixture/impurity cf the blood. On autopsy in all cases was detected the damage of the ventricles: one lateral - into 3/5 cases, both lateral ones - into 1/5 cases (in one of them in the area of ventricle was discovered metallic fragment).

Page 483.

In ventricles was located turbid purulent fluid/liquid. Was noted festering wound canal and purulent meningitis, in the half the cases - basilar meningitis.

Secondary purulent ependymitis is developed predominantly in the periods of the delimitation of infectious fccus and development of late complications. Its development occurs as a result: 1) of the penetration of pus from the area of abscess into the ventricles of the brain; 2) the intrcduction cf infection into the ventricles cf the brain through the ventricular liquor fistula; 3) the dissemination of the spilled purulent encephalitis for the wall of the ependyma and the vascular web/plexus of ventricle.

In wounded, dead persons after the wounds of brain, into 5.5o/o

was discovered purulent ependymitis (Kh. I. Gargavi). According to the data of the maps/charts/cards of the deepened characteristic, purulent ependymitis noted in 3.0o/o of cases of the penetrating wounds of skull.

The mechanisms of the onset of secondary purulent ependymitis are explained: 1) by the penetration of abscess into the ventricle of brain - 19.8o/o; 2) by the complication of the liquor fistulas of the ventricles of brain - 25.2o/o; 3) spreading of the spilled purulent encephalitis to the wall of ventricle - 55.0o/o.

Purulent ependymitis on the ground of the penetration of abscess into ventricle it was developed in wounded, whose abscess of brain flowed/occurred/lasted in the majority of the cases without the expressed encephalytic phenomena. In the series/row of patients to the moment/torque of the penetration of pus into the ventricle of the presence of abscess it was not suspected. This indicated already N. I. Pirogov.

On autopsy was detected the abscess with the well expressed capsule and with the clearly visible place of communication/report with the ventricle of brain.

The basic reason for the penetration of pus from abscess into

ventricle should be seen in different building/structure of capsules of abscess in its different sectors. The sectors of capsule, nearer situated to brain core and shells, are considerably thicker than the sectors, situated is more deep, it is nearer to ventricles. In this building/structure of capsule in wounded with small bone defect the abscess is inclined to increase in the line of least resistance - in the direction of the ventricle of brain. Infection within abscess gradually leads to the decomposition/decay of the surrounding tissues and thereby to the creation of conditions for the penetration of pus from abscess into ventricle.

In the majority of the cases the penetration occurs with lightning speed, but sometimes true penetration precedes the development of nonpurulent periventricular encephalitis.

The first indications of the clinical picture of the acute/sharp penetration of pus from abscess into the ventricle of brain have in N. I. Pirogov: "... patient can remain with complete consciousness, without any paralysis, until pus lays to itself route/path into the ventricle of the brain; at the same time patient suddenly inflows into hibernation, are spasms, paralysis, which are finished by death".

The clinical picture of the penetration of abscess into

ventricle is developed as follows: against the background completely or relative to the favcrable condition of the wounded who frequently does not have almost any foundations for suspecting the abscess of brain, suddenly appear the acute/sharp, unbearable headache, the vomiting, sometimes repeated. Pupils are expanded, the color of face frequently is changed - it becomes first sharply pale, then by sharply red, face is ccvered/coated with the drops of the perspiration; it appears the general/common/total motor excitation which large explains by the unbearable head pain; respiration is repeat/quickened.

Page 484.

For hour or several hours the temperature rises to 39.8-41°, pulse is repeat/quickened to 130-150 strikes/shocks per minute; after 1-2 hours motor excitation descends, patient begins to lose consciousness appear tonoclonic spasms, which are relieved by tonic ones in all extremities. Frequently patient inflows into comatose condition, spasms cease, appear the sharply pronounced meningeal phenomena, stertorous respiration, also, through 6-12-24, thinner/less frequent after 36 hours usually attacks/advances death.

The acute/sharp, unendurable pain with which begins the described picture, can be explained by the acute/sharp stimulation of

the nerve ends of vascular web/plexus by pus, which entered into ventricle.

With the penetration of pus into the front/leading crescent of lateral ventricle sometimes was observed the acute/sharp development of the syndrome of cavernous sinus - exophthalamus, swelling of the mucous membrane of eye, weakness of oculomotor nerves.

In liquor were detected all cellular elements/cells of the bursting open cerebral abscess. In the field of view - cellular detrite. The structure of cells established/installed could not be. The content of protein in cerebrospinal fluid achieved 18-20o/oo. Research of microflora of cerebrospinal fluid, pus from the bursting open abscess and purulent liberations/excretions from the cerebral wound established the identity of bacterial flora in them.

On autopsy was detected the area of abscess with the remainders/residues of purulent masses, less frequently completely emptied. Abscess in the majority of the cases had well organized dense capsule. In the periphery of the place for the perforation of the capsule was considerably more thinly and it is less dense. The substance of brain in the periphery of the capsul of abscess at small distance was somewhat flaccid, but without the trails of purulent melting. The ventricles of brain are expanded and filled with turbid

fluid/liquid. The ependyma of ventricles turbid, is reddened, are sometimes visible point of hemorrhage.

In the first months of the Great Patrictic War the wounded with the "small" bone defects of skull, as a result of satisfactory condition, always did not attract proper attention of the doctors. Meanwhile in brain in such wounded sometimes were developed the abscesses, with which the condition of wounded suddenly deteriorated and they rapidly perished. With the introduction of the necessary primary processing of the wounds of skull a number of wounded with low bone defects and with unrecognized abscesses of brain was decreased, but the cases of the acute/sharp penetration of pus from the unrecognized abscess into the ventricle of brain became rarity.

The pathogenesis of the form/species of purulent ependymitis in question dictates known care in the relation to lumbar punctures, especially to encephalography, used for diagnostic targets. The distance/separation of cerebral fluid/liquid leads to a decrease in intra-ventricular pressure and an increase in the difference between pressure within abscess and within ventricles, which can accelerate the penetration of pus into ventricle.

The treatment of patient with the penetration of abscess into ventricle consists of the urgent surgical emptying of abscess and the

wide local and overall use/application of penicillin and sulfanilamides. As showed the experiment/experience of the Great Patriotic War, during active treatment some wounded with periventricular encephalitis, which developed on the soil of the penetration of abscess, recovered.

Page 485.

Purulent ependymitis, complicated ventricular by liquorrhea, was developed in the period of the delimitation of infectious focus and later complications, in the majority of the cases after the spontaneous autopsy of ventricle as a result of decomposition/decay and rejection/separation of the necrotic units of protrusion and development of secondary liquorrhea. In a small number of cases of ependymitis in these periods it was developed after the operational autopsy of ventricle with the subsequent liquorrhea. The development of secondary liquorrhea usually preceded an increase in the sizes/dimensions of protrusion, sometimes considerable aggravation of the meningo-encephalytic phenomena. The intra-ventricular pressure increase as a result of nonpurulent periventricular encephalitis in the presence of the decomposing protrusion led gradually to the formation of the seen with eye ventricular fistula from which in an abundant quantity escape/ensued the cerebrospinal fluid. Usually through several days when the purulent infection through the liquor

fistula penetrated the ventricular systes, was developed purulent ependymitis. Then the ensuing/escaping/flowing out cerebrospinal fluid became turbid; grcwn in the period of ncnpurulent inflammation of liquorrhea, as a result of pyoinflammatory changes in vascular plexus, gradually was decreased.

Post-operation liqucrrhea was develcped with the operational autopsy of ventricle usually in connection with the distance/separation of the deeply lying/horizcntal foreign bodies, bone fragments or during the total distance/separation of the deeply arranged/located abscesses of brain. During the insignificant damage of the wall of the ventricle liquorrhea was frequently short-term; for several hours the defect in the wall of ventricle was occluded, and purulent infection into area ventricle did not penetrate. During the more considerable damage of the ventricle liquorrhea did not cease, but gradually it grew; sometimes was developed the post-operation protrusion on surface of which was determined the seen with the naked eye liquor fistula.

Clinic of ependymitis, which is complicated by liquorrhea (in contrast to its cther fcrms/species), was characterized first of all by the presence of ventricular fistula with liquorrhea. The develcpment of suppuratica preceded the appearance of growing of liquorrhea, moreover in cerebrospinal fluid rcse a quantity of

protein in the absence of cells or presence of small pleocytosis.

During nonpurulent periventricular encephalitis sometimes was noted an increase in the temperature. This increase in the temperature was not another indicator of the development of purulent inflammation, but caused a temporary delay of the outflow of cerebrospinal fluid from ventricular fistula. Following by the escape of fluid/liquid the temperature was usually decreased. From the moment/torque of the development of purulent ependymitis the temperature, which thus far was normal or subfebrile, rose to 38-39°. Following by an increase in the temperature was noted the cloudiness of the cerebrospinal fluid, escape/ensuing from ventricular fistula. The research of the cerebrospinal fluid, obtained by means of lumbar puncture, showed the rapid increase of protein to 4-6-7o/oo and even 8o/oo and pleocytosis in the limits of 2000-5000 cells in 1 mm^3 with the predominance of leukocytes. Sometimes was noted the considerable difference in the composition of the cerebrospinal fluid, undertaken from ventricle, and the cerebrospinal fluid, obtained with lumbar puncture. This was explained by the continuous shift/relief of fluid/liquid in ventricle, as a result of abundant liquorrhea and increased the production of cerebrospinal fluid. However, cerebrospinal fluid in the lumbar section was constantly supplemented by protein and cellular elements/cells due to exudate from the shells of head and spinal cord. During the latter/last days before death of

wounded a quantity of cerebrcspinal fluid, flowing from fistula, as a result of pathological changes in vascular webes/plexi, was decreased, and it became noticeably more turbid.

In the clinical course of this form/species of purulent ependymitis impressive was the conduct of patient.

Page 486.

Within one-two days to death it was frequently in complete consciousness, in contact. Headaches especially did not harass. Meningeal phenomena were expressed distinctly.

Warning/prevention cf the development of this form/species of complication in essence is reduced to the treatment of ventricular liquorrhea. The proposed by a number of the authors methods cf the treatment of liquorrhea consist in tamponade of ventricular fistula by the small piece of muscle, by streptocide and by other methods. Positive effect from the use/application of these methods is feasible with primary liquorrhea to the development of the phenomena cf nonpurulent periventricular encephalitis with the growing liquorrhea. In the latter case these methods are not applied, because after tamponage intra-ventricular pressure rises and tampon is ejected of ventricular fistula course. Furthermore, under conditions of purulent

wound muscular tampon can prove to be by the guide of infection from wound into the area of ventricle. As is known, in proportion to a decrease in intracranial pressure it rises the production of cerebral fluid/liquid and, on the contrary, the higher the intracranial pressure, the more is suppressed the function of vascular webes/plexi and it is decreased the production of cerebral fluid/liquid. In the presence of growing ventricular liquorrhea under conditions of purulent wound one should attempt to, first of all, avoid the penetration of infection into the area of ventricle.

If we support fistula with opened, allowing/assuming the abundant escape of fluid/liquid, intracranial pressure descends, which in turn, increases the education of cerebrospinal fluid and reinforces its current from ventricle towards the outside; this impedes the penetration of infection into the area of ventricle.

When wound is cleaned of purulent masses, then is observed the gradual decrease in liquorrhea as a result of the property of the automatic regulation of the production of cerebrospinal fluid. This factor is utilized for the gradual decrease in liquorrhea: the region of fistula and protrusion of brain is covered by cellophane leaflet, is conducted ultraviolet lighting of the protrusion of the brain through cellophane, is assigned energetic dehydration, together with sulfanylamido therapy, which decreases the outflow of fluid/liquid

from ventricle, is decreased liquor formation, it decreases by liquorrhea and it leads to the ccclusion of fistula.

In the series/row of wounded from secondary liquorrhea under conditions purulent wound by this method it was possible to attain the occlusion of ventricular fistula and to prevent the develcpment of ependymitis.

Positive results gave use/application of antibiotics (in particular, penicillin) cf the day of the treatment of wounded, suffering with ependymitis cn ground of liquorrhea with relatively prolonged clinical course.

Purulent ependymitis, developing as a result of the dissemination of the spilled purulent encephalitis for the wall of ventricle. In the pericd of the first world war some authors began the study of the pathogenesis of basilar meningitides, with which on autopsy was not detected the places of the penetration of pus into the area of ventricle.

V. N. Shamov at XIV congress/descent of russian surgeons demonstrated the series/row of characteristic pathoanatomical preparations. He showed that "the infectious process in brain is not spread limitlessly in different directions, but has always marked

inclination to go from the surface of brain being centrally towards ventricles, developed, obviously, on the course of lymphatic vessels. Implication in the infectious process of cerebral ventricles is escorted/tracked by the rapid march/passage of infection to the base of brain".

Page 487.

The study of the pathogenesis of basilar meningitides helped, thus, to explain the pathogenesis of purulent ependymitis with the spilled purulent encephalitis.

In these cases the suppuration without the anatomical damage of the integrity of the wall of ventricle gradually converted/transferred to ependyma and vascular webes/plexi, giving purulent ependymitis. In the examined above cases of the penetration of abscess into ventricle at first were destroyed vascular webes/plexi and ependyma.

In those rare cases when encephalytic focus approaches a ventricle in the location of vascular web/plexus, the latter can delimit periventricular process and protect from the penetration of purulent infection into ventricle.

Symptoms, characteristic for approaching the encephalytic focus to the wall of ventricle, which follow: the growing poverty/scarcity of motor activity, the sharp predominance of the symptom of Koenig above the rigidity of occiput, the difference in the tone of extremities of both of sides, oscillation/vibration of difference and tone between upper and lower extremities, insufficiency, and then the paresis of look upward, the dissociation of tendinous reflexes, sometimes their extinction. Rarely are detected extrapyramidal hyperkineses or extrapyramidal hemiparesis.

Usually the encephalytic focus which leads to the development of ependymitis captures almost entire thickness of cerebral tissue and is spread, being cuneate narrowed, in the direction of ventricle. In such wounded against the background sharply pronounced crust - subcortical encephalytic symptoms the micro-symptoms of ependymitis are revealed/detected still more difficult.

Further approximation/approach of the encephalytic focus to ependyma and vascular wet/plexus of ventricle manifests itself by a sharper increase in the temperature, by appearance or reinforcing of meningeal symptoms, by larger manifestation of the symptom of Koenig. As a result of the intra-ventricular pressure increase appears or increases the protrusion; on ocular day in the majority of the cases they are detected the sign/criterion of initial stagnation or

smoothing of boundaries of mammillary visual nerves. In cerebrospinal fluid - small pleocytosis with an insignificant increase in the quantity of protein. These initial phenomena of ependymitis sometimes force doctor to search for abscess, of are usually detected only the signs/criteria of abscess formation of cerebral tissue at considerable depth.

With ependymitis the quantity of cells in cerebrospinal fluid it grows to larger degree than protein. Appearance in cerebrospinal fluid of the gradually growing pleocytosis with the clinical picture of the progressive encephalitis is the initial sign/criterion of ependymitis. The diagnosis of the latter is possible only from the moment/torque of a sharp increase in the temperature, appearance or increase in protrusion and obtaining of cerebrospinal fluid with large pleocytosis with a small another quantity of protein.

From the onset of these signs/criteria the temperature continues to remain within limits of 39-40°, pulse becomes frequent, in cerebrospinal fluid grows a quantity of protein, grow meningeal phenomena. Consciousness is darkened, by times it is explained, in 2-3 days to death of patient finally loses the consciousness.

Large pleocytosis in cerebrospinal fluid usually was evaluated as the symptom of purulent meningitis; moreover was not considered the possibility of the ventricular origin of purulent elements/cells before the development of meningitis; was not considered the fact that in the late periods of cerebral injury, as a result of commissural tunicary processes in the periphery of wound, meningitis greatly rarely was developed primary. The development of meningitis in the majority of the cases preceded purulent ependymitis. This was confirmed by the fact that with autopsies most frequently it was detected basillar meningitis.

In the unit of the cases the development of the clinical symptomatology of ependymitis preceded surgical intervention apropos of abscess with the subsequent aggravation. To the symptoms, which precede the development of ependymitis after process/operation on abscess, they can be referred: an increase in the temperature, the appearance of nausea and vomiting, loss of appetite, somnolency, anemia and an increase in the sizes/dimensions of protrusion. In the period of the appearance of these symptoms the cerebrospinal fluid remains transparent/hyaline, with small cytosis.

The syndrome of purulent ependymitis appears from moment/torque, when in cerebrospinal fluid they appear by the large cytosis and the moderately increased quantity of protein (1-1.5o/oo). Subsequently,

when meningeal phenomena sharply grow, a quantity of protein gradually increases, achieving sometimes 16 and (it is rare) even 30o/oo.

During the relatively prolonged course of ependymitis rarely was developed delimitation of one of crescents or one of the lateral ventricles.

With the autopsy of the brain of wounded person who died from purulent ependymitis on the soil of the dissemination of the spilled encephalitis, is visible the typical picture: there is no abscess there is an encephalitic focus which is spread from the place of wound, being cuneate narrowed, to one of the crescents or the center section of the lateral ventricle.

In other cases is detected the abscess with the badly/poorly expressed capsule; the medial or lower department of capsule directly merges with the subject encephalytic focus, which are spread to lateral ventricle. If abscess was operationally revealed, then capsule is sometimes more organized, and encephalytic focus, which achieves ventricle, is arranged/located on the side from consuls, also, under it. In cases when abscess was operationally removed together with capsule, is detected area with the decomposing walls from edematic cerebral tissue with the remainders/residues of

small/fine hemorrhages and the trails of pus. The ventricles of brain are usually somewhat deformed and always filled with putriform fluid/liquid. Purulent masses are visible in the lower crescents of lateral ventricles, in the third and fourth ventricle and on the basis of brain. Vascular webes/plexi are usually covered with purulent impositions.

For warning/preventing this form/species of ependymitis it is necessary to pay serious attention to the treatment of the spilled encephalitis, and also the encephalitis, which escorts/tracks abscess or which develops after the surgical treatment of abscess.

The treatment of the spilled encephalitis is difficult problem. Wide application of antibiotics during the treatment of encephalitis - basic route/path for warning/preventing ependymitis.

Lumbar punctures and encephalography with the spilled encephalitis and the complicated abscesses are not harmless. The moderate build-up/growth of pleccytosis with a small quantity of protein in cerebrospinal fluid characterizes the progression of process in subependymal tissue and it frequently precedes the development of purulent ependymitis. Therefore the detection of this cerebrospinal fluid with the appropriate clinical picture must serve as a counter-indication to repeated punctures and to encephalography.

During the operational distance/separation of abscess with capsule it is necessary with great care to be related to each millimeter of the cerebral tissue, which separates/liberates capsule of abscess from the area of ventricle.

Page 489.

With autopsy and draining of abscess for warning/preventing of the spilled encephalitis, ependymitis and subsequent meningitis it is necessary to widely use the penicillin: to pour it into the area of the emptied abscess, to irrigate by it the surrounding cerebral wound and to introduce intramuscularly and lumbar.

The experiment/experience of the Great Patriotic War made possible to Soviet scientists to establish/install pathogenesis, to study clinic and pathological anatomy of ependymitis and to attain in the known unit of the cases of the recovery of this more dangerous complication of the wounds of brain.

Tunicary-cerebral scars, adhesive arachnoiditis, sub-arachnoidal cysts and cicatrical painful syndromes of the dura meter of later periods.

To a number of late complications after the wound of brain are related the suppurative or reactive-inflammatory processes, which in the period of the distant consequences frequently become leading and determine all special features/peculiarities of clinic. However, the relating here pathophysiological and pathomorphological phenomena are comparatively scanty and little expressed. Can be revealed/detected them only during comprehensive neurologic, liquor-diagnostic and x-ray examination, moreover finally diagnosis succeeds in refining sometimes only on operating table. Discussion deals with local Rubtsovs processes, about restricted or spilled adhesive arachnoidites, about atrophic processes in cerebral tissue, about slit-shaped secondary proencephalia, about strain, regional expansion or displacement of ventricles, about closed or open cerebral dropsy. Principal of these forms are cicatrical painful forms in the region of bone defects with the painful syndrome of the solid cerebral shell, hypertension adhesive and hydrocephalic symptom complexes after the complicated wounds of brain, and mainly, traumatic epilepsy after the penetrating wounds, extremely diverse in their manifestations and course.

One of the bases is a question about character/nature and forms of the cicatrization of cerebral wounds.

According to contemporary representations in process the healings of cerebral wounds are secreted three component of scar formation: gliofibrillar, argyrophil (precollagenic) and collagenic (P. Ye. Snesarev). Glicse scar is soft, not stimulating is cerebral tissue, little connected with vessels. The filaments of argyrophil scar do not sub*end, but they expand brain tissue and serve as it by supporting framework/body, not preventing the contracting activity of vessels. In contrast to this collagenic filaments are inert in plastic sense and exhibit the property of contraction and compression, sharply affecting the connected with them vascular-astrocytic net/system. The cells and the vessels, which caught into collagenic scar tissue, are squeezed and atrophy, but constant stress is the source of the stimulation of brain. The formation of cicatrical collagenic tissue long before precedes the appearance of argyrophil filaments. But the process of collagenization may or may not arise. Then via the growth of argyrophil filaments concludes the argyrophil form of cicatrization. In the organization of cerebral wound and the formation of scar participate its different composite/compound component parts, which are characterized by dissimilar properties. Mesodermal collagenic scar is formed in more surface departments, argyrophil and gliose - in deeper.

To the Great Patriotic War the mechanisms of the formation of cerebral scar and its clinical manifestations barely were studied.

Page 490.

The period of the formation of scar must not be considered as clinically imperceptible, since the special features/peculiarities of this period can be revealed via the comparison of clinical course and neurologic picture with the data of the research of cerebro-spinal fluid and by results of encephalography with a large quantity of air. Research must be carried out after 2-3 months after the healing of wound with preliminary evaluation of the condition of cerebrospinal fluid.

The clinical manifestation of the period of the formation of a tunicary-cerebral scar depends on the degree of the primary damage/defeat of the brain tissue and quality of the surgical processing of wound.

If crust-subcortical damage/defeat was shallow and limited, if in proper time and it was fully removed destroyed cerebral substance and fragments, then the composition of cerebro-spinal fluid to the

time of scar formaton of wound remains normal or there is by the small of hyper-albuminoses. In clinic first and foremost stand the pains in the region of scar - they are caused by periosteal-tunicary intergrowth at the edges of defect. Headaches bear general character/nature, but it is especially strong in the region of scar. They are escorted/tracked by ripple reduction in defect and sometimes by the delay of pulse. Scar is drawn in; meningeal symptoms weak or they are absent. In the periods of intracranial pressure increase is noted certain mental retardation and can appear the signs/criteria of ill-defined build-up/growth the formerly focus symptoms; it is not eliminated epileptic attack/seizure/paroxysm. With encephalography in the similar cases is detected insignificant and flat protrusion of the wall of similar/analogous ventricle in the direction of scar and bone defect, and also insufficient execution of subarachnoid slots by the arch/summary of the casualty portion. The adhesive tunicary process can contribute to the development of the temporary/time disorder of the circulation of cerebrospinal fluid. In the course of 4-6 months after the healing of the full-valued processed and past without complication shallow crust-subcortical wounds the process of the formation of scar is not yet completed and occurs the application of liquor circulation to scar, which becomes apparent by the instability of clinical symptoms and by the fluctuations of craniocerebral pressure.

With deeper wounds, which are escorted/tracked by the bulky decomposition of brain tissue, the process of healing even during its uncomplicated course decelerates by prolapse. Cerebrospinal fluid comes to the norm of the month thrcugh 2-3 after the healing cf wound. Encephalography by this time detects sharp protrusion cf ventricular wall in killing zone, usually with certain expansion of entire ventricle as the consequence of the cicatrization of deeper departments of white substance. This protrusicn has relief of high canopy. The displacement of the center line of ventricles is not observed or it is minimal. Tunicary-cerebral cicatrical sector in the surface departments of cicatrical complex can be very not bulky and very not rough, and therefore it frequently subtends the adjacent to it sections of cortex. Grouped epileptic fits are rare and even they are absent. Their Epileptogenic zone can be located somewhere in the neighborhood from scar, in the region of tunicary adhesive process. Sometimes fits are caused by general/common/total violations of liquor circulation.

The significant part of the cerebral wounds - 38.8o/o (according to the data of the maps/charts/cards of the deepened characteristic) - heals after prolonged festering and complications on the course of wound canal (perifocal encephalitis, meningoencephalitis, prolapse). In cerebrospinal fluid is noted the increased content the squirrel and pleocytosis. The appearance of normal cerebrospinal fluid is the

sign/criterion of gradual formation of scar.

Page 491.

During massive tangential or segmental damages/defeats the encephalography makes it possible to reveal/detect sharp pulling of one of the bearings/angles of ventricles or part of it wall in the direction of scar, which is esccrted/tracked by the explicit displacement of the center line cf an entire system of ventricles. Is created the impression of the local wrinkling cf cerebral tissue in the region of the former wound; this is the ccnsequence of predominance in the cicatrical complex of collagenic connective elements/cells. As the ordinary consequence of the form of cicatrization presented serve early and frequent jack epileptic fits. In a large number of cases the time of their appearance can serve as the indicator of the compression of the collagenic elements/cells of scar.

To changes in the ventricular wall, by the caused cicatrization of the abscessed cerebral wound, are somewhat more lately connected hydrocephalic phenomena as a result of the disruption of the absorption of cerebrospinal fluid and local leptomeningitis. After the healing of cerebral wound, following the evacuation of the long existed abscess, is observed the considerable displacement of the

center line of ventricular system in the direction of stricken area. In this case is noted also the local or extended adhesive arachnoiditis, the glicse wrinkling of the damaged hemisphere as a result of prolonged encephalytic processes and prolapse, and also phenomenon of general/ccmmon/total dropsy of brain. After perifocal meningoencephalitis the cicatrization and the wrinkling of the damaged region are more extended.

Special attention deserves scar formation with the healing of the wounds, caused by penetration into the depth of the brain of small/fine fragments. It is here necessary to differ the initial intake unit of the cerebral wound of narrow deep intra-cerebral fragmentation courses with blind end. In the zone of inlet and in the initial unit of the cerebral wound the cicatrization has features, characteristic to the healing of crust-subcortical very bulky damage/defeat with the arranged/located here bone fragments. With encephalography is detected the pulling of ventricular wall to the region of inlet. To this usually contributes adhesive arachnociditis the casualty regions of cortex. If healing went without complications, tunicary-crust unit of the cicatrical course, located in dura mater, only a little deforms the surface of brain, little affecting the wall of ventricle. However, in the case of more severe festering in inlet is formed the bulkier collagenic tunicary-cerebral scar, which can deform the counterpart of the ventricle. In both

cases collagenic cicatrization causes changes in the adjacent sectors of cortex, which obtain the value of the epileptogenic zone.

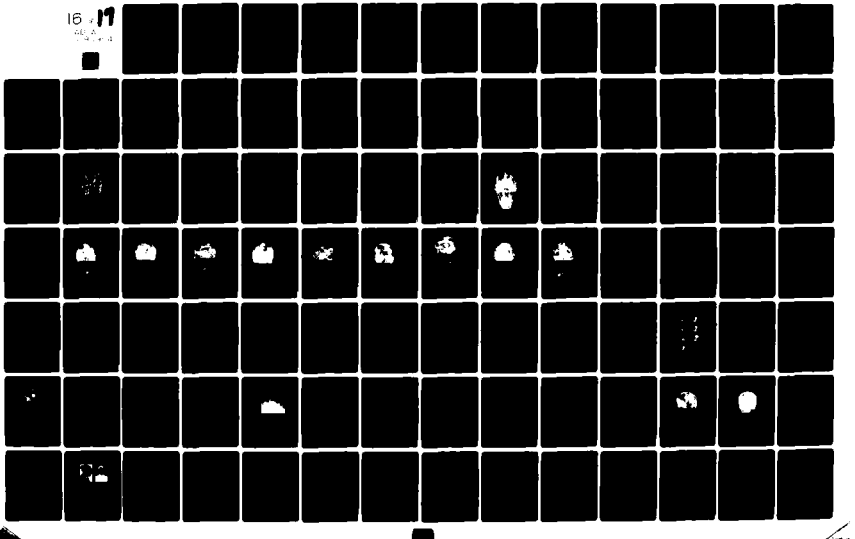
Should be secreted the form of scar formation in brain, which does not draw any noticeable strain of the damaged region of brain. In these cases the healing most frequently occurs by educating the cystic area on the course of the former wound canal in brain. In scar itself predominate the argyrophil elements/cells, which create regarding some authors "supporting framework/body" for forming a cyst-like area. Under such conditions scar does not lead to the decrease of the volume of the casualty region of brain.

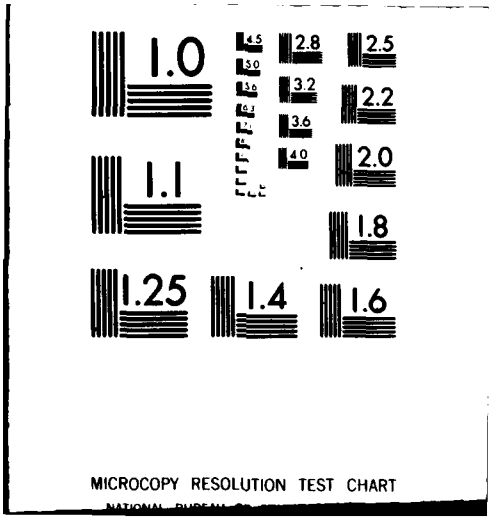
Adhesive arachnoidites in many respects determine the clinical features of the series/row of the late and distant consequences of the wounds of brain, especially the cases of traumatic epilepsy. Arachnoidites can be expressed in hydrocephalic phenomena and in the ischemia of the crust unit of the casualty portion and hemisphere.

Page 492.

Adhesive arachnoidites lead to the unchecked development of subarachnoid slots, which with encephalography finds to itself expression in the nonfulfillment of these slots in larger or smaller sectors. At the same time, overfilling by cerebrospinal fluid of the

AD-A090 984 FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OH F/G 6/5
THE EXPERIENCE OF SOVIET MEDICINE IN THE GREAT PATRIOTIC WAR 19--ETC(U)
FEB 80 V N SHAMOV, B A SAMOTOKIN
UNCLASSIFIED FTD-ID(RS)T-1925-79 NL




1.0
1.1
1.25
1.4
1.6
1.8
2.0
2.2
2.5
2.8
3.2
3.6
4.0
4.5
5.0
5.6
6.3
7.1
8.0
9.0
10.0
11.2
12.5
14.0
16.0
18.0
20.0
22.4
25.0
28.0
32.0
36.0
40.0
45.0
50.0
56.0
63.0
71.0
80.0
90.0
100.0
112.0
125.0
140.0
160.0
180.0
200.0
224.0
250.0
280.0
320.0
360.0
400.0
450.0
500.0
560.0
630.0
710.0
800.0
900.0
1000.0
1120.0
1250.0
1400.0
1600.0
1800.0
2000.0
2240.0
2500.0
2800.0
3200.0
3600.0
4000.0
4500.0
5000.0
5600.0
6300.0
7100.0
8000.0
9000.0
10000.0
11200.0
12500.0
14000.0
16000.0
18000.0
20000.0
22400.0
25000.0
28000.0
32000.0
36000.0
40000.0
45000.0
50000.0
56000.0
63000.0
71000.0
80000.0
90000.0
100000.0
112000.0
125000.0
140000.0
160000.0
180000.0
200000.0
224000.0
250000.0
280000.0
320000.0
360000.0
400000.0
450000.0
500000.0
560000.0
630000.0
710000.0
800000.0
900000.0
1000000.0
1120000.0
1250000.0
1400000.0
1600000.0
1800000.0
2000000.0
2240000.0
2500000.0
2800000.0
3200000.0
3600000.0
4000000.0
4500000.0
5000000.0
5600000.0
6300000.0
7100000.0
8000000.0
9000000.0
10000000.0
11200000.0
12500000.0
14000000.0
16000000.0
18000000.0
20000000.0
22400000.0
25000000.0
28000000.0
32000000.0
36000000.0
40000000.0
45000000.0
50000000.0
56000000.0
63000000.0
71000000.0
80000000.0
90000000.0
100000000.0
112000000.0
125000000.0
140000000.0
160000000.0
180000000.0
200000000.0
224000000.0
250000000.0
280000000.0
320000000.0
360000000.0
400000000.0
450000000.0
500000000.0
560000000.0
630000000.0
710000000.0
800000000.0
900000000.0
1000000000.0
1120000000.0
1250000000.0
1400000000.0
1600000000.0
1800000000.0
2000000000.0
2240000000.0
2500000000.0
2800000000.0
3200000000.0
3600000000.0
4000000000.0
4500000000.0
5000000000.0
5600000000.0
6300000000.0
7100000000.0
8000000000.0
9000000000.0
10000000000.0
11200000000.0
12500000000.0
14000000000.0
16000000000.0
18000000000.0
20000000000.0
22400000000.0
25000000000.0
28000000000.0
32000000000.0
36000000000.0
40000000000.0
45000000000.0
50000000000.0
56000000000.0
63000000000.0
71000000000.0
80000000000.0
90000000000.0
100000000000.0
112000000000.0
125000000000.0
140000000000.0
160000000000.0
180000000000.0
200000000000.0
224000000000.0
250000000000.0
280000000000.0
320000000000.0
360000000000.0
400000000000.0
450000000000.0
500000000000.0
560000000000.0
630000000000.0
710000000000.0
800000000000.0
900000000000.0
1000000000000.0
1120000000000.0
1250000000000.0
1400000000000.0
1600000000000.0
1800000000000.0
2000000000000.0
2240000000000.0
2500000000000.0
2800000000000.0
3200000000000.0
3600000000000.0
4000000000000.0
4500000000000.0
5000000000000.0
5600000000000.0
6300000000000.0
7100000000000.0
8000000000000.0
9000000000000.0
10000000000000.0
11200000000000.0
12500000000000.0
14000000000000.0
16000000000000.0
18000000000000.0
20000000000000.0
22400000000000.0
25000000000000.0
28000000000000.0
32000000000000.0
36000000000000.0
40000000000000.0
45000000000000.0
50000000000000.0
56000000000000.0
63000000000000.0
71000000000000.0
80000000000000.0
90000000000000.0
100000000000000.0
112000000000000.0
125000000000000.0
140000000000000.0
160000000000000.0
180000000000000.0
200000000000000.0
224000000000000.0
250000000000000.0
280000000000000.0
320000000000000.0
360000000000000.0
400000000000000.0
450000000000000.0
500000000000000.0
560000000000000.0
630000000000000.0
710000000000000.0
800000000000000.0
900000000000000.0
1000000000000000.0
1120000000000000.0
1250000000000000.0
1400000000000000.0
1600000000000000.0
1800000000000000.0
2000000000000000.0
2240000000000000.0
2500000000000000.0
2800000000000000.0
3200000000000000.0
3600000000000000.0
4000000000000000.0
4500000000000000.0
5000000000000000.0
5600000000000000.0
6300000000000000.0
7100000000000000.0
8000000000000000.0
9000000000000000.0
10000000000000000.0
11200000000000000.0
12500000000000000.0
14000000000000000.0
16000000000000000.0
18000000000000000.0
20000000000000000.0
22400000000000000.0
25000000000000000.0
28000000000000000.0
32000000000000000.0
36000000000000000.0
40000000000000000.0
45000000000000000.0
50000000000000000.0
56000000000000000.0
63000000000000000.0
71000000000000000.0
80000000000000000.0
90000000000000000.0
100000000000000000.0
112000000000000000.0
125000000000000000.0
140000000000000000.0
160000000000000000.0
180000000000000000.0
200000000000000000.0
224000000000000000.0
250000000000000000.0
280000000000000000.0
320000000000000000.0
360000000000000000.0
400000000000000000.0
450000000000000000.0
500000000000000000.0
560000000000000000.0
630000000000000000.0
710000000000000000.0
800000000000000000.0
900000000000000000.0
1000000000000000000.0
1120000000000000000.0
1250000000000000000.0
1400000000000000000.0
1600000000000000000.0
1800000000000000000.0
2000000000000000000.0
2240000000000000000.0
2500000000000000000.0
2800000000000000000.0
3200000000000000000.0
3600000000000000000.0
4000000000000000000.0
4500000000000000000.0
5000000000000000000.0
5600000000000000000.0
6300000000000000000.0
7100000000000000000.0
8000000000000000000.0
9000000000000000000.0
10000000000000000000.0
11200000000000000000.0
12500000000000000000.0
14000000000000000000.0
16000000000000000000.0
18000000000000000000.0
20000000000000000000.0
22400000000000000000.0
25000000000000000000.0
28000000000000000000.0
32000000000000000000.0
36000000000000000000.0
40000000000000000000.0
45000000000000000000.0
50000000000000000000.0
56000000000000000000.0
63000000000000000000.0
71000000000000000000.0
80000000000000000000.0
90000000000000000000.0
100000000000000000000.0
112000000000000000000.0
125000000000000000000.0
140000000000000000000.0
160000000000000000000.0
180000000000000000000.0
200000000000000000000.0
224000000000000000000.0
250000000000000000000.0
280000000000000000000.0
320000000000000000000.0
360000000000000000000.0
400000000000000000000.0
450000000000000000000.0
500000000000000000000.0
560000000000000000000.0
630000000000000000000.0
710000000000000000000.0
800000000000000000000.0
900000000000000000000.0
1000000000000000000000.0
1120000000000000000000.0
1250000000000000000000.0
1400000000000000000000.0
1600000000000000000000.0
1800000000000000000000.0
2000000000000000000000.0
2240000000000000000000.0
2500000000000000000000.0
2800000000000000000000.0
3200000000000000000000.0
3600000000000000000000.0
4000000000000000000000.0
4500000000000000000000.0
5000000000000000000000.0
5600000000000000000000.0
6300000000000000000000.0
7100000000000000000000.0
8000000000000000000000.0
9000000000000000000000.0
10000000000000000000000.0
11200000000000000000000.0
12500000000000000000000.0
14000000000000000000000.0
16000000000000000000000.0
18000000000000000000000.0
20000000000000000000000.0
22400000000000000000000.0
25000000000000000000000.0
28000000000000000000000.0
32000000000000000000000.0
36000000000000000000000.0
40000000000000000000000.0
45000000000000000000000.0
50000000000000000000000.0
56000000000000000000000.0
63000000000000000000000.0
71000000000000000000000.0
80000000000000000000000.0
90000000000000000000000.0
100000000000000000000000.0
112000000000000000000000.0
125000000000000000000000.0
140000000000000000000000.0
160000000000000000000000.0
180000000000000000000000.0
200000000000000000000000.0
224000000000000000000000.0
250000000000000000000000.0
280000000000000000000000.0
320000000000000000000000.0
360000000000000000000000.0
400000000000000000000000.0
450000000000000000000000.0
500000000000000000000000.0
560000000000000000000000.0
630000000000000000000000.0
710000000000000000000000.0
800000000000000000000000.0
900000000000000000000000.0
1000000000000000000000000.0
1120000000000000000000000.0
1250000000000000000000000.0
1400000000000000000000000.0
1600000000000000000000000.0
1800000000000000000000000.0
2000000000000000000000000.0
2240000000000000000000000.0
2500000000000000000000000.0
2800000000000000000000000.0
3200000000000000000000000.0
3600000000000000000000000.0
4000000000000000000000000.0
4500000000000000000000000.0
5000000000000000000000000.0
5600000000000000000000000.0
6300000000000000000000000.0
7100000000000000000000000.0
8000000000000000000000000.0
9000000000000000000000000.0
10000000000000000000000000.0
11200000000000000000000000.0
12500000000000000000000000.0
14000000000000000000000000.0
16000000000000000000000000.0
18000000000000000000000000.0
20000000000000000000000000.0
22400000000000000000000000.0
25000000000000000000000000.0
28000000000000000000000000.0
32000000000000000000000000.0
36000000000000000000000000.0
40000000000000000000000000.0
45000000000000000000000000.0
50000000000000000000000000.0
56000000000000000000000000.0
63000000000000000000000000.0
71000000000000000000000000.0
80000000000000000000000000.0
90000000000000000000000000.0
100000000000000000000000000.0
112000000000000000000000000.0
125000000000000000000000000.0
140000000000000000000000000.0
160000000000000000000000000.0
180000000000000000000000000.0
200000000000000000000000000.0
224000000000000000000000000.0
250000000000000000000000000.0
280000000000000000000000000.0
320000000000000000000000000.0
360000000000000000000000000.0
400000000000000000000000000.0
450000000000000000000000000.0
500000000000000000000000000.0
560000000000000000000000000.0
630000000000000000000000000.0
710000000000000000000000000.0
800000000000000000000000000.0
900000000000000000000000000.0
1000000000000000000000000000.0
1120000000000000000000000000.0
1250000000000000000000000000.0
1400000000000000000000000000.0
1600000000000000000000000000.0
1800000000000000000000000000.0
2000000000000000000000000000.0
2240000000000000000000000000.0
2500000000000000000000000000.0
2800000000000000000000000000.0
3200000000000000000000000000.0
3600000000000000000000000000.0
4000000000000000000000000000.0
4500000000000000000000000000.0
5000000000000000000000000000.0
5600000000000000000000000000.0
6300000000000000000000000000.0
7100000000000000000000000000.0
8000000000000000000000000000.0
9000000000000000000000000000.0
10000000000000000000000000000.0
11200000000000000000000000000.0
12500000000000000000000000000.0
14000000000000000000000000000.0
16000000000000000000000000000.0
18000000000000000000000000000.0
20000000000000000000000000000.0
22400000000000000000000000000.0
25000000000000000000000000000.0
28000000000000000000000000000.0
32000000000000000000000000000.0
36000000000000000000000000000.0
40000000000000000000000000000.0
45000000000000000000000000000.0
50000000000000000000000000000.0
56000000000000000000000000000.0
63000000000000000000000000000.0
71000000000000000000000000000.0
80000000000000000000000000000.0
90000000000000000000000000000.0
100000000000000000000000000000.0
112000000000000000000000000000.0
125000000000000000000000000000.0
140000000000000000000000000000.0
160000000000000000000000000000.0
180000000000000000000000000000.0
200000000000000000000000000000.0
224000000000000000000000000000.0
250000000000000000000000000000.0
280000000000000000000000000000.0
320000000000000000000000000000.0
360000000000000000000000000000.0
400000000000000000000000000000.0
450000000000000000000000000000.0
500000000000000000000000000000.0
560000000000000000000000000000.0
630000000000000000000000000000.0
710000000000000000000000000000.0
800000000000000000000000000000.0
900000000000000000000000000000.0
1000000000000000000000000000000.0
1120000000000000000000000000000.0
1250000000000000000000000000000.0
1400000000000000000000000000000.0
1600000000000000000000000000000.0
1800000000000000000000000000000.0
2000000000000000000000000000000.0
2240000000000000000000000000000.0
2500000000000000000000000000000.0
2800000000000000000000000000000.0
3200000000000000000000000000000.0
3600000000000000000000000000000.0
4000000000000000000000000000000.0
4500000000000000000000000000000.0
5000000000000000000000000000000.0
5600000000000000000000000000000.0
6300000000000000000000000000000.0
7100000000000000000000000000000.0
8000000000000000000000000000000.0
9000000000000000000000000000000.0
10000000000000000000000000000000.0
11200000000000000000000000000000.0
12500000000000000000000000000000.0
14000000000000000000000000000000.0
16000000000000000000000000000000.0
18000000000000000000000000000000.0
20000000000000000000000000000000.0
22400000000000000000000000000000.0
25000000000000000000000000000000.0
28000000000000000000000000000000.0
32000000000000000000000000000000.0
36000000000000000000000000000000.0
40000000000000000000000000000000.0
45000000000000000000000000000000.0
50000000000000000000000000000000.0
56000000000000000000000000000000.0
63000000000000000000000000000000.0
71000000000000000000000000000000.0
80000000000000000000000000000000.0
90000000000000000000000000000000.0
100000000000000000000000000000000.0
112000000000000000000000000000000.0
125000000000000000000000000000000.0
140000000000000000000000000000000.0
160000000000000000000000000000000.0
180000000000000000000000000000000.0
200000000000000000000000000000000.0
224000000000000000000000000000000.0
250000000000000000000000000000000.0
280000000000000000000000000000000.0
320000000000000000000000000000000.0
360000000000000000000000000000000.0
400000000000000000000000000000000.0
450000000000000000000000000000000.0
500000000000000000000000000000000.0
560000000000000000000000000000000.0
630000000000000000000000000000000.0
710000000000000000000000000000000.0
800000000000000000000000000000000.0
900000000000000000000000000000000.0
1000000000000000000000000000000000.0
1120000000000000000000000000000000.0
1250000000000000000000000000000000.0
1400000000000000000000000000000000.0
1600000000000000000000000000000000.0
1800000000000000000000000000000000.0
2000000000000000000000000000000000.0
2240000000000000000000000000000000.0
2500000000000000000000000000000000.0
2800000000000000000000000000000000.0
3200000000000000000000000000000000.0
3600000000000000000000000000000000.0
4000000000000000000000000000000000.0
4500000000000000000000000000000000.0
5000000000000000000000000000000000.0
5600000000000000000000000000000000.0
6300000000000000000000000000000000.0
7100000000000000000000000000000000.0
8000000000000000000000000000000000.0
9000000000000000000000000000000000.0
10000000000000000000000000000000000.0
11200000000000000000000000000000000.0
12500000000000000000000000000000000.0
14000000000000000000000000000000000.0
16000000000000000000000000000000000.0
18000000000000000000000000000000000.0
20000000000000000000000000000000000.0
22400000000000000000000000000000000.0
25000000000000000000000000000000000.0
28000000000000000000000000000000000.0
32000000000000000000000000000000000.0
36000000000000000000000000000000000.0
40000000000000000000000000000000000.0
45000000000000000000000000000000000.0
50000000000000000000000000000000000.0
56000000000000000000000000000000000.0
63000000000000000000000000000000000.0
71000000000000000000000000000000000.0
80000000000000000000000000000000000.0
90000000000000000000000000000000000.0
100000000000000000000000000000000000.0
112000000000000000000000000000000000.0
125000000000000000000000000000000000.0
140000000000000000000000000000000000.0
160000000000000000000000000000000000.0
180000000000000000000000000000000000.0
200000000000000000000000000000000000.0
224000000000000000000000000000000000.0
250000000000000000000000000000000000.0
280000000000000000000000000000000000.0
320000000000000000000000000000000000.0
360000000000000000000000000000000000.0
400000000000000000000000000000000000.0
450000000000000000000000000000000000.0
500000000000000000000000000000000000.0
560000000000000000000000000000000000.0
630000000000000000000000000000000000.0
710000000000000000000000000000000000.0
800000000000000000000000000000000000.0
900000000000000000000000000000000000.0
1000000000000000000000000000000000000.0
1120000000000000000000000000000000000.0
1250000000000000000000000000000000000.0
1400000000000000000000000000000000000.0
1600000000000000000000000000000000000.0
1800000000000000000000000000000000000.0
2000000000000000000000000000000000000.0
2240000000000000000000000000000000000.0
2500000000000000000000000000000000000.0
2800000000000000000000000000000000000.0
3200000000000000000000000000000000000.0
3600000000000000000000000000000000000.0
4000000000000000000000000000000000000.0
4500000000000000000000000000000000000.0
5000000000000000000000000000000000000.0
5600000000000000000000000000000000000.0
6300000000000000000000000000000000000.0
7100000000000000000000000000000000000.0
8000000000000000000000000000000000000.0
9000000000000000000000000000000000000.0
10000000000000000000000000000000000000.0
11200000000000000000000000000000000000.0
12500000000000000000000000000000000000.0
14000000000000000000000000000000000000.0
16000000000000000000000000000000000000.0
18000000000000000000000000000000000000.0
20000000000000000000000000000000000000.0
22400000000000000000000000000000000000.0
25000000000000000000000000000000000000.0
28000000000000000000000000000000000000.0
32000000000000000000000000000000000000.0
36000000000000000000000000000000000000.0
40000000000000000000000000000000000000.0
45000000000000000000000000000000000000.0
50000000000000000000000000000000000000.0
56000000000000000000000000000000000000.0
63000000000000000000000000000000000000.0
71000000000000000000000000000000000000.0
80000000000000000000000000000000000000.0
90000000000000000000000000000000000000.0
100000000000000000000000000000000000000.0
112000000000000000000000000000000000000.0
125000000000000000000000000000000000000.0
140000000000000000000000000000000000000.0
160000000000000000000000000000000000000.0
180000000000000000000000000000000000000.0
200000000000000000000000000000000000000.0
224000000000000000000000000000000000000.0
250000000000000000000000000000000000000.0
280000000000000000000000000000000000000.0
320000000000000000000000000000000000000.0
360000000000000000000000000000000000000.0
400000000000000000000000000000000000000.0
450000000000000000000000000000000000000.0
500000000000000000000000000000000000000.0
560000000000000000000000000000000000000.0
630000000000000000000000000000000000000.0
710000000000000000000000000000000000000.0
800000000000000000000000000000000000000.0
900000000000000000000000000000000000000.0
1000000000000000000000000000000000000000.0
1120000000000000000000000000000000000000.0
1250000000000000000000000000000000000000.0
1400000000000000000000000000000000000000.0
1600000000000000000000000000000000000000.0
1800000000000000000000000000000000000000.0
2000000000000000000000000000000000000000.0
2240000000000000000000000000000000000000.0
2500000000000000000000000000000000000000.0
2800000000000000000000000000000000000000.0
3200000000000000000000000000000000000000.0
3600000000000000000000000000000000000000.0
4000000000000000000000000000000000000000.0
4500000000000000000000000000000000000000.0
5000000000000000000000000000000000000000.0
5600000000000000000000000000000000000000.0
6300000000000000000000000000000000000000.0
7100000000000000000000000000000000000000.0
8000000000000000000000000000000000000000.0
9000000000000000000000000000000000000000.0
10000000000000000000000000000000000000000.0
11200000000000000000000000000000000000000.0
12500000000000000000000000000000000000000.0
14000000000000000000000000000000000000000.0
16000000000000000000000000000000000000000.0
18000000000000000000000000000000000000000.0
20000000000000000000000000000000000000000.0
22400000000000000000000000000000000000000.0
25000000000000000000000000000000000000000.0
28000000000000000000000000000000000000000.0
32000000000000000000000000000000000000000.0
36000000000000000000000000000000000000000.0
40000000000000000000000000000000000000000.0
45000000000000000000000000000000000000000.0
50000000000000000000000000000000000000000.0
56000000000000000000000000000000000000000.0
63000000000000000000000000000000000000000.0
71000000000000000000000000000000000000000.0
80000000000000000000000000000000000000000.0
90000000000000000000000000000000000000000.0
100000000000000000000000000000000000000000.0
112000000000000000000000000000000000000000.0
125000000000000000000000000000000000000000.0
140000000000000000000000000000000000000000.0
160000000000000000000000000000000000000000.0
180000000000000000000000000000000000000000.0
200000000000000000000000000000000000000000.0
224000000000000000000000000000000000000000.0
250000000000000000000000000000000000000000.0
280000000000000000000000000000000000000000.0
320000000000000000000000000000000000000000.0
360000000000000000000000000000000000000000.0
400000000000000000000000000000000000000000.0
450000000000000000000000000000000000000000.0
500000000000000000000000000000000000000000.0
560000000000000000000000000000000000000000.0
630000000000000000000000000000000000000000.0
710000000000000000000000000000000000000000.0
800000000000000000000000000000000000000000.0
900000000000000000000000000000000000000000.0
1000000000000000000000000000000000000000000.0
1120000000000000000000000000000000000000000.0
1250000000000000000000000000000000000000000.0
1400000000000000000000000000000000000000000.0
1600000000000000000000000000000000000000000.0
1800000000000000000000000000000000000000000.0
2000000000000000000000000000000000000000000.0
2240000000000000000000000000000000000000000.0
2500000000000000000000000000000000000000000.0
2800000000000000000000000000000000000000000.0
3200000000000000000000000000000000000000000.0
3600000000000000000000000000000000000000000.0
4000000000000000000000000000000000000000000.0
4500000000000000000000000000000000000000000.0
5000000000000000000000000000000000000000000.0
5600000000000000000000000000000000000000000.0
6300000000000000000000000000000000000000000.0
7100000000000000000000000000000000000000000.0
8000000000000000000000000000000000000000000.0
9000000000000000000000000000000000000000000.0
10000000000000000000000000000000000000000000.0
11200000000000000000000000000000000000000000.0
12500000000000000000000000000000000000000000.0
14000000000000000000000000000000000000000000.0
16000000000000000000000000000000000000000000.0
18000000000000000000000000000000000000000000.0
20000000000000000000000000000000000000000000.0
22400000000000000000000000000000000000000000.0
25000000000000000000000000000000000000000000.0
28000000000000000000000000000000000000000000.0
32000000000000000000000000000000000000000000.0
36000000000000000000000000000000000000000000.0
40000000000000000000000000000000000000000000.0
45000000000000000000000000000000000000000000.0
50000000000000000000000000000000000000000000.0
56000000000000000000000000000000000000000000.0
63000000000000000000000000000000000000000000.0
71000000000000000000000000000000000000000000.0
80000000000000000000000000000000000000000000.0
90000000000000000000000000000000000000000000.0
100000000000000000000000000000000000000000000.0
112000000000000000000000000000000000000000000.0
125000000000000000000000000000000000000000000.0
140000000000000000000000000000000000000000000.0
160000000000000000000000000000000000000000000.0
180000000000000000000000000000000000000000000.0
200000000000000000000000000000000000000000000.0
224000000000000000000000000000000000000000000.0
250000000000000000000000000000000000000000000.0
280000000000000000000000000000000000000000000.0
320000000000000000000000000000000000000000000.0
360000000000000000000000000000000000000000000.0
400000000000000000000000000000000000000000000.0
450000000000000000000000000000000000000000000.0
500000000000000000000000000000000000000000000.0
560000000000000000000000000000000000000000000.0
630000000000000000000000000000000000000000000.0
710000000000000000000000000000000000000000000.0
800000000000000000000000000000000000000000000.0
900000000000000000000000000000000000000000000.0
1000000000000000000000000000000000000000000000.0
1120000000000000000000000000000000000000000000.0
1250000000000000000000000000000000000000000000.0
1400000000000000000000000000000000000000000000.0
1600000000000000000000000000000000000000000000.0
1800000000000000000000000000000000000000000000.0
2000000000000000000000000000000000000000000000.0
2240000000000000000000000000000000000000000000.0
2500000000000000000000000000000000000000000000.0
2800000000000000000000000000000000000000000000.0
3200000000000000000000000000000000000000000000.0
3600000000000000000000000000000000000000000000.0
4000000000000000000000000000000000000000000000.0
4500000000000000000000000000000000000000000000.0
5000000000000000000000000000000000000000000000.0
5600000000000000000000000000000000000000000000.0
6300000000000000000000000000000000000000000000.0
7100000000000000000000000000000000000000000000.0
8000000000000000000000000000000000000000000000.0
9000000000000000000000000000000000000000000000.0
10000000000000000000000000000000000000000000000.0
11200000000000000000000000000000000000000000000.0
12500000000000000000000000000000000000000000000.0
14000000000000000000000000000000000000000000000.0
16000000000000000000000000000000000000000000000.0
18000000000000000000000000000000000000000000000.0
20000000000000000000000000000000000000000000000.0
22400000000000000000000000000000000000000000000.0
25000000000000000000000000000000000000000000000.0
28000000000000000000000000000000000000000000000.0
32000000000000000000000000000000000000000000000.0
36000000000000000000000000000000000000000000000.0
40000000000000000000000000000000000000000000000.0
45000000000000000000000000000000000000000000000.0
50000000000000000000000000000000000000000000000.0
56000000000000000000000000000000000000000000000.0
63000000000000000000000000000000000000000000000.0
71000000000000000000000000000000000000000000000.0
80000000000000000000000000000000000000000000000.0
90000000000000000000000000000000000000000000000.0
100000000000000000000000000000000000000000000000.0
112000000000000000000000000000000000000000000000.0
125000000000000000000000000000000000000000000000.0
140000000000000000000000000000000000000000000000.0
160000000000000000000000000000000000000000000000.0
180000000000000000000000000000000000000000000000.0
200000000000000000000000000000000000000000000000.0
224000000000000000000000000000000000000000000000.0
250000000000000000000000000000000000000000000000.0
280000000000000000000000000000000000000000000000.0
320000000000000000000000000000000000000000000000.0
360000000000000000000000000000000000000000000000.0
400000000000000000000000000000000000000000000000.0
450000000000000000000000000000000000000000000000.0
500000000000000000000000000000000000000000000000.0
560000000000000000000000000000000000000000000000.0
630000000000000000000000000000000000000000000000.0
710000000000000000000000000000000000000000000000.0
800000000000000000000000000000000000000000000000.0
900000000000000000000000000000000000000000000000.0
1000000000000000000000000000000000000000000000000.0
1120000000000000000000000000000000000000000000000.0
1250000000000000000000000000000000000000000000000.0
1400000000000000000000000000000000000000000000000.0
1600000000000000000000000000000000000000000000000.0
1800000000000000000000000000000000000000000000000.0
2000000000000000000000000000000000000000000000000.0
2240000000000000000000000000000000000000000000000.0
2500000000000000000000000000000000000000000000000.0
2800000000000000000000000000000000000000000000000.0
3200000000000000000000000000000000000000000000000.0
3600000000000000000000000000000000000000000000000.0
4000000000000000000000000000000000000000000000000.0
4500000000000000000000000000000000000000000000000.0
5000000000000000000000000000000000000000000000000.0
5600000000000000000000000000000000000000000000000.0
6300000000000000000000000000000000000000000000000.0
7100000000000000000000000000000000000000000000000.0
8000000000000000000000000000000000000000000000000.0
9000000000000000000000000000000000000000000000000.0
10000000000000000000000000000000000000000000000000.0
11200000000000000000000000000000000000000000000000.0
12500000000000000000000000000000000000000000000000.0
14000000000000000000000000000000000000000000000000.0
16000000000000000000000000000000000000000000000000.0
18000000000000000000000000000000000000000000000000.0
20000000000000000000000000000000000000000000000000.0
22400000000000000000000000000000000000000000000000.0
25000000000000000000000000000000000000000000000000.0
28000000000000000000000000000000000000000000000000.0
32000000000000000000000000000000000000000000000000.0
36000000000000000000000000000000000000000000000000.0
40000000000000000000000000000000000000000000000000.0
45000000000000000000000000000000000000000000000000.0
50000000000000000000000000000000000000000000000000.0
56000000000000000000000000000000000000000000000000.0
63000000000000000000000000000000000000000000000000.0
71000000000000000000000000000000000000000000000000.0
80000000000000000000000000000000000000000000000000.0
90000000000000000000000000000000000000000000000000.0
100000000000000000000000000000000000000000000000000.0
112000000000000000000000000000000000000000000000000.0
125000000000000000000000000000000000000000000000000.0
140000000000000000000000000000000000000000000000000.0
160000000000000000000000000000000000000000000000000.0
180000000000000000000000000000000000000000000000000.0
200000000000000000000000000000000000000000000000000.0
224000000000000000000000000000000000000000000000000.0
250000000000000000000000000000000000000000000000000.0
280000000000000000000000000000000000000000000000000.0
320000000000000000000000000000000000000000000000000.0
360000000000000000000000000000000000000000000000000.0
400000000000000000000000000000000000000000000000000.0
450000000000000000000000000000000000000000000000000.0
500000000000000000000000000000000000000000000000000.0
560000000000000000000000000000000000000000000000000.0
630000000000000000000000000000000000000000000000000.0
710000000000000000000000000000000000000000000000000.0
800000000000000000000000000000000000000000000000000.0
900000000000000000000000000000000000000000000000000.0
1000000000000000000000000000000000000000000000000000.0
1120000000000000000000000000000000000000000000000000.0
1250000000000000000000000000000000000000000000000000.0
1400000000000000000000000000000000000000000000000000.0
1600000000000000000000000000000000000000000000000000.0
1800000000000000000000000000000000000000000000000000.0
2000000000000000000000000000000000000000000000000000.0
2240000000000000000000000000000000000000000000000000.0
2500000000000000000000000000000000000000000000000000.0
2800000000000000000000000000000000000000000000000000.0
3200000000000000000000000000000000000000000000000000.0
3600000000000000000000000000000000000000000000000000.0
4000000000000000000000000000000000000000000000000000.0
4500000000000000000000000000000000000000000000000000.0
5000000000000000000000000000000000000000000000000000.0
5600000000000000000000000000000000000000000000000000.0
6300000000000000000000000000000000000000000000000000.0
7100000000000000000000000000000000000000000000000000.0
8000000000000000000000000000000000000000000000000000.0
9000000000000000000000000000000000000000000000000000.0
10000000000000000000000000000000000000000000000000000.0
11200000000000000000000000000000000000000000000000000.0
12500000000000000000000000000000000000000000000000000.0
14000000000000000000000000000000000000000000000000000.0
16000000000000000000000000000000000000000000000000000.0
18000000000000000000000000000000000000000000000000000.0
20000000000000000000000000000000000000000000000000000.0
22400000000000000000000000000000000000000000000000000.0
25000000000000000000000000000000000000000000000000000.0
28000000000000000000000000000000000000000000000000000.0
32000000000000000000000000000000000000000000000000000.0
36000000000000000000000000000000000000000000000000000.0
40000000000000000000000000000000000000000000000000000.0
45000000000000000000000000000000000000000000000000000.0
50000000000000000000000000000000000000000000000000000.0
56000000000000000000000000000000000000000000000000000.0
63000000000000000000000000000000000000000000000000000.0
71000000000000000000000000000000000000000000000000000.0
80000000000000000000000000000000000000000000000000000.0
90000000000000000000000000000000000000000000000000000.0
100000000000000000000000000000000000000000000000000000.0
112000000000000000000000000000000000000000000000000000.0
125000000000000000000000000000000000000000000000000000.0
140000000000000000000000000000000000000000000000000000.0
160000000000000000000000000000000000000000000000000000.0
180000000000000000000000000000000000000000000000000000.0
200000000000000000000000000000000000000000000000000000.0
224000000000000000000000000000000000000000000000000000.0
250000000000000000000000000000000000000000000000000000.0
280000000000000000000000000000000000000000000000000000.0
320000000000000000000000000000000000000000000000000000.0
360000000000000000000000000000000000000000000000000000.0
400000000000000000000000000000000000000000000000000000.0
450000000000000000000000000000000000000000000000000000.0
500000000000000000000000000000000000000000000000000000.0
560000000000000000000000000000000000000000000000000000.0
630000000000000000000000000000000000000000000000000000.0
710000000000000000000000000000000000000000000000000000.0
800000000000000000000000000000000000000000000000000000.0
900000000000000000000000000000000000000000000000000000.0
1000000000000000000000000000000000000000000000000000000.0
1120000000000000000000000000000000000000000000000000000.0
1250000000000000000000000000000000000000000000000000000.0
1400000000000000000000000000000000000000000000000000000.0
1600000000000000000000000000000000000000000000000000000.0
1800000000000000000000000000000000000000000000000000000.0
2000000000000000000000000000000000000000000000000000000.0
2240000000000000000000000000000000000000000000000000000.0
2500000000000000000000000000000000000000000000000000000.0
2800000000000000000000000000000000000000000000000000000.0
3200000000000000000000000000000000000000000000000000000.0
3600000000000000000000000000000000000000000000000000000.0
4000000000000000000000000000000000000000000000000000000.0
4500000000000000000000000000000000000000000000000000000.0
5000000000000000000000000000000000000000000000000000000.0
5600000000000000000000000000000000000000000000000000000.0
6300000000000000000000000000000000000000000000000000000.0
7100000000000000000000000000000000000000000000000000000.0
8000000000000000000000000000000000000000000000000000000.0
9000000000000000000000000000000000000000000000000000000.0
10000000000000000000000000000000000000000000000000000000.0
11200000000000000000000000000000000000000000000000000000.0
12500000000000000000000000000000000000000000000000000000.0
14000000000000000000000000000000000000000000000000000000.0
16000000000000000000000000000000000000000000000000000000.0
18000000000000000000000000000000000000000000000000000000.0
20000000000000000000000000000000000000000000000000000000.0
22400000000000000000000000000000000000000000000000000000.0
25000000000000000000000000000000000000000000000000000000.0
28000000000000000000000000000000000000000000000000000000.0
32000000000000000000000000000000000000000000000000000000.0
36000000000000000000000000000000000000000000000000000000.0
40000000000000000000000000000000000000000000000000000000.0
45000000000000000000000000000000000000000000000000000000.0
50000000000000000000000000000000000000000000000000000000.0
56000000000000000000000000000000000000000000000000000000.0
63000000000000000000000000000000000000000000000000000000.0
71000000000000000000000000000000000000000000000000000000.0
80000000000000000000000000000000000000000000000000000000.0
90000000000000000000000000000000000000000000000000000000.0
100000000000000000000000000000000000000000000000000000000.0
112000000000000000000000000000000000000000000000000000000.0
125000000000000000000000000000000000000000000000000000000.0
140000000000000000000000000000000000000000000000000000000.0
160000000000000000000000000000000000000000000000000000000.0
180000000000000000000000000000000000000000000000000000000.0
200000000000000000000000000000000000000000000000000000000.0
224000000000000000000000000000000000000000000000000000000.0
250000000000000000000000000000000000000000000000000000000.0
280000000000000000000000000000000000000000000000000000000.0
320000000000000000000000000000000000000000000000000000000.0
360000000000000000000000000000000000000000000000000000000.0
400000000000000000000000000000000000000000000000000000000.0
450000000000000000000000000000000000000000000000000000000.0
500000000000000000000000000000000000000000000000000000000.0
560000000000000000000000000000000000000000000000000000000.0
630000000000000000000000000000000000000000000000000000000.0
710000000000000000000000000000000000000000000000000000000.0
800000000000000000000000000000000000000000000000000000000.0
900000000000000000000000000000000000000000000000000000000.0
1000000000000000000000000000000000000000000000000000000000.0
1120000000000000000000000000000000000000000000000000000000.0
1250000000000000000000000000000000000000000000000000000000.0
1400000000000000000000000000000000000000000000000000000000.0
1600000000000000000000000000000000000000000000000000000000.0
1800000000000000000000000000000000000000000000000000000000.0
2000000000000000000000000000000000000000000000000000000000.0
2240000000000000000000000000000000000000000000000000000000.0
2500000000000000000000000000000000000000000000000000000000.0
2800000000000000000000000000000000000000000000000000000000.0
3200000000000000000000000000000000000000000000000000000000.0
3600000000000000000000000000000000000000000000000000000000.0
4000000000000000000000000000000000000000000000000000000000.0
4500000000000000000000000000000000000000000000000000000000.0
5000000000000000000000000000000000000000000000000000000000.0
5600000000000000000000000000000000000000000000000000000000.0
6300000000000000000000000000000000000000000000000000000000.0
7100000000000000000000000000000000000000000000000000000000.0
8000000000000000000000000000000000000000000000000000000000.0
9000000000000000000000000000000000000000000000000000000000.0
10000000000000000000000000000000000000000000000000000000000.0
11200000000000000000000000000000000000000000000000000000000.0
12500000000000000000000000000000000000000000000000000000000.0
14000000000000000000000000000000000000000000000000000000000.0
16000000000000000000000000000000000000000000000000000000000.0
18000000000000000000000000000000000000000000000000000000000.0
20000000000000000000000000000000000000000000000000000000000.0
22400000000000000000000000000000000000000000000000000000000.0
25000000000000000000000000000000000000000000000000000000000.0
28000000000000000000000000000000000000000000000000000000000.0
32000000000000000000000000000000000000000000000000000000000.0
36000000000000000000000000000000000000000000000000000000000.0
40000000000000000000000000000000000000000000000000000000000.0
45000000000000000000000000000000000000000000000000000000000.0
50000000000000000000000000000000000000000000000000000000000.0
56000000000000000000000000000000000000000000000000000000000.0
63000000000000000000000000000000000000000000000000000000000.0
71000000000000000000000000000000000000000000000000000000000.0
80000000000000000000000000000000000000000000000000000000000.0
90000000000000000000000000000000000000000000000000000000000.0
100000000000000000000000000000000000000000000000000000000000.0
112000000000000000000000000000000000000000000000000000000000.0
125000000000000000000000000000000000000000000000000000000000.0
140000000000000000000000000000000000000000000000000000000000.0
160000000000000000000000000000000000000000000000000000000000.0
180000000000000000000000000000000000000000000000000000000000.0
200000000000000000000000000000000000000000000000000000000000.0
224000000000000000000000000000000000000000000000000000000000.0
250000000000000000000000000000000000000000000000000000000000.

individual remaining free slots can achieve considerable degree.

For the development of residual adhesive arachnoidites is exclusively great the value of the submeningeal hemorrhage, which attacks directly following the wound. In initial or early period it is characterized by the rapidly passing jack symptoms of the extended crust damage/defeat. After the healing of wound with encephalography is detected adhesive intermeningeal process with unchecked development and impoverishment of some subarachnoid spaces and certain expansion of others.

From submeningeal hemorrhage in the very region of the damage/defeat of brain should be differed the phenomena, caused by crust-tunicary edema in the periphery of damage/defeat. This difference consists in the build-up/growth of focus symptoms during the first days after wound and in considerable oscillations/vibrations in the intensity of the advanced phenomena. With encephalography after healing it is detected that in the zones of reactive crust-tunicary edema the phenomena of adhesive arachnoiditis are less expressed, than after hemorrhage. During the development of restricted arachnoiditis occurs the expansion of lateral ventricle on the side of damage/defeat and unchecked development of the subarachnoid spaces. It is expanded, but is considerably weaker, and the ventricle of opposite side, and also the

third ventricle and sylvian aqueduct. In this case is retained the asymmetry of the large expansion of ventricle primarily of the damaged hemisphere. The more extensive was developed the intermeningeal adhesive process, the sharper becomes apparent subsequently the general/common/total expansion of the gastral system. The neurologic manifestation of the process of expanding the ventricles, as a rule, very unspecifically and even unnoticeably, if we do not consider the frequent epileptic fits, jack or generalized. In many instances even of the extensive damages/defeats of brain it is not observed the expressed phenomena of local hydrocephalia. Considerably more frequent in this case are detected the phenomena of bilateral sharp internal hydrocephalia with the appropriate expansion of all ventricles as the consequence of the violation of the resorbing function. Leading become no longer cicatrical processes, but, as shows roentgenological picture, disorders of circulation and the atrophic changes in the brain, which have basic effect on further development of process.

In connection with adhesive arachnoiditis, as a result of submeningeal hemorrhage, can be observed hypersecretory dropsy of ventricles - secondary atrophic external hydrocepalia.

Besides adhesive arachnoiditis on arch/summary, the attention must be drawn also to basal productive arachnoiditis, which is

encountered with the penetrating wounds of brain. Among them high value they can have optochiasmic arachnoiditis, arachnoiditis in the average/mean or posterior cranial pit. Their clinical picture corresponds to local local syndromes.

Special features/peculiarities of the course of Rubtsovs and adhesive processes in the period of the distant consequences after the wound of brain. In the period of the distant consequences with encephalography are detected further changes in brain.

Page 493.

On one hand, this concerns the system of ventricles, which in the significant part of the cases has a tendency toward the growing expansion with the retention/preservation/maintaining of previous cicatrical asymmetry of volume and position/situation. Expansion ratio depends on the vastness of adhesive arachnoiditis. Especially arranges/locates to the expansion of ventricles continuous adhesive process in the regions of arch/summary, which adjoin the large longitudinal cerebral slot; in these cases the disorder of the absorption of cerebral fluid/liquid proves to be most strong.

On the other hand, are detected the gradually connected and growing changes in subarachnoid spaces of hemispheres and,

consequently, also in cerebral cortex. Since signs/criteria of increase not no intracranial pressure there is, it is clinically appropriate to speak about the atrcphy of cerebral tissue. In a number of cases are formed and progress the gross cyst-like and mutually communicated expansions of subarachnoid spaces in the region of a tunicary-cerebral scar - the zone of the greatest cicatrical contraction. This fact testifies about the progressive atrophy of cerebral tissue in the zcne of the inlet of the healed cerebral wound.

The described processes are clinically little noticeable, which is generally characteristic for the majority cf the progressive residual conditions.

The growing expansicn of cerebral ventricles and subarachnoid spaces is most clear detected with the methods of experimental psychology, since it is expressed in the form of intellectual and emotional depression. The representation of the processes indicated frequently can be found also in the features epileptic fits. Atrophic processes in the cortex, which adjcins the scar, lead to the formation of liquor accumulations in the expanding subarachnoid spaces and the disorder liquor flow from these areas. The gradually connected focus fits and their seriality are the clinical expression of the processes indicated.

In the dynamics of the distant consequences of cerebral wounds attention is drawn to the form of intra-cerebral healing, with which in the region of cerebral decomposition on the course of wound canal is formed the area, which contains cerebrospinal fluid. Such cyst-like areas are inclined to further expansion, moreover an increase in their volume is not escorted/tracked by a somewhat noticeable increase of the residual symptoms of the former damage/defeat. An increase in the areas is escorted/tracked by the soft drawing back of conductor elements/cells and by the retention/preservation/maintaining the structure of hemisphere.

Decisive importance here has, apparently violation of water metabolism/exchange in brain. This violation is not the consequence of the disorders of resorption and outflow of craniocerebral fluid/liquid. Intracranial pressure remains normal and its increase is observed only in the form of individual short-term attacks/seizures/paroxysms. Water metabolism/exchange is especially disrupted in the sectors of the greatest tissue and hemodynamic shifts/shears in cerebral substance, with the secondary accumulation of fluid/liquid in the subarachnoid spaces. It is necessary to also allow the role of the disorder of liquor formation. In a number of cases post-traumatic hydrocephalic consequences are stable; this is

determined encephalographically. Subsequently such processes can flow/occur/last completely favorably; is logical therefore to propose the restoration/reduction of more normal liquid-tissue relations in cerebral tissue and in liquor-containing system.

Page 494.

There is a group of the penetrating wounds where in the period of the distant consequences the jack symptoms of cerebral damage/defeat are combined with considerable internal general/common/total hydrocephalia, inclined to growth. On the processes of tunicary-cerebral cicatrization and cortical atrophy sharply predominates the picture of the expansion of ventricular system. Similarly flow/occur/last the wounds, which are escorted/tracked by submeningeal hemorrhages, which were considerably extended on both hemispheres with the subsequent spilled adhesive arachnoiditis on arch/summary. Discussion deals usually with the multiple damages/defeats of brain by small/fine metallic fragments. To jack symptoms - the type of microsymptoms - are superimposed overall phenomena. Epileptic attacks/seizures/paroxysms bear the generalized character/nature.

Psychopathological and experimental-psychological methods of research establish the picture of the spilled process.

This category of patients requires observation during the increase of symptoms, use/application of dehydration measures and cerebrospinal ones after piercing; unconditionally good result gives mercusal. The X-ray therapy, directed toward the limitation of liquor formation, in a number of cases also gives a good effect.

In a known number of penetrating wounds of skull the period of the distant consequences flows/occurs/lasts without further progression of degenerative-atrophic process in cerebral tissue. The circulation of cerebrospinal fluid also can remain undisturbed. Hardly ever are formed cyst-like areas according to Rubtsovs to courses in brain and in the sectors, which undergo degenerate changes. The cases of more favorable course are observed with the less deep and more restricted tunicary-cortical and cortical-subcortical wounds, on which are escorted/tracked by considerable submeningeal hemorrhages. The full value of primary process/operation or deferred intervention, the timely and wide application of the antibiotics which predetermine the favorable course of the process of healing, can be decisive.

Cicatrical painful syndromes of solid cerebral shell. Among the clinical forms, connected with Rubtsovs with processes after the

wounds of skull and brain, must be isolated the painful syndromes of solid cerebral shell. Observations of these wounded the head brain during war showed that these wounds are sufficiently frequently escorted/tracked by the expressed pains, reason which it is pachymeningitis. The basic condition for their development is the disposition of process in the specific sectors of solid cerebral shell. The distinctive special feature/peculiarity of pachymeningeal pains consists in their regionality and sometimes in irradiation.

During wounds and Rubtsovs's lifetime the processes, directly involving the region of the external curvature of the territory or the region of its connection with large crescent-shaped extension, is observed Burdenko-Cramer's territorial painful syndrome: pain in eyes with photalgia, sometimes - with the recoil of pains into occiput, forehead, whisky. This syndrome most of rosary during the cicatrization of the arranged/located on the territory fragments and foreign bodies. Distance/separation of foreign bodies lowers also territorial pains.

In the region of the solid cerebral shell of arch/summary is most clear secreted the painful pachymeningeal syndrome of center sagittal line, by the called rough cicatrization of dura mater in its parasagittal sections, in the region of large longitudinal sinus and in the large curvature crescent-shaped extension. With considerable

bone defects in this region there can be sharp oscillations/vibrations in tension of the tissue, which closes defect in skull, depending on a change in the position/situation of head and body.

Page 495.

This is combined with considerable, and sometimes also with very agonizing pains. The indicated forms very frequently arise as a result of cicatrizatior and complete neglect cf subtunical spaces in the region of defect and in the neighborhood with it. Is formed partial arachnoidal unit/block along the center line of arch/summary in the zone of bone defect and in the region of a tunicary-cerebral cicatrization, even more impeding the circulation of cerebrospinal fluid.

Pachymeningeal pains have certain connection/communication with periosteal-tunicary symptoms. Here are related the pains on the edges of defect, independent and with scanning, the amplifying with retraction and protrusion of skin and scar tissue, that cover defect.

Periosteal pains bear most frequently local character/nature. With them sometimes is noted certain swelling of tissue and bloating of skin vessels at the edges of the defect; there can be hyperesthesia of skin.

Strictly pachymeningeal pains depend on the abundance of nerve fibers in the sagittal departments of the solid cerebral shell of arch/summary, including the walls of longitudinal sinus and the large curvature crescent-shaped extension. Anatomical conditions predetermine considerable differences in the sensitivity of the frontal, sincipital and sincipital-postcranial sectors of the sagittal department of the solid cerebral shell of arch/summary. Is most great and distinct the manifestation of sagittal pachymeningeal painful syndrome, if it is caused from the average/mean sincipital departments of arch/summary and especially from its sincipital-postcranial or postcranial departments. During the disposition of defect and its pachymeningeal cicatrization in the postcranial unit of the center line of pain they acquire certain tentorial character/nature, being escorted/tracked by pains in eyes and photalgia.

The large falciform extension of solid cerebral shell also can be the place of origin of Rubtsovs of pains, moreover most frequently when cicatrical processes are localized in the region of its upper curvature or in the postcranial sectors of large crescent-shaped extension.

Cicatrical pachymeningeal pains from those departments of the solid cerebral shell of arch/summary which cover/coat large

hemispheres, in the specific number of cases are almost the only clinical sign/criterion of Rubtsova of the phases of local damage/defeat. In the period of the distant consequences of pain from solid cerebral shell in the region of arch/summary they testify about the violations, called by cicatrization in the region of a bone-periosteal-tunicary complex in defect.

Sometimes the reason for persistent pachymeningeal headaches are the fragments and the scars, which directly affect the solid cerebral shell, which covers large hemispheres. This is observed in the cases where the bone defect was low or even it remained unnoticed. Despite the fact that certain number of wounded with similar damages did not undergo sufficient surgical processing, the healing of this bone or bone-tunicary wound flowed/occurred/lasted without considerable festering. The headaches, which develop after such damages/defeats, are not escorted/tracked by the characteristic pachymeningeal irradiation; however during neurologic research sometimes it is possible to reveal/detect the series/row of the signs/criteria, which speak for pachymeningeal nature of pains.

Page 496.

Photalgia or pains in eyes during the movements of body, local percutorial sickliness, phenomenon of adhesive arachnoiditis in the

zone of the available damage/defeat (with encephalogram) - all this serves as reading to the operational distance/separation of the metallic fragment, located near solid cerebral shell. The data, adjusted on process/operation, as a rule, confirm the diagnosis of the pachymeningeal nature of pains. The effect of process/operation becomes apparent rapid- head pains pass. During the disposition of bone defect and dural-periosteal wounds and scars in upper-lateral sectors of frontal and frontoparietal of region pachymeningeal pains are more frequently weak and constants. This is related both to the local pains in the region of defect and to the pains, which give into frontal region. If cicatrical process proceeds on lateral surface not far off from sagittal line in sincipital and sincipital-occipital region, pachymeningeal pains can be considerable. Pains in the region of a bone-tunicary damage/defeat are combined in such cases with the pains, which give into forehead, supercilium, eye, sometimes into temple. Pains can be bilateral, especially in eyes.

The considerable anatomical regions of the solid cerebral shell of arch/summary, which occupy its average/mean lateral departments, do not give sufficiently outlined scars of pachymeningeal pains. This will agree also with the anatomical-physiolcgical data, which attest to the fact that the considerable sectors of cerebral shell in the region of arch/summary seem deprived of nerve filaments.

The pachymeningeal cicatrical painful ccmplex of average/mean cranial pit sometimes is developed after the basal wounds of temporal region. Trigeminal pains it can in this case not be. Pains from the solid cerebral shell of the average/mean cranial fossa are spread to postcranial and postcranial-temporal region, are concentrated in the basal unit of the temple with the advent of morbid perceptions in ear, they can be escorted/tracked by recoil into forehead. From the average/mean cranial fossa can proceed very severe pachymeningeal pains and besides with considerable tendency toward irradiation to other side and into the zones of the solid cerebral shell of the region of arch/summary.

The illumination of a question about the nature of the painful syndromes of solid cerebral tunica, i.e., explanation of their somatic or sympathetic manifestation, has high value for clinicians. Tentorial painful syndrcme is somatic, conducted through the trigeminal nerve (circular nerve of its first branch). This is confirmed also in practice. For the bilateral tractotomy of trigeminal nerves in one of the cases it was possible quickly and completely to end pains.

The pachymeningeal painful syndrome, called from solid cerebral shell, into basic-sympathetic, conducted periadventitially with the branches of average/mean tunicary artery.

The preventive carving of cerebral scar in the period of the late complications of the injury of brain is in the overwhelming majority of the cases the measure for warning/prevention of inflammatory complications in scar and the substance of the cessation of chronic jet inflammatory relapsing/recidivism/recidivist/recidivity fistulas in scar, which impede its final healing.

Another reading to the preventive carving of scar with the healed wound are the persistent headaches with nausea and vertigoes, which are sometimes escorted/tracked by subfebrile temperature, changes in the blood and cerebrospinal fluid, even by certain hyperemia of eyeground, without the clinical picture of the abscess of brain. On process/operation in the similar cases find the ripening micro-abscesses, and the sometimes even sufficiently large/coarse ulcers, which develop hidden.

Page 497.

In certain cases during the microscopic examination of the removed scar tissue were discovered the pictures, characteristic for festering the scar. During x-ray examination in such cases frequently

are detected the signs/criteria, inherent in the defective processed wound. In the defined number of cases clinical symptoms, course, process/operation and data of the microscopic examination of the removed scar tissue correspond to the picture of chronic inflammatory process in cerebral scar as the protracted phase of its organization and formation, but also under these conditions the possibility of educating of abscess or festering of scar cannot be excluded subsequently.

The carving of cerebral scar from strictly therapeutic readings in the period of the distant consequences of the wound of skull is conducted first of all apropos of traumatic cicatrical epilepsy. As the reading to cooperation serve also headaches both in the region of bone defect and of the irradiating or general/common/total, bearing the features of pachymeningeal, from the zone of bone defect.

During war was raised a question that, in contrast to the preventive/warning carving of a tunicary-cerebral scar, as a result of the possible development in it of pyoinflammatory process, would be conducted also the carving of rough traumatic cerebral scar (in essence collagenic) for the preservation of wounded from development subsequently of focus cicatrical epilepsy. Cicatrization after cerebral wound and scar after cerebral process/operation far are not identical and can become apparent differently: neurologic, surgical,

pneumo-graphically, morphologically and pathophysiologically. The new scar, which was being formed after the successful radical carving of traumatic scar, especially when wound process passed with complication, will be different - more thin and tender, than that removed. Cerebral wound after the distance/separation of neoplasm also heals by scar; however, the latter rarely causes epilepsy.

Cysts of brain (intracerebral).

The traumatic intracerebral cysts of brain, which appear with the penetrating wounds, are enccuntered sufficiently rarely - into 0.5o/o, and according to different authors they comprise from 0.5 to 2.5o/o.

Traumatic cysts on their origin are either retentional (this concerns mainly extracerebral forms), or ramolitional (intracerebral cysts).

Frequently the same pathological forms are named first cysts, then porencephalias; it is possible that it would be expedient to maintain the term porencephalia only for the forms, which are the defect of the development of brain, but all remaining forms/species of the pathological areas of brain (innate/inherent, traumatic, tumorous, parasitic, retentional or ramolitional) to name cysts.

The classification of intracerebral cysts is represented in the following form: 1) the intracerebral cysts, which are not communicated with the ventricles: sub-cortical and periventricular (or paraventricular); 2) the intracerebral cysts, which are communicated with the ventricles; 3) intra-ventricular (" truly" intra-ventricular cysts); 4) the combined, i.e., sub-arachnoidal and intra-cerebral cysts: not communicating with ventricles and communicating with ventricles (the so-called total) (Fig. 186).

Page 498.

By term "intra-ventricular" cyst are described such forms/species of the cysts which have communication/report with the system of ventricles. From this category must be excluded those varieties/subspecies of changes in the configuration of the ventricles which are created as a result of rough cicatricial pulling of the wall of ventricle to the scar of bone defect, asymmetry, deformation of ventricles. With large right/law could be called intra-ventricular those cysts, which are the result of softening brain with the closed injury (contusion) or after encephalitis with that penetrating of wound and which, being arranged/located near the system of ventricles, are communicated with it.

However, also these cysts intra-ventricular it is not possible to name/call - this of the cysts, which are communicated with ventricles.

Strictly speaking, the as truly intra-ventricular cysts can be considered only those areas, which are formed in the "amputated" unit of the ventricle with transventricular wounds of the latter, when the forming scar fills the lumen of the damaged ventricle and delimits thus cyst-like formation.

From a pathoanatomical point of view basic are the round or oval areas, usually considerable spread which appear after crushing or hemorrhage with contusion or after encephalytic softening with wounds.

However, it is impossible to characterize otherwise as cysts, and those variety/subspecies of the "granulomas of foreign body", when capsule, comprised by massive multilayer fibrous stratification, does not cover foreign body directly, but includes known amount of liquid. The relationship of this variety/subspecies of granulomas with ordinary intracerebral cysts is proven by the fact that the latter just as rarely do not include foreign bodies. However, cystic

are those "tunnel" and "slit-shaped" education for frequency of which focuses attention a number of the authors. They can appear on the spot of the which associate the injury "zones of molecular jolts", the represented in the form slots, sometimes linear, with numerous small/fine hemorrhages. The source of such "tunnel" cysts can be, apparently also narrow sectors of encephalytic changes, which go at angle from the cicatrizing wound canal towards lateral ventricle, from periphery to center.

One should also recall about the possibility of formation and "poriferous scar", saturated by a considerable quantity of smaller and larger size/dimension of cysts.

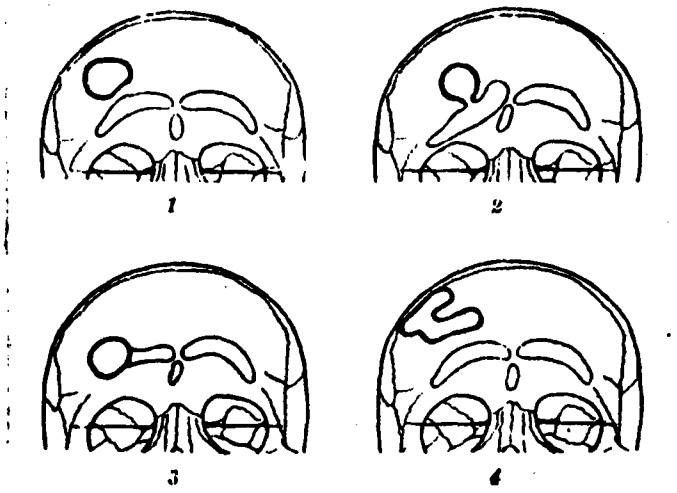


Fig. 186. Different forms/species of intracerebral cysts.

Page 499.

Of all varieties/subspecies of cysts basic practical value for clinician have ramolitional cysts, which appear after the clcsed injury (contusion) or the penetrating wound (crushing, encephalitis) and which achieve the specific sizes/dimensions. On these ramolitional cysts which have most explicit clinical form, and will go speech subsequently.

In the genesis of the education of traumatic cysts much is still unclear. The explanations of their origin by shaping of areas by massive by volume softening are clearly insufficient. It is known

that and the low foci of necrosis can conclude with cyst formation and that the massive defects are replaced sometimes by scar. Is widely-known the value of the age: than is less mature/ripe cerebral tissue, the more frequent the substitution of defect occurs according to the type of cyst formation, but not cicatrization. According to data some authors, in the genesis of cavitation has a value not only directly as a result of injury crushing, but also additional vascular disorders, which appear with the specific individual characteristics of organism.

Consequently, the character/nature of the process, which replaces defect (education of scar, areas), is defined, apparently by the combination of the series/row of the reasons both for external and internal order/formation, moreover one should add and this very important factor as the general condition of wounded, resistivity and jet capability of organism, to a considerable extent being determining the reaction of cerebral tissue to damage.

As is known, the substitution of defect always occurs during the cooperation of two tissue systems - glial and mesodermal, with considerable participation in the process of vascular net/system.

The education of scar or cyst is determined as the final result by relationship/ratio in the reduction process it is calm two

systems. The phase on which stops the process, it leads to the education either of the subtending collagenic scar or argentophilic fibrousness, which creates "supporting framework/body" for the area of cyst.

The descriptions of the pathoanatomical picture of the traumatic cysts of brain are sufficiently diverse. So, some authors assert that the area of cyst, filled with serous fluid, can be surrounded by "normal cerebral tissue". Others tell about continuous fibrous capsule. Are described heterogeneous structures by one and the same of the capsules, which correspond to different stages of reparational processes - from initial stages with living another reaction to the almost completed stable conditions. The contradiction of descriptions is to a considerable extent caused, apparently by the fact that they correspond to different phases of the development of process.

On the silent infection in the cysts of brain speaks a number of the authors. Frequently are noted the coexistence of cyst and abscess, festering cyst, "sanitation" of abscess in the form of its conversion into cyst, etc.

The presence of latent infection and its aggravation determine the pathoanatomical picture of cyst. The fluid/liquid, which fulfills cyst, can be transparent/hyaline or turbid, serous (achromatic,

xanthochromic yellow, or brown) or blood-containing. Depending on the communication/report of cyst with ventricles or sub-arachnoidal space, liquid contents of cyst can be identical in composition of cerebrospinal fluid, contain much protein without pleocytosis, the increased quantity of regular/prescribed elements/cells, up to neutrophiles (upon transfer into festering) finally it can be sterile or contain bacterial flora.

The great variety of structures is observed in the walls of the cysts, which appear after the penetrating wounds where it is developed, as a rule, picture of encephalitis with the characteristic to it disorders of blood and liquor circulation.

Page 500.

Characteristic in these cases is the heterogeneity of building/structure of the wall of cyst and the presence simultaneously of different stages of reparative process with predominance first of argyrophilic fibrousness, then collagenization. Process is frequently escorted/tracked by inflammatory phenomena with the formation of purulent fistulas. By this, apparently to known degree is explained the presence of numerous hemorrhages and softenings in the surrounding departments of brain (encephalitis). In later period, after the complete healing of wound and during the

calmed down inflammatory process, can advance the formation of dense uniform capsule.

However, located in area cysts or walls its foreign bodies, bone and metallic fragments can give new aggravations and contribute to march/passage into abscess (festering cyst).

Macroscopically on the internal wall of the area of traumatic cysts frequently are determined the sectors of rusty or yellow - result of the former hemorrhages (Fig. 187).

On micro-preparations in these sectors is established/installed the presence of the cellular elements/cells, loaded with the small lumps of hemosiderin, stained azure color.

In supplementary section/cut of the same preparation whose figure was already given, visible the well expressed cicatrical growths, going from soft cerebral shells and consisting of the thin, whitish, branching zones of the irregular form which pass through the sector of rusty color.

It is virtually important that the cysts fairly often prove to be set.

The clinical picture of intracerebral cysts after the penetrating wounds can be developed according to the type of tumoral process (increase in intracranial pressure, appearance or redoubling of the occurring after the wound local symptoms without the signs/criteria of inflammatory process, i.e., without abrupt changes in the temperature, picture of the blood, cerebro-spinal fluid, etc.). In the majority of the cases in such patients of wound they were well and in proper time processed, fragments in cerebral substance it was not discovered. These sufficiently rare forms of complications appear usually within late periods after wound, with the long ago cicatrizing wound and the dense scar of bone defect.

However, cysts after the penetrating wounds in contrast to the cysts, which appear after the closed injuries, much more frequently flow/occur/last over the type of abscess, with them it is necessary to usually differentiate. In origin of both complications primary meaning have vastness of initial crushing and the depth of damage/defeat, the absence or the low-grade processing of wound, complication in the early period of its course and the presence of unremoved/uneliminated foreign bodies (especially bone fragments).

Just as abscess, intracerebral cyst are developed most frequently in the period of the delimitation of infectious focus and late period, most frequently to 5 - 6th month after wound. The

observing rarely cysts of early period, which are formed usually and early abscesses, in basis or depth of cerebral prolapse in the presence of purulent necrotic of wound, from abscess actually are not differed. Both that and other process can be the consequence not only crushing, but also encephalitis, which complicates the course of cerebral wound. There is a series/row of transitional forms in the form of the infected cyst (the "silent" infection), which gives sometimes festering and abscess; is possible reverse/inverse - "sanitation" of abscess, its conversion into cyst, especially after emptying or as a result of applying of sulfanilamides and antibiotics. Finally, limber cyst and abscess are observed simultaneously.

Page 500a.

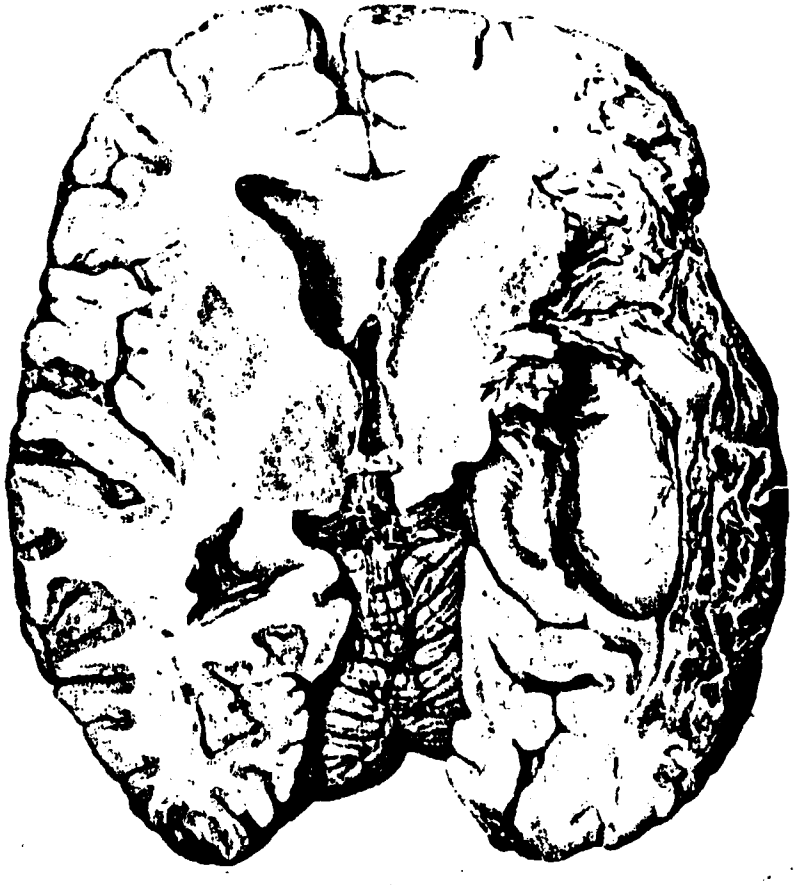


Fig. 187. Cysts of brain. (Artist T. V. Belyayev).

Page 501.

It becones clear, why differential diagncsis sonetines is extremely difficult, and sonetines and it is inpossible. Virtually cyst most frequently they accept as abscess and frequently detect

only with test puncture or process/operation.

So, according to A. I. Gazovaya's data, of 12 patients, who had cysts after the penetrating wounds, 7 patients were operated under the diagnosis of the abscess of brain.

Not always the appearance of disorders, which signal about the presence of cyst, designates the beginning of its development. Cyst can exist long ago, and its clinical manifestation in the form of onset or development of focus symptoms and increased intracranial pressure can retard. This fact depends on the reanimation of latent infection, on changes in the conditions for the communication/report of cyst with liquor space or intertissue fluids/liquids. The aforesaid is confirmed by observations on the process/operation when the cyst, it would seem, which recently develcped, proves to be locked in the dense, long age formed fibrous capsule.

By this time bone defect usually is already closed with connective scar, sometimes with fistulas.

One of the basic and early symptoms is a deterioration in the general condition of the patient: apathy, torpidity, stupefaction. Is typical in this case onset or reinforcing of headaches. The developing of intracranial pressure increase manifests itself in

protrusion and stress/voltage of the region of bone defect. Since here there is a known degree of decompression, then vomiting and stagnant nipples are noted more rarely than with cysts after the closed injury. Then with cysts after the penetrating wounds more frequently are noted the symptoms of tunicary stimulation, moreover the rigidity of postcranial muscles and the upper Brudzinski sign are more characteristic than, for example, the Kernig signs (manifests itself the restricted cerebral localization of tunicary processes); sufficiently frequent is the symptom of Gordon, sometimes expressed on the side of localization of cyst. Changes in the cerebro-spinal fluid are not necessary, but nevertheless at its elevated pressure in a number of cases is noted blurred lymphocytosis and increased quantity of protein. Since in this case at basis frequently is an aggravation of inflammatory process, the reanimation of infection, but not only the hypertensive syndrome, characteristically blurred increase in the temperature (subfebrile), moderate leukocytosis of the blood, relative neutrophilia and especially increased ROE.

As is evident, the series/row of the enumerated symptoms resembles abscess, and once more is confirmed the difficulty of differential diagnosis. However, with cysts these phenomena are expressed so not sharply and they are developed usually more slowly. Characteristic for a cyst (nonpurulent) is more favorable course.

The basic method of the treatment of intracerebral traumatic cysts with the penetrating wounds is process/operation. Exception are those varieties/subspecies of changes in the configuration of the ventricles which are created as a result of the cicatrical "pulling" of the wall of ventricles to the scar of bone defect and where, strictly speaking, discussion deals only with deformation and asymmetry of ventricles, but not about patholcgical area as independent education.

Page 502.

Specifically, here it is possible to evaluate according to advantage the method of pneumo-encephalography (Fig. 188), since the clinical picture, which is folded from the symptcm complex of intracranial pressure increase and frequently focus Jackscnian epilepsy, it dictates, it would seem, the advisability of surgical intervention. As is shown experiment/experience, in these cases proves to be successful conservative therapy in the form of dehydration and repeated lumbar punctures.

The methods of proposed surgical intervention are sufficiently diverse and depend on the depth of the occurrence of intracerebral cyst, phase of process and degree of the infection of cyst.

Are more difficult for surgical treatment the intracerebral cysts, which are communicated from cavity of ventricles. Here especially necessary is the occlusion of wound tightly, since drainage is dangerous due to liquorrhea and possible recording of infection from without. With the collapse of area successfully can be used the cross-linking of cerebral tissue, while with noncollapsing cyst - sealing by muscle, fascia, by grease. The very defect of the wall of ventricle can be tightened and taken in due to the left with carving unit of the capsule, which is located in depth, in the "day" of cyst, or frequently detected here sectors of the connective tissue, which replaced the killed cerebral tissue.

Soviet neurosurgeons' experience, acquired in the year of the Great Patriotic War, showed that closed treatment of post-operation wound with traumatic cysts even in cases when they were the consequence of the penetrating wound with the presence of foreign body and infection, is more advisable. So, where the bone defect is already closed with scar and where have even fistulous courses and foreign bodies, is preferable the autopsy of cyst, its emptying, the distance/separation of foreign bodies, hemostasis and laminar suturing tightly.

Are especially convincing the results of the surgical treatment of the traumatic cysts of late period, which are communicated with

ventricles, with foreign bodies, frequently with fistulas, sometimes clearly infected or combining with abscesses. The elimination of the elements/cells, which support the inflammatory or suppurative process, the occlusion of the defects of the wall of lateral ventricle, careful hemostasis and application of anechoic sutures to wound they allowed the author to obtain in 18 operated wounded favorable outcome (A. V. Triumfov).

Important value has, it is doubtless, the local and overall use/application of sulfanilamide preparations and antibiotics (penicillin). Treatment with them one should to begin even to process/operation and continue in the post-operation period. The need for this is dictated, on one hand, by tendency toward application as far as possible of blind suture, and on the other hand, by the wish to prevent possible outbreak of inflammation and onset after the process/operation of encephalitis or meningoencephalitis.

The frequency of post-operation complications is clear already at least because to remove cyst with its walls it is by no means always possible due to heterogeneity and inferiority of the formed capsule, even in late period. The sectors of insufficient limitation of area are encountered more frequently in basis, on the day of cyst, which during deep disposition makes the process/operation of especially difficult and responsible as a result of the proximity of

ventricles.

Deserves attention the method of preliminary, at least partial, evacuation of area via puncture and suction, that facilitates the subsequent peeling of walls and separating the cyst with capsule.

Page 502a.



Fig. 188. Cyst of brain. Encephalogram.

Page 503.

The onset of post-operation encephalitis (more frequent than meningoencephalitis) is characterized by a deterioration in the general condition of patient, by apathy, blackout of consciousness, by increase in the temperature, by headaches, appearance or aggravation of the syndrome of tunicary stimulation, by pleocytosis in cerebro-spinal fluid, increase in leukocytosis of the blood and ROE, by redoubling of the available focus cerebral disorders. These symptoms can be represented partially, and they can completely be absent. If after conducting of full of course sulfanilomide treatment the symptoms of complication still keep or appear again, then is assigned the repeated course of treatment.

The use/application of sulfanilamides and especially antibiotics played, it is doubtless, large role in reducing post-operation complications and in many respects it contributed to the successes of the surgical treatment of the traumatic intracerebral cysts of brain.

TRAUMATIC DROPSY OF THE BRAIN OF LATE PERIODS.

Traumatic dropsy of the brain of late periods, just as any other

form of hydrocephalus, is the suffering of central nervous system at basis of which lies/rests the pathology of liquor metabolism/exchange. The experiment/experience of the Great Patriotic War made it necessary to focus attention on this form of hydrocephalus, to trace the dynamics of the development of the suffering indicated on the material of many hundreds of wounds of brain and allowed the named form of the damage/defeat of central nervous system to secrete in the specific nosologic unit.

It is necessary to indicate that in the literature prior to the beginning of the Great Patriotic War it was possible to meet the description only of the individual casuistic cases of dropsy of brain after the injury of skull, but in monographic works - only indication of injury as to one of the etiological factors of dropsy. It was not given the detailed description of the picture of the pathogenesis of this suffering, were not described neurologic clinical picture and classification of the various forms of traumatic dropsy. In prewar literature it was indicated chiefly the presence of internal communicated asymmetric hydrocephalus, which was being sometimes blocked by adhesive process in the region of Majandi and Lushka apertures.

The analysis of the traumatic material of the institute of the neurosurgery im. N. N. Burdenko within the period of the Great

Patriotic War (more than 1000 cases of wounds and injuries of skull and brain) made it possible sufficient categorically to assert that traumatic dropsy of brain in one or the other degree was observed fairly often with the wounds of brain. It is necessary to say that with this suffering is not only a series/row of properties and phenomena, characteristic for dropsy of the brain of any pathogenesis and different etiology, but there are their special features/peculiarities, which differ it from other forms of traumatic hydrocephalus.

In the pathogenesis of traumatic dropsy of brain cross themselves between themselves diverse factors. In the initial period of the wound of brain as a result of damage to cerebral tissue rapidly is developed acute/sharp hydrocephalus with the associated phenomena of the hypersecretion of cerebrospinal fluid and contusion edema of brain.

Page 504.

With the initial injury of brain the wounding shell, destroying brain, naturally, causes the mechanical death of the damaged sectors of cerebral tissue. Subsequently perish also the adjacent sectors of brain, which were being located "in zone of sclecular concussion" (N. N. Burdenko), but under the effect of wound infection attack/advance

characteristic changes in the vascular system of brain and cerebral shells. All these factcrs, together undertaken, lead to loss and atrophy of cerebral tissue only with the partial substitution with scar formations. This defect of tissue in the lccked area of the skull is completed by liquid medium - cerebrospinal fluid. Thus, here is revealed/detected the factor of passive hydrocephalus, i.e., hydrocephalus ex vacuo.

In parallel with the pathogenetic factor indicated is encountered the factor cf another crder/formation. When the wound of skull is complicated by the infection of cerebral wound and toxic factors give the rapidly growing phenomena of edema of brain, then is sharply disrupted by tissue cerebral metabolism and is impeded the normal resorption of cerebrospinal fluid. Are created the conditions cf the prolonged, frequently which is continued by months intra-cerebral hypertension, which, naturally, entails the growing atrophy of cerebral tissue from pressure, and atrophy contributes to a progressive increase in hydrocephalus. This already the factor of active hydrocephalus - hydrocephalus destruentis.

Damage/defeat by the inflammatory process of shells after injury frequently causes regional neglect of sub-arachnoidal spaces into some places and education of cystic sub-arachnoidal areas in others, as a result of which is disturbed the normal resorption and

circulation of cerebrospinal fluid. The progressive cicatrization of the casualty sectors of brain leads as tc the wrinkling of the corresponding regions cf brain and to the grcwing cicatrical tightening of the wall cf lateral ventricle tc trepanation aperture. The latter fact frequently mechanically contributes to the expansion cf liquor spaces both ventricular, and sub-arachnoidal. Observations beginning 100 by wounded, who transferred the injury of skull, after 3-4-5 years after it, especially in the presence of epileptic fits, they indicate the specific progression of the phenomena of hydrocephalus.

The clinical picture of traumatic dropsy of brain is very varied, since it in each case reflects the basic link in the general/common/total complex of the course of the bullet wounds of skull, which at given mcment/torque is leading. However, the clinical picture of the series/rcw of the specific pheromena, general cerebral and local can be connected precisely with the pathology of the liquor system: the composition cf cerebrospinal fluid (reduction of protein to $0.2^{o}/_{oo}$ and below in the absence of inflammatory phenomena) and by the lumbar pressure of cerebrospinal fluid (lower than the ordinary average numerals). The phenomena of cerebral hypotension in these cases are escorted/tracked by blunt headaches and series/row of other overall cerebral phenomena (descent in the memory, change in muscular tone, violation of water metabolism/exchange, pathology of vestibular

apparatus, etc.). In what measure all these phenomena are connected precisely with hydrocephalic components, it is not always easy to determine, but there is no doubt that the violations of the normal circulation of cerebrospinal fluid in brain and tunicary spaces cannot be indifferent in this respect.

Page 504a.

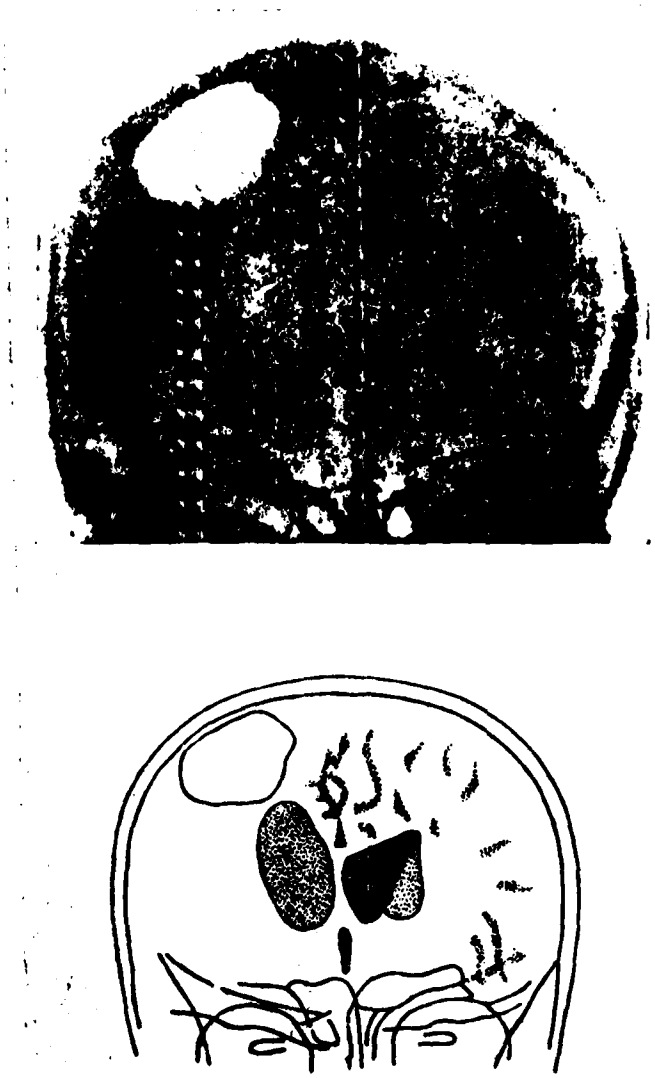


Fig. 189. Internal open asymmetric hydrocephalus.

Page 504b.

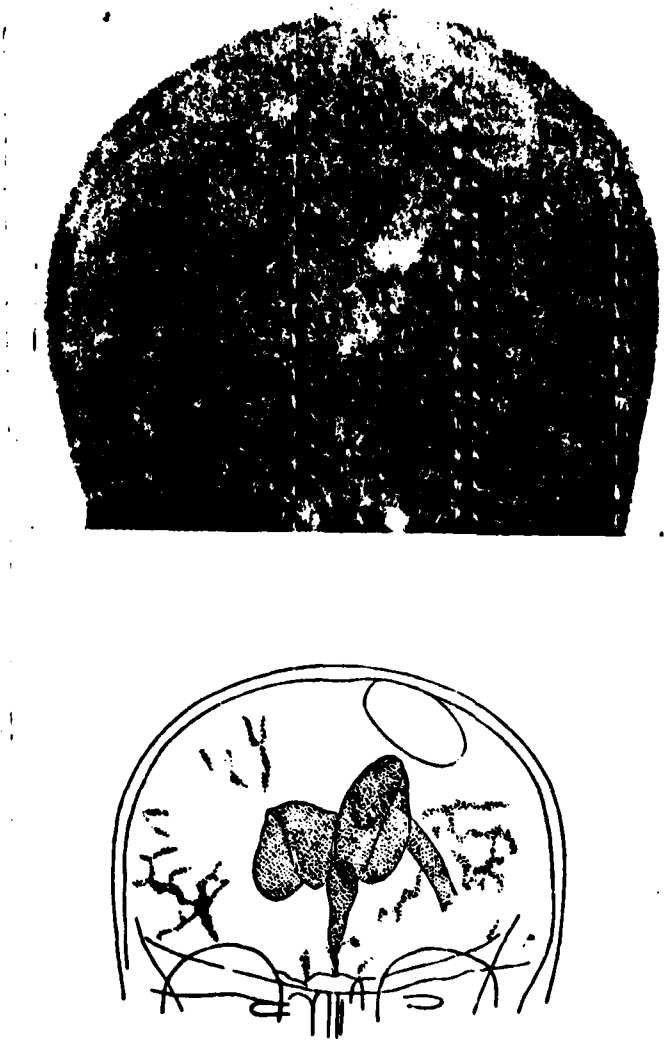


Fig. 190. Internal hydrocephalus with initial form of external.

Page 504c.



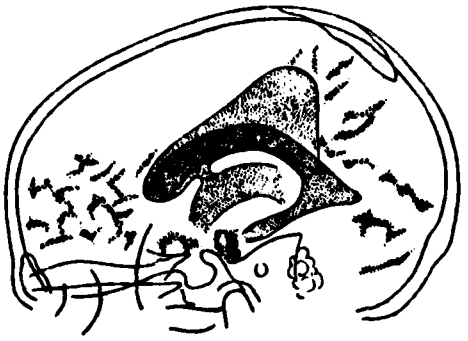


Fig. 191. Lateral photograph and scheme from X-ray photograph of the same wounded.

Page 504d.

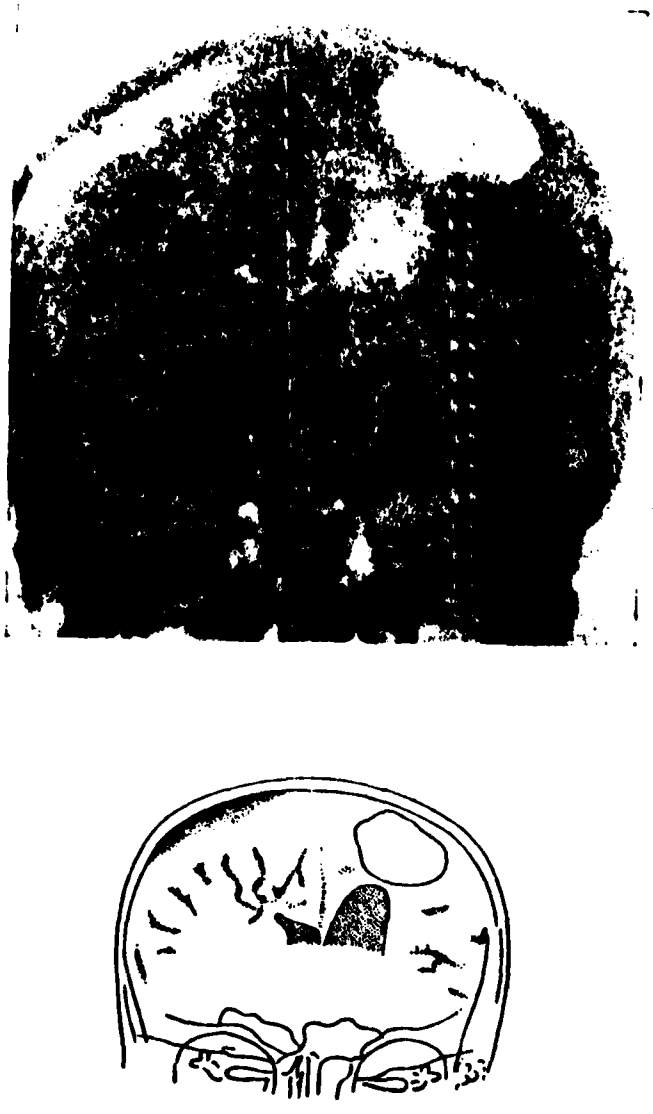


Fig. 192. Combination of internal hydrocephalus from external.

Page 504e.

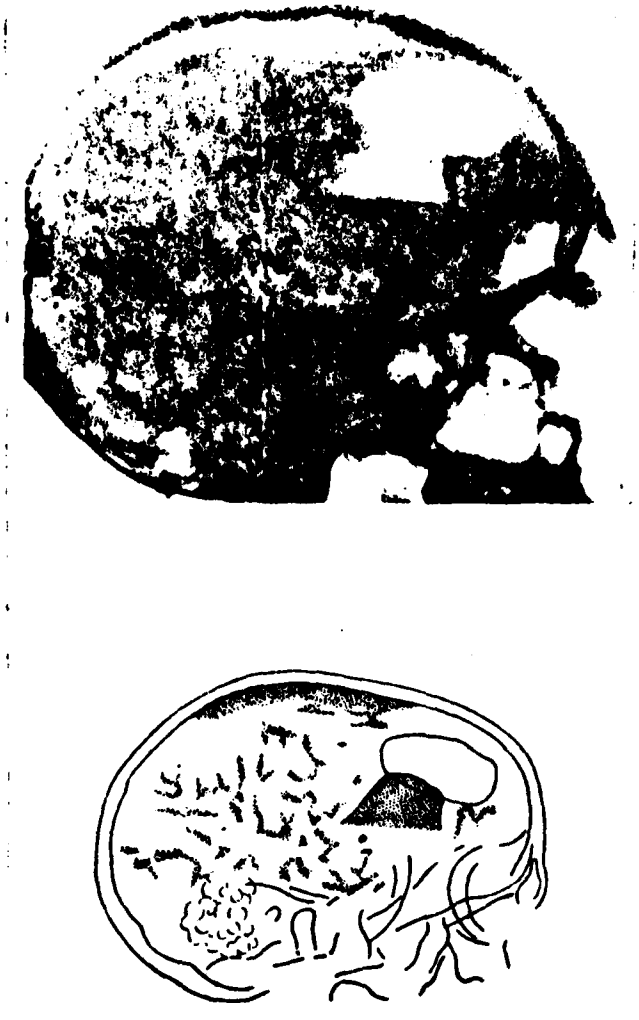


Fig. 193. Lateral photcgraph and scheme from X-ray photograph of the same wounded.

Page 504f.



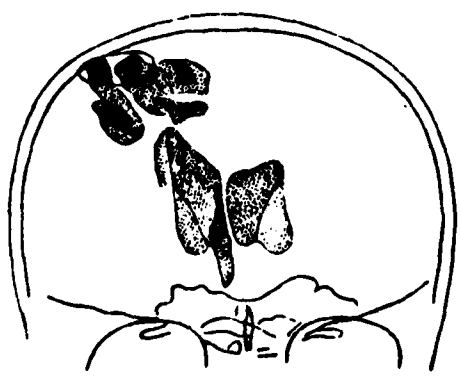


Fig. 194. Internal hydrocephalus with porencephalia.



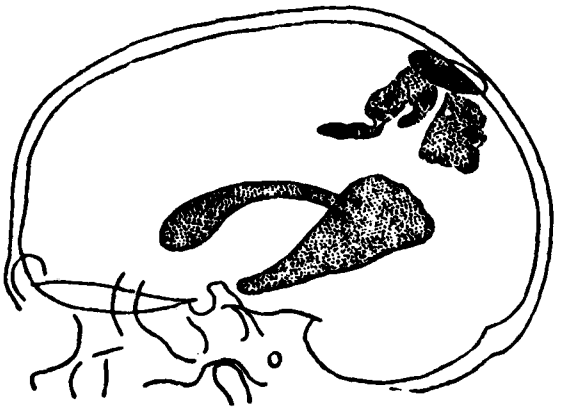
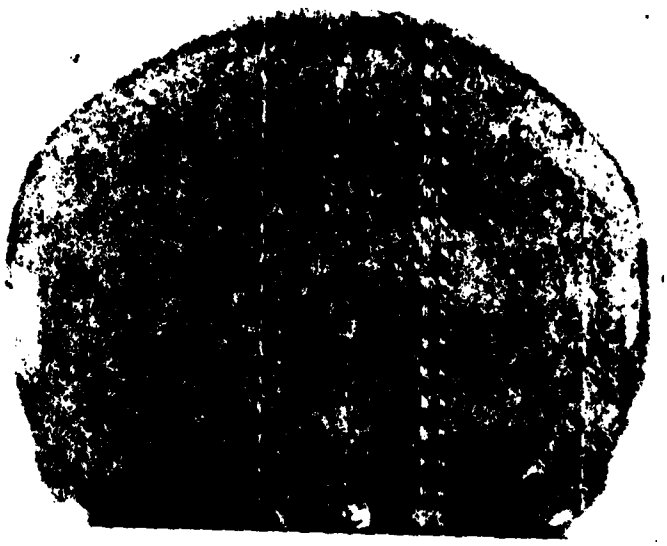


Fig. 195. Lateral photograph and scheme from X-ray photograph of the same wounded.

Page 504h.



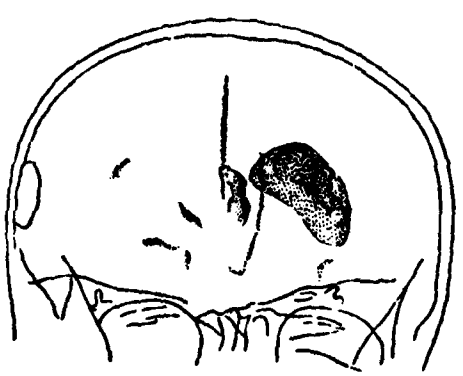


Fig. 196. Occlusion of hydrocephalus (photograph of front/leading crescents).

Page 504i.



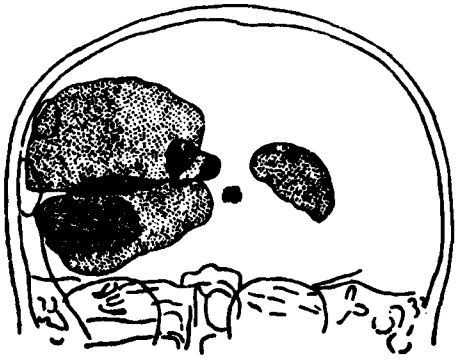


Fig. 197. Occluded hydrocephalus.

Page 505.

It is necessary tc emphasize that all clinical manifestations of traumatic dropsy are very diverse, and therefcre, giving the data indicated, we on can give any percentage relaticnships/ratios. If in kncwn period in the case of traumatic dropsy is lowered/reduced liquor pressure and descent in the content cf protein, then after the short time intracranial hypotension is relieved by hypertension, is established/installed hyper-albuminoses, blunt headaches are made by sharp ones, appear nausea, vomiting, photalgia. The change indicated is explained by the cutbreak of inflammatory process in brain scar cr shells. In other cases the smooth course cf traumatic dropsy is suddenly disrupted by the heavy phenomena of the occlusion of liquor spaces, and the clinical picture of suffering acquires another character/nature.

The diagnosis of traumatic dropsy in each individual case is placed on the basis of the study of entire ccurse of cerebral injury, cn the comparison of the data of the neurologic picture of suffering and their dynamics in different periods cf wcund process, on the data of the research of cerebrospinal fluid, liquor pressure and liquorodynamic tests/samples. But the basic method which makes it possible with the comprehensive completeness tc ccme to light/detect/expose the picture of suffering, is

pneumo-encephalography. Specifically, the contrast X-ray method of research with series of repeat measurements made it possible to confirm position/situation that traumatic dropsy is revealed/detected as the regular consequence of the wounds of skull and permanent component/link in the complex of the phenomena, observed in the course of wound process with the bullet injuries of brain.

With pneumoencephalography is determined the degree of expansion of the lateral ventricles of brain, in the majority of cases with the simultaneous and sufficiently considerable expansion of the area of the third ventricle. The expansion of the areas of lateral ventricles, almost as a rule, is asymmetric. On the casualty side, depending on localization of damage, is more is sharply expanded either lower crescent or individual section of the body of ventricle in the form of protrusion or diverticulum, as if pulled to the place where there was the defect of cranial bone. When of considerable damage and death of cerebral tissue or its subsequent atrophy is present, entire system of ventricles is displaced toward the former damage/defeat, with simultaneous, sometimes sufficiently considerable, by the deformation of the corresponding sector of ventricle. At the same time (approximately/exemplarily into 10.0o/o of cases of the investigated material, which concerns the wound of skull), besides changes indicated above, are determined the clearly outlined cystic areas, connected with the area of the ventricles of

brain (so-called porencephalia).

In other cases in photographs is noticeable the also unclearly outlined education in the form of maculae or nebulae of the irregular form which next day after pneumo-encephalography accept the more clearly outlined ducts/contours. With repeated pneumoencephalography (through 8 months, year and more) sometimes it was possible to establish/install in the same places the already designed cystic education. Stereoscopic survey in the similar cases made it possible to confirm that the visible in photographs maculae, zones, nebulae so forth are actually/really air lock in the not designed even more cystic areas which should be called "slit-shaped" and "tunnel" porencephalias. the presence of similar education is confirmed on operating table and on sectional material.

Air distribution in sub-arachnoidal spaces also has its characteristic features. In the region of the former damage/defeat of brain sub-arachnoidal slots usually are not filled.

Page 506.

The noticeable expansion of sub-arachnoidal slots frequently occurs on the side of the undamaged/uninjured cerebral hemisphere, although the considerable expansions of their limber are encountered also on

the side of the casualty hemisphere and sector of brain. In the high percentage of the cases (to 70.0) is stated/established the presence of wide basal tanks with large accumulation of air behind sella turcica, and sometimes also from its lateral sides. In the photographs, repeated in a year it is more, frequently are noted the growing sizes/dimensions of sub-arachnoidal spaces.

In the development of traumatic dropsy it is possible to distinguish three basic stages. The first stage, which directly follows after injury and phenomena of the acute/sharp infection of brain, this is acute/sharp hydrocephalus. The second stage - period of progressive hydrocephalus when is developed the series/row of the consecutive complications, which go usually with the prolonged cerebral hypertension, which always facilitates the progress of hydrocephalic phenomena. Finally, the third stage - stabilizing of hydrocephalus, usually observed in the late period of traumatic disease/sickness/illness/malady when infectious factors fell back already to background and when further progression of hydrocephalus is phenomenon passive, connected with the continuous formation of cerebral scar, the atrophy of cerebral tissue and the subsequent wrinkling of the casualty hemisphere of brain.

The anatomical changes, which advanced in the liquor-containing areas and spaces with the bullet wounds of brain and which involved

shaping of hydrocephalus, make it possible to distinguish four basic forms: 1) traumatic dropsy of brain, at base of which lies/rests the so-called internal hydrocephalus; 2) traumatic dropsy of brain, with which is observed the combination of the phenomena of internal hydrocephalus with the phenomena of the external; 3) traumatic dropsy of brain, with which the widely spread picture of internal hydrocephalus is combined with the presence of the porencephalic cystic areas; 4) the transitional form of traumatic dropsy of brain with which communicated dropsy is combined from accumulating by occlusion factors.

The given classification is only the tentative of scheme, since each case of hydrocephalus has its characteristic features and in each individual case is known transition stages from one form to another. Most frequently there are mixed forms of pathology of liquir system, and in this pathology it is possible to emphasize only the individual predominant features of one or the other form of dropsy of brain.

The degree of the development of traumatic dropsy of brain usually depends on the value of the former traumatic damage to cerebral tissue and to severity of the develcping cerebral infection. It is possible to distinguish: 1) initial, 2) the average and 3) the significant degree of the development of traumatic hydrocephalus.

Division is this, naturally, conditional and correct representation about each case of traumatic dropsy of the brain can give only in detailed description.

From the complications in the course of traumatic dropsy of brain, which require surgeon's special attention, it is necessary to indicate progressive development of joints, intergrowth, scars somewhere on the course of liquor routes/paths. The intergrowth indicated and the scars can bring to the gradually growing occlusion and the disengagement of the liquor system of ventricles from sub-arachnoidal spaces.

Page 507.

The diagnosis of occlusion of hydrocephalus is commonly known and does not present special difficulties. Occlusion with the marked phenomena on the looked over material into 400 cases of the wounds of skull is noted in 5 cases. Surgical intervention with similar complications consists in the perforation of calloused body and the release of intergrowth in the region of the aperture of Magendie, sometimes with splitting up of lower worm.

Another complication is analogous in known degree to the first. With the wounds, connected with the damage/defeat of the lateral ventricles of brain, just as with any other wound of brain, occurs the prolonged, but steady rearrangement of cerebral scar, i.e., the progressive structural change in the areas of the ventricles of brain, the education in them of diverticula, cystic areas, sometimes with the constriction of the corresponding crescent of ventricle or part of it. If in this case is insulated the sector of lateral ventricle with vascular web/plexus, then the accumulation of cerebrospinal fluid in similar hand occurs it is rapidly and

escorted/tracked by the phenomena of the sharply growing cerebral hypertension.

The diagnosis of a similar complication is difficult, since neurologic picture in this case has much in common with picture abscess of brain and is differentiated mainly by the diagnostic punctures of liquor spaces, cystography and research of cerebrospinal fluid.

Treatment is operational, with the autopsy of the encysted cyst and setting of communication/report to its area with sub-arachnoidal space or with the area of the system of the lateral ventricles of brain. It is possible also to coagulate the isolated/insulated unit of the vascular web/plexus.

However, the complication of the character/nature indicated is rarely, more frequently it is necessary to deal concerning the porencephalic cysts of different formation. The porencephalic cysts with the prolonged structural rearrangement of cerebral scar not only progress in their sizes/dimensions, but they can sometimes and completely be isolated and form the intracerebral or subdural cysts near the wall with the slowly growing hypertension cerebral phenomena. Traumatic dropsy of brain with the presence of the isolated porencephalic cyst is determined usually with the aid of

contrast X-ray procedure. Treatment operational, with autopsy and distance/separation of cyst with subsequent plastic surgery of the wall of lateral ventricle and plastic surgery of solid cerebral shell.

Surgical treatment of the forms of complications indicated gave good results.

Somewhat otherwise flows/occurs/lasts traumatic dropsy of brain in cases when in the presence of external hydrocephalus progresses the development of basal productive arachnoiditis. This causes the formation of joints, intergrowth and the formation of the delimited basal cysts, which lead to the so-called optochiasmal arachnoiditis and to progressive loss of view. The similar cases are relatively rare, they require surgical treatment. Process/operation consists of the release of region chiasmuies from joints and intergrowth with the simultaneous autopsy of cystic education from the side of the front skull pit.

It is necessary to pay attention to one more form of the pathology of liquor system with traumatic dropsy of brain. Besides the disorder of the circulation of cerebrospinal fluid on ordinary anatomical liquor routes/paths, with the bullet wounds of brain and which associates them internal hydrocephalus always is a known

disorder of liquor circulation, also, in the very parenchyma of cerebral tissue with the presence of a considerable quantity of cerebrospinal fluid in the stroma of cerebral scar and in its periphery.

Page 508.

The pathology of indicated liquor circulation, escorted/tracked by local edemas of cerebral tissue and by violation of tissue cerebral metabolism, is, it is doubtless, one of the essential moments/torques in the pathogenesis of epileptic fits.

At times observed with traumatic dropsy of the brain of the "outbreak" of the hypertension cerebral phenomena most frequently are connected with the periodic aggravation of inflammatory process in the places of the former damage/defeat of cerebral tissue or shells. This process usually accompany the phenomena of the overproduction of cerebrospinal fluid and deterioration in its resorption. Periodic lumbar punctures, antipyretic therapy and systematic dehydration shortly usually stabilize hydrocephalus. In the more persistent cases of liquor hypertension from conservative measures successfully was utilized the X-ray therapy (Figs. 189, 190, 191, 192, 193, 194, 195, 196 and 197).

RUPTURES OF THE VENTRICLES OF BRAIN.

One of the severe complications of the late period of the wounds of brain is the stable fallout of the ventricle of brain with the formation of its huge flask-shaped diverticulum through the extensive bone defect. This form of delimited internal hydrocephalus is studied little and in the literature is illuminated insufficiently.

The poverty of literature data and the absence of the special works, dedicated to study and treatment of postwound rupture of the ventricles of brain, are explained by the fact that in past wars it was encountered exclusively rarely, since patients with extensive wounds and severe purulent complications of brain and shells, as a rule, the perished and the percentage of those recovered was negligible. The contemporary methods of struggle with the purulent infection of brain and ventricles played the decisive role in the rescue of the life of this group of wounded.

In the year of the Great Patriotic War the rupture of ventricle ceased to be rare phenomenon. As the basis of present chapter are assumed the observations of 68 patients with the extensive and stable ruptures of the ventricles of brain.

Thorough clinical study of the patients indicated with use by a

method of pneumo-encephalography, ventriculography, electroencephalography, research or the resorttive function cf brain, dynamic study of liquor production, clinical and biochemical research of fluid/liquid (hernial, ventricular and spinal), produced within different periods after wound, and also series/row of other special methods of research, made possible to compose representation about the character/nature of this complication, its pathogenesis and clinical course. As a result was manufactured most rational and effective method treatment-operaticnal.

The ruptures of the ventricles of brain appear usually after extensive ones, more freguent than tangential ones and segmental ones, wounds of skull and brain, complicated by local purulent encephalitis, rupture cf brain, ventriculitis and [redacted] meningitis, by a thin-abundant liqyorrhea and by extensive meningoencephalitis. Another necessary condition for the onset of the rupture of ventricle is the high pressure of cerebro-spinal fluid in the period of weakening inflammatory phenomena and reverse/inverse development of the rupture of brain (Fig. 198).

Page 509.

In the stage of encephalitis pyoinflammatory process is developed most intensely in the place of the application/appendix of

injury and envelops not only the substance of brain, but also the wall of ventricle, chorcid web/plexus and shells of brain. Is developed local purulent encephalitis, ependysitis and meningitis with the education of the considerable rupture cf brain.

The changed wall cf ventricle under the pressure of cerebro-spinal fluid and the effect of labyrinth departments of brain already from the first days of inflammatory process is extracted towards the trepanation defect and subsequently, protruding to the surface of skull, it is expanded, remaining that covered with the thick layer of the changed cerebral substance. Upon transfer cf the pyonecrotic process to the swelling wall of ventricle, simultaneously with the rejection/separatien of necrotic masses, appears liquor fistula and as a rule, cccurs the dissemination of purulent infection. With the aid cf frequent lumbar punctures and use/application of antibiotics and antiseptics of patients frequently it is possible to derive from the threatening condition.

However, as a result of the mentioned above inflammatory phenomena is disrupted the dynamics of cerebral blood circulation, attack/advance changes in vascular web/plexus and is turned off/disconnected from the system of the circulation of fluid/liquid sub-arachnoidal space fcr considerable elongation/extent. All this, together undertaken, is caused considerable change in the processes

of liquor formation and absorption, leading usually to the overproduction of fluid/liquid and decrease in the resorbtive function. Because of this sharply rises the pressure of cerebro-spinal fluid (sometimes to 600 mm of the water column), and if it is retained up tc the moment/torque of the abatement of the inflammatory phenomena when rupture granulates and is epithelialized, but brain gradually "departs" tc the area of skull, then in parallel with the decrease of the encephalitic process the deformed wall of ventricle under the pressure of cerebrospinal fluid/liquid is given out to sides more and it is more; it occupies in protrusion the freed from brain space and expands it to the degree of maximum stress/voltage and thinning of cicatrical integument. Thus, attack/advance extensive, regional, opened hydrocephalus. Begins the intensive cicatrization.

As a result of inflammatory process in the protruding unit of the ventricle appear finest connective films in the form of the webs which divide the area of ventricle into chambers/cameras. Frequently cross connection these it is possible to see by the naked eye through thin epithelial integument.

Entire/all extra-cranial unit of the ventricle is soon scldered in its basis to the edges of bone defect, solid cerebral shell and to the integuments of skull by massive fixed cicatricial annulus. The

surface of rupture is intimally coalesced with the extensive sharpened epithelial scar and on periphery - with skin integuments.

The protrusion of brain achieves usually vast sizes/dimensions, it has most frequently spherical form, it consists of the deformed, protruding unit of the ventricle and only on periphery and in his basis borders on massive layer Rubtsov. In this stage when completely calmed down inflammatory phenomena, the wall cf protrusion no longer contains the cerebral substance whose remainders/residues by this time undergo cicatrical regeneration. Therefore the formed protrusicn it is possible with the good reascn to define as the stable rupture of ventricle, which does not exhibit tendency toward reverse/inverse development even in cases when the pressure of cerebro-spinal fluid achieves norm (Fig. 199).

Page 510.

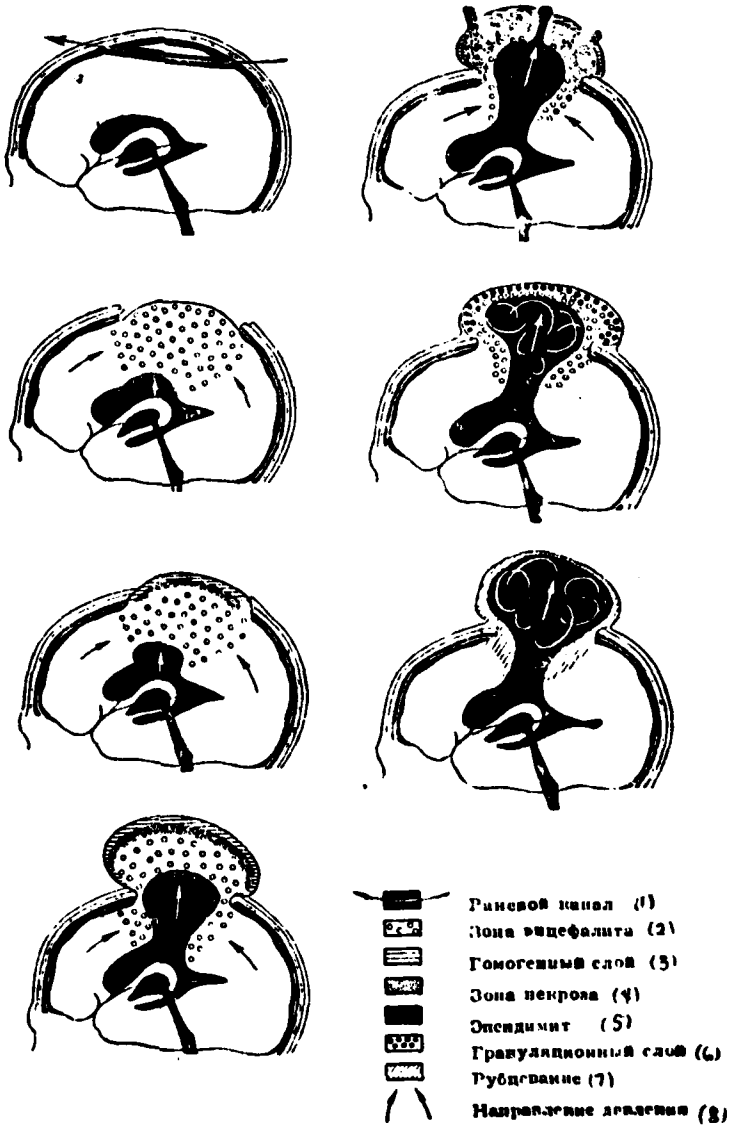


Fig. 198. Scheme of education of rupture of ventricle of brain.

Key: (1). Wound canal. (2). Zone of encephalitis. (3). Homogeneous layer. (4). Zone of necrosis. (5). Ependymitis. (6). Granulating layer. (7). Cicatrization. (8). Direction of pressure.

Page 511.

Considerable changes occur at the same time and in the area of the skull: are distorted the anatomical relationships/ratios not only of an entire ventricular system, but also all sectors of brain, including contradictory/opposite hemisphere. Everything is displaced towards bone defect, towards scars. The brain, fixed/recorded to cranial box on its considerable elongation/extent by the fallen walls of the sharply expanded ventricle, is deprived of its natural mobility. On past this, the fluid/liquid, which circulates in the wide pedicle of ventricle, which goes to rupture, exerts considerable pressure on brain tissue. There are also squeezed the surrounding veins, which reinforces the phenomena of congestion and local edema, disrupting blood supply and liquor circulation of brain.

With the aid of special research it is possible to establish/install considerable hyperproduction and lowered/reduced absorbability of cerebro-spinal fluid. If we derive cerebro-spinal fluid (100-120 cm^3) to complete retraction of the rupture of ventricle, then it again is restored to initial position for several

hours. The coloring substance (indigocarmine 1o/o 1 cm³ or methylene blue 1o/o 0.5 cm³ in breeding/culture/dilution to 5-10 cm³ of cerebro-spinal fluid), introduced into the area of ventricle, shows in urine not earlier than after 40-50 minutes and it continues to be secreted in the course of twenty-four hours.

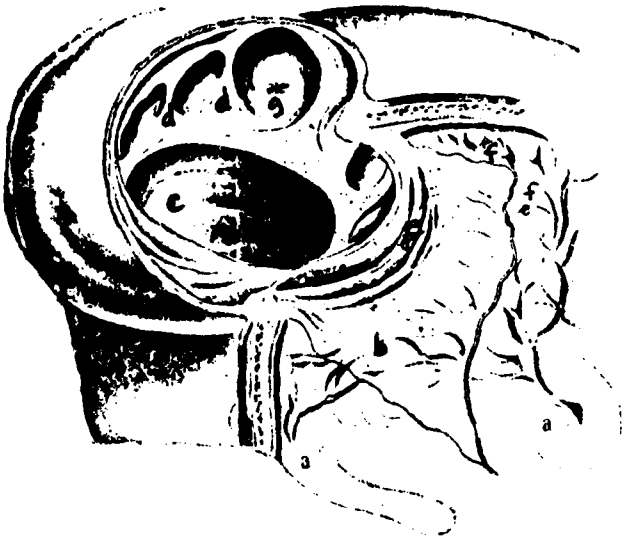


Fig. 199. Scheme of the rupture of ventricle. a) the lateral ventricle; b) the expanded deformed sector of ventricle forms the pedicle of the rupture; c) the wide entrance from the area of rupture into the area of the ventricle; d) finest cicatrical films divide area into chambers/cameras (g); e) the basis of rupture is massive Rubtsov by the annulus, soldered with bone and shells; f) cerebral substance is squeezed and is deformed limb rupture.

Page 512.

In all observed wounded the appearance of hernia of the ventricle of brain preceded the development of the protrusion of brain against the background of purulent encephalitis, meningitis and

ependymitis, together with a sharp increase in pressure of cerebro-spinal fluid.

In 50 cases in the past was noted liquorrhea and in 17 cases - abscesses of brain.

The ruptures of the ventricle of brain give very heavy clinical picture. Are observed the rough focus fallouts, which usually rivet patients to bed. The most depressing impression produce patients with the ruptures of the ventricles, which are localized in the sagittal line: these patients with extremital paralyses of struts and hands are completely helpless even in bed.

The electroencephalography, produced in a year is more after the onset of the rupture of the ventricles of brain, it showed abrupt changes of the "electrical activity" of brain in all departments both of injured/damaged and contradictory/opposite hemisphere.

In 20 patients of 68 were observed the epileptic fits of general and local character/nature.

In spite of the high pressure of cerebro-spinal fluid and the voltage of rupture, signs/criteria the intracranial pressure increases usually it is not observed. Exclusion they composed 13

patients with the sharply pronounced hypertension phenomena.

At the same time in 14 patients with the extensive ruptures of the ventricles of the brain of different localization in 7 cases was found abscess in the wall of ventricle and in 7 cases - foci of festering in the scars, containing bone fragments. At the same time in these patients process was in calm stage, patients themselves felt well, no signs/criteria of hypertension in them it was detected. All 14 patients are operated - is produced the total distance/separation of abscess and festering Rubtsov. Outcome is favorable.

These cases completely disprove old representation about the fact that the expansion and the smartness of the wall of ventricle to bone defect serve as basis for the exclusion of the abscess of brain.

The diagnosis of the extensive stable ruptures of the ventricles of brain is not difficult. The protrusion of brain, usually vast sizes/dimensions, is covered with the thin epithelial scar, which are translucent in center. In contrast to the late rupture of brain (encephalitic), supported by abscesses, it fluctuates very lively, with a change in the position/situation of head the voltage and its volume change; with straining it increases and is strained; palpation gives perception of fluid/liquid. During spinal puncture with the removal of considerable amount of liquid the rupture is decreased and

disappears.

Clinical diagnosis should be always reinforced the pneumo-encephalography, which with maximum clarity reflects characteristic changes in both ventricle and rupture itself, in particular, its polythalamous structure (Fig. 200).

Problem of the treatment of the stable fallcuts of the ventricles of the brain is not developed. The autopsy of the area of ventricle, its draining or tamponing with grease, etc., as this was conducted in certain cases of the cystic expansion of lateral ventricle, were conjugated/combined with large lethality and were deprived of sense in view of the absence of therapeutic effect.

Page 512a.

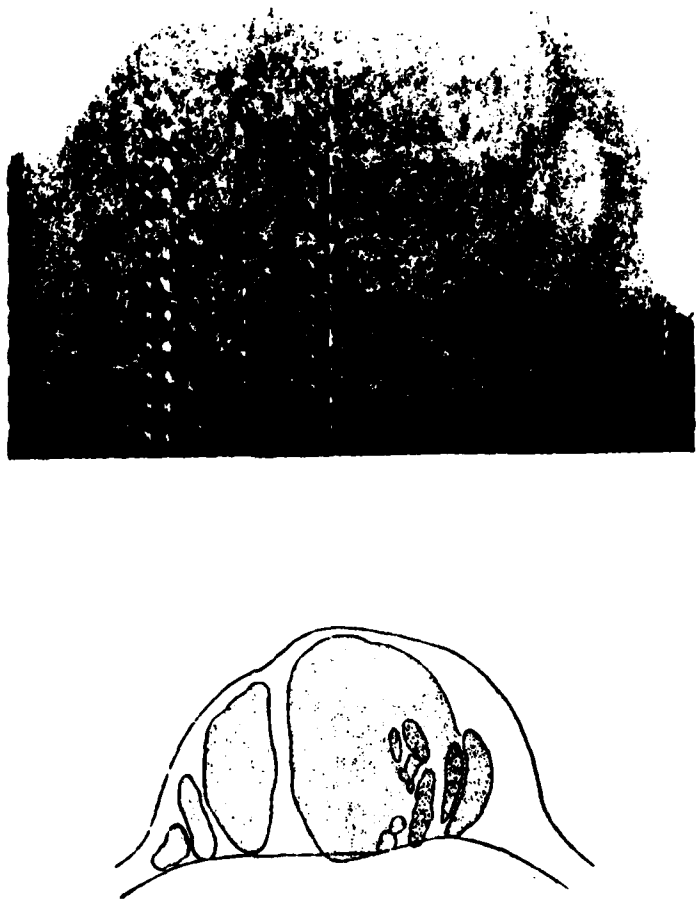


Fig. 200. Extensive polythalamous rupture of right lateral ventricle.

The carving of the extracranial part of the ventricle and the plastic occlusion of the extensive defect of the wall of the ventricle, which achieves 10-13 cm in diameter, is virtually unrealizable, risked for a life, but in the case of success they cannot be effective, since all disturbances of discirculatory order/formation and distortion of the anatomical relationships/ratios of brain and ventricle will not change.

The observations of 68 patients, which were continuing from one to 2 years are more, with the use/application of the most varied forms/species of the conservative therapy (including anti-infection, dehydration physiotherapy, frequent spinal punctures and X-ray therapy) they showed that although in a number of cases was achieved the decrease of the pressure of cerebrospinal fluid to normal values however to eliminate the rupture of ventricle it was impossible not in one case.

Study of the pathogenesis of this complication and morphological changes with it made possible to be stopped at the surgical method of treatment which was developed and used since 1943 in 65 cases of the extensive stable hernias of ventricles of brain (A. S. Mel'kumova).

The target of process/operation consisted in without the autopsy of ventricle freeing of brain and ventricle from the fixatives Rubtsov, to tamp the expanded area of ventricle by its its own walls, which were being arranged/located out of the area of skull, and to create thereby favorable conditions for the circulation of the cerebro-spinal fluid and blood.

Under local novocaine anesthesia very carefully and thoroughly is separate/liberated finest epithelial graft/flap from the surface of the protruding wall of ventricle. After the distance/separation of cicatrical graft/flap so carefully are separate/liberated skin of edge from the wall of ventricle to the edges of bone defect. Skin edges will be mobilized for large elongation/extent so that at the termination of process/operation the imposition of skin sutures would be conducted without tension. Are cut the scars, which convert from the rupture of ventricle to soft tissues, are revealed bone edges of defect, is freed/released from Rubtsov space between the edges of solid cerebral shell and the internal surface of bone. From Rubtsov solid cerebral shell are formed two flat/plane grafts/flaps, composing its direct continuation in order subsequently to utilize them for the plastic occlusion of the defect of solid cerebral shell. Under the control of elastic spatula is cut all over the wide, massive cicatrical annulus, which tightly envelops the basis of the rupture of ventricle and edge of solid cerebral shell. Following by

this is conducted cerebrospinal puncture and release of the pedicle of rupture (deformed, elongated unit of the ventricle) from loose ones Rubtsov by elastic spatulas.

In proportion to the removal of fluid/liquid the protruding part of the ventricle retracts and, dive-submerging in the extensive area of ventricle, it tamps it in the thickness of hemisphere. Are further conducted careful hemostasis, processing of the bone edges of defect, plastic occlusion of the defect of solid cerebral shell by Rubtsovs by rags, fascia or by aponeurosis, anechcic suture to skin.

If process/operation is conducted when the high pressure of cerebro-spinal fluid is present, then in the postoperation period are necessary frequent spinal punctures during 7-10 days with the removal of large amount of liquid. However, the removal of fluid/liquid must be ceased upon the appearance of a head pain. In the cases of the normal pressure of fluid/liquid it is sufficient 1-2 punctures during the first day after process/operation.

Page 514.

An indispensable condition for this process/operation is the absence of any signs/criteria of pyoinflammatory process from the side of brain, shells and integuments of skull.

In the presence of paraventricular ulcer the course of process/operation substantially changes. To the fcreground protrudes the problem of the elimination of ulcer, whereas process/operation apropos of the rupture of ventricle acquires subordinate value. In such cases by the rupture of ventricle was ccnducted the total distance/separation cf paraventricular abscess, especially as autopsy or puncture of ulcer in these cases according to technical specifications is almost impossible.

The enucleation of abscess from the wall of ventricle with the aid of spatula, surgical diathermy and scalpel was conducted after the release of the rupture of ventricle from Rubtsov and removal of cerebro-spinal fluid (preliminarily bone defect was expanded in the direction of the predicted abscess or scar).

By accurately such mode were driven out from the wall of ventricle the festering scars of brain. In a number of cases after the distance/separation cf those festering Rubtsov with the accumulation of the bone fragments, which penetrate into the area of ventricle or rupture, was formed the defect cf the wall of ventricle by value from several millimeters to 1-1.5 cm. In such cases it was necessary place sutures to the walls of ventricle, which managed

almost always, although not easily.

In all cases where the process/operation was conducted in the absence of an inflammatory-purulent process, with the observance of all given above conditions, the postoperation course was completely smooth. Was observed the stable elimination of the rupture of ventricle, epileptic fits and considerable improvement in neurologic status. The pneumo-encephalography, produced in the series/row of patients after process/operation, she indicated the restoration/reduction of the subnormal sizes/dimensions of the victim of ventricle, which was achieved by the contraction of extensive area by his submerged there inherent walls (Figs. 201-202). Was noted also the restoration/reduction of sub-arachnoidal space at the level of damage/defeat.

Electroencephalography indicated the considerable restoration/reduction of the electrical activity of brain, appeared alpha-rhythm, rose the electrical activity of brain, appeared trace effects, disappeared epileptoid and acute/sharp waves.

The invariable/unchanged success of the procedure of surgical treatment indicated, the absence of lethal outcomes, liquorrhea, meningoencephalitis made possible from the end of 1944 to carry out the second moment/torque of process/operation - at a normal

intracranial pressure tc shut the extensive defects of skull by chondral-bone autotransplant, undertaken frcm edge/rib arc together with the waste/exiting from it two-three cuts of edges/fins.

The indicated autotransplant is preferable over others for a number of reasons: it [redacted] is possible to take any sizes/dimensions - to 15x10 cm; it is sufficiently elastic and at the same time dense/tight and is convenient for the simulation; it [redacted] is possible to cut and to stitch thrcugh; cartilage is almost nonvascular tissue, it begets well, it is very resistant to infection and usually it is not resolved. The latter differs well it frcm bcne transplant.

At a normal pressure of cerebro-spinal fluid and an absence of epileptic fits was conducted tne plastic occlusion of the defect of skull by a chondral-bone autotransplant one-time with process/operation apropcs of tne rupture of ventricle. No complications were observed, on the contrary, was noted a considerable improvement in the general condition and health of patients (Fig. 203).

Page 514a.



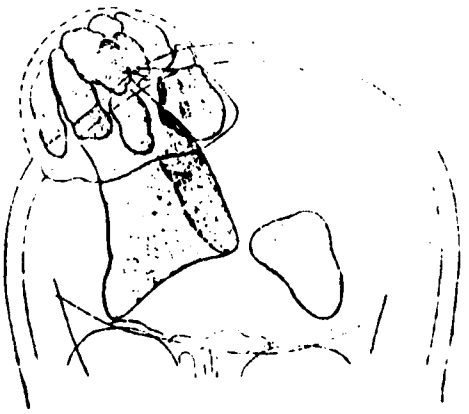


Fig. 201. Rupture of ventricle of brain. Encephalogram to process/operation. The posterior section of right lateral ventricle converts/transfers into rupture.

Page 514b.





Fig. 202. The same wounded after process/operation. Normal anatomical relationships/ratios of the ventricular system are restored.

Page 515.

In all it is produced of 65 process/operations. From them with the plastic occlusion of the defect of skull - 23. The period of the education of rupture at the operated patients oscillated from one to three years. The mortal cases it was not. The periods of observations after process/operation from one year to five years, in the latter/last cases - several months.

For one of the operated patients was the rupture of the fourth ventricle, which arose after the extensive wound of the right half cerebellum.

The sharp one-sided violations of motor and static coordination almost completely disappeared after the process/operation, produced 2 years after wound.

The invariable/unchanged success, observed after process/operation, and the considerable restoration/reduction of the function of the victims of the departments of brain should be explained number of factors: by release of brain from compression, by restoration/reduction of its natural mobility, by improvement in the

blood supply of brain, by restoration/reduction of its compensator function, restoration/reduction of the normal liquor routes/paths - ventricular system and cross-country ability of sub-arachnoidal space. The conditions indicated contributed to the restoration/reduction of the processes of liquor production and absorbing cerebrospinal fluid.

Everything said gives grounds to note that the surgical treatment of the extensive stable ruptures of the ventricles of brain is directed toward the essence of pathological process. Its major advantage consists in the fact that the process/operation is conducted without the autopsy of ventricle and for contracting the area of the latter are utilized their own walls of ventricle.



а б

Fig. 203. Rupture of cerebral ventricle. a) tc the process/operation; b) after process/operatien.

Page 516.

Pathogenesis, clinic, course of traumatic epilepsy of late periods.

The basic conditicn/position on which must be developed the contemporary concept abcut traumatic epilepsy, consists with respect to it as to the syndrome, cennected with the specific periods of the course of wound and cicatrizatien in brain.

For the duration of any period of the course of the wound of brain can occur epileptic fits.

Their clinical course in different periods has its distinctive features. In some periods the fits are observed one time and no longer they are repeated; into other periods they gradually disappear, into the third - unit at first fits become systematic; finally, in some periods of the course of the injury of brain the fits become systematic from the moment/torque of onset and are the basic syndrome of disease.

The reason for the diverse course of epileptic syndrome should be searched for in these clinical, pathomorphological and pathophysiological special features/peculiarities in terms of which differs one period of wound process from another. Pathogenetically fits can be connected only with that pathological process in cerebral tissue, which characterizes this period.

Prior to the beginning of the cicatrization of cerebral wound the fits are connected with the series/row of the processes, which appear in the development periods of early complications and their elimination (local compression of brain, edema and violation of the circulation of cerebrospinal fluid into the blood, the jet and purulent inflammations in wound).

The fits of early epilepsy are observed most frequently during the first days and in weeks after wound.

According to data of the maps/charts/cards of the deepened characteristic, early epilepsy with the penetrating wounds of skull is encountered into 2.6o/o cases. The character/nature of the wounding shell does not noticeably affect the frequency of the cases of early epilepsy. On the contrary, the known dependence of the frequency of fits on the character/nature of wound canal unconditionally exists. Most frequently early epilepsy was observed with the tangential wounds when cerebral cortex was damaged on extensive surface (2.9o/o). With the blind-end wounds of brain epilepsy was observed into 2.5o/o cases, with perforating wounds - only into 1.5o/o.

Known effect on the frequency of early epilepsy had traumatic complications with wound. If the wound of brain was not escorted/tracked by considerable hemorrhage, epilepsy was noted into 2.2o/o of cases. But if occurred considerable submembrane and intra-cerebral hematomas, early epilepsy appeared into 3.6o/o. In the hospitals of army and front area epileptic attacks/seizures/paroxysms in third of cases develcped during the first 20 days after wound.

Almost all attacks/seizures/paroxysms in these cases carried crust character/nature. Early epilepsy into 2/3 cases was observed with the wounds of sincipital region, less frequent with the wounds of frontal, it is still less frequent - temporal and finally rarely with the wounds of postcranial region. About the same tell the data of the maps/charts/cards of the deepened characteristic.

In the period of early complications and their elimination, and also in the period of late complications the epileptic fits of limber appeared at the moments of the greatest aggravation of inflammatory complication and abated together with the latter.

Page 517.

The relapse of inflammatory complications again led to the appearance of epileptic fits. However, there were the cases when inflammatory complications were eliminated, and epileptic fits were repeated. In the period of late complications and distant consequences when predominate the processes of cicatrization, condition for the development of fits others. Their frequency in the wounded in who from the moment/torque of the penetrating wounds of skull it passed more half a year, according to the data of the hospitals of the deep rear, achieves 33.0o/o.

Under traumatic epilepsy is understood the period of late complications and distant consequences of the wcunds of brain. In late period in tunicary-cerebral scar can be combined the processes jet-pyo-inflammatory with processes strictly cicatrizations. In this period still can develcp the abscesses or festerings of scar. However, in scar itself can flow/occur/last the completing chronic inflammatory processes.

The epileptic fits, caused by build-up/growth or aggravation of pyoinflammatory process in cerebral scar, are frequently only one of the symptoms and must be considered in light cf remaining clinical data, including research of cerebrospinal fluid. The chronic inflammatory process in scar, which is not resolved by festering and which is gradually eliminated in proportion tc the organization of scar, belongs to the fcrms, transfer from late period to the period of the distant consequences.

Cicatrical epilepsy of the period of the distant consequences is pure/clean traumatic epilepsy. Its frequency can be determined only during prolonged observation of the fate of wcunded with the penetrating damages of skull.

The effect of scar cn the development cf epilepsy is varied. In these cases the momentums, which cause the physicochemical changes of

the cerebral tissue and the violation of water metabolism/exchange, are combined with different pathophysiolcgical factors, which in the final analysis creates the permanent irritants.

Sizable role in this case play vascular violations (especially anemia) at a direct pressure of scar on its surrounding vascular net/system of the nearest sectors cf brain.

Appearing in these sectors changes acquire the value of secondary epileptic foci. These epileptogenic zones around scar have a tendency in the course of time tc be expanded.

The formation of scar affect different irflammatory complications with the healing of wound, vastness of the zone of primary traumatic necrcses and violation of the circulation of the cerebrospinal fluid and blood. As a result the surface departments of scar can be formed sufficiently well, while in its deep departments remain other foci of inflammation. The surface departments of scar in essence are formed due tc the collagenic mescdermal inclusions, while in the formation of deep departments of scar most frequently participate argyrophil and gliofibrillar fractions.

With cicatrical epilepsy there is a tendency toward the build-up/growth of fits.

Hidden the inflammatory process taking place in deep departments of the forming scar frequently affects character/nature and frequency of the attacks/seizures/paroxysms of epilepsy, which indicates the inclusion into the epileptogenic zone of the new regions of brain core.

Page 518.

If the formation of scar flows/occurs/lasts without inflammatory complications, epileptic attacks/seizures/paroxysms are more homogeneous and more permanent. The character/nature of cicatrical epilepsy affects also the abundance and the depth of scar, the degree of collagenation, wrinkling and hyalinization, regressive changes in the vessels of scar, necrosis of its tissue, education of cysts in poriferous scar, presence of foreign bodies and reaction of tissue of brain to their presence.

In a number of cases within the distant periods after wound in the surface departments of scar are formed the expansions of subarachnoid spaces, up to the appearance of sub-arachnoidal cysts. Epileptogenic zones in these cases are expanded, capturing different sectors of brain core. Epileptic attacks/seizures/paroxysms are

frequently characterized by the stimulation of the fields, situated near from the place of wound. For example, the wound of frontal-sincipital-temporal region is frequently escorted/tracked by the stimulation of motor orbicular zone. Subsequently into the zone of stimulation are involved the centers of temporal region in combination with vestibular, auditory or gustatory aura. At the same time the appearance of a whole series of epileptic attacks/seizures/paroxysms can occur as a result of the violation of the circulation of cerebrospinal fluid in the region of wound. In proper time used dehydration with the discharge of cerebro-spinal fluid can break epilepsy.

With wound, and also in the process of cicatrization can be formed the cysts, the diverticula and the courses, which are communicated with ventricle, which in turn, can serve sometimes as the source of epilepsy.

In the similar cases to the clinical manifestations of the stimulation of brain core before the epileptic rank are connected the paroxysms of hyperemia of body and face. An increase in the volume of porencephalic course can lead to the appearance of tonic spasms, nystagmus, diplopia, etc., giving indications of participation in the process of the deep departments of brain and ventricular wall.

Most frequently the late epileptic attacks/seizures/paroxysms appeared after 9-14 months after wound. The healing of the wound of brain was frequently escorted/tracked meningo-encephalic or by abscess. In many instances epilepsy had distinct numbers of cavities of course. Epileptogenic zone usually coincided with the sector of wound and the disposition of bone defect.

Upon the more extensive decomposition of brain, with the development of massive scar and the pulling of the wall of ventricle, epileptogenic zone frequently was spread beyond the limits of bone defect.

The extensive decomposition of cortex and subcortex with tangential or segmental wounds led subsequently to heavy epileptic attacks/seizures/paroxysms. Multi-fragmentation damage of brain with the fan-shaped disposition of wound courses were characterized in majority by the general/common/total type of epileptic attacks/seizures/paroxysms.

The density of scar and the poverty of its vascularization, and also degenerate changes in its tissue contribute, as has already been indicated, to the development of circulatory violations in the frontier with scar zone of brain. Adhesive tunicary-crust changes also disrupt cerebrospinal fluid and blood circulation in the

adjacent with scar sectors of cortex. Which are formed in this way secondary epileptogenic zones ccntribute to the diversity of epileptic attacks/seizures/paroxysms.

Page 519.

The formation of cysts in sub-arachnoidal space, in the thickness of brain, and also deformation by the scar of the walls of ventricle disrupt water metabolism/exchange in cerebral tissue and they manifest themselves in the build-up/growth of epileptic syndrome and the frequency increase of fits. In the similar cases surgical intervention gives the dcubtless effect.

Special importance for a complete understanding of character/nature and course of posttraumatic epilepsy have inflammatory processes in brain and scar tissue.

The outcome of such chronic inflammatory processes in cerebral scar, as indicated L. I. Smirnov, can be either their gradual elimination, together with the individual outbreaks of aggravations or march/passage into festering. Epileptic attacks/seizures/paroxysms in many respects depend on the ccurse of inflammatory processes in scar. Frequently the similar chronic inflammatory processes lead to the education of epilepsy in the period of the late complications of

the course of the wounds of brain, its prolonged existence and tendency toward build-up/growth. The appearance of epilepsy against the background reinforcing of headaches, subfebrile temperature and heavy postepileptic condition force to assume the presence of inflammatory process in scar and the possibility of considerable changes in border zone. By this fact it is possible to explain the continuation of epileptic fits after the elimination of inflammatory process.

Everything said leads to conclusion about the existence of two forms of epilepsy, to a considerable degree of those of mutually connected with each other.

Discussion deals with the liberation/excretion of purely cicatrical traumatic epilepsy, period of late complications, frequently being caused by the outbreaks of purulent complications in the form of abscess or festering of scar and continuing in the period of the distant consequences of the wounds of brain.

In the demarcation of the noted forms of cicatrical epilepsy the vital importance acquires the retrospective analysis of the course of the early periods of the wounds of brain with the development/detection of the former inflammatory complications. It is logical that the inflammatory processes can convert/transfer in the

period of late complications and cause the appearance of the second form/species of cicatrical epilepsy.

In clinical evaluations of late chronic inflammatory complications decisive importance have observations of the dynamics of epileptic syndrome, appearance of individual neurologic symptoms, their interconnection, character/nature of the general/common/total reaction of organism, results of the research of cerebrospinal fluid, and also roentgenological and electroencephalcgraphic data. It is important to also demarcate the nonpurulent forms of inflammatory process from purulent forms. Sharp growth of general cerebral and local symptoms, deterioration in the health of patient, appearance of strain of scar, its protrusion, sickliness and decrease of pulsation, appearance of general/common/total apathy, retardation, symptoms of the stimulation of cerebral shells are observed with purulent forms. With nonpurulent forms these phenomena are expressed less sharply and soon they pass.

Furthermore, with purulent forms usually are connected the symptoms of intracranial pressure, the build-up/growth of local symptoms, and also the frequency increase of the fits, which convert into a series, and sometimes also general/common/total continuous convulsive fit. In the unit of the observations large attacks/seizures/paroxysms are combined with numerous, almost

permanent low fits.

Changes in cerebrcspinal fluid are detected hardly ever. Pleocytosis and increase quantities of protein in individual analyses tell most frequently abcut the limply elapsing inflammatory process in scar.

Page 520.

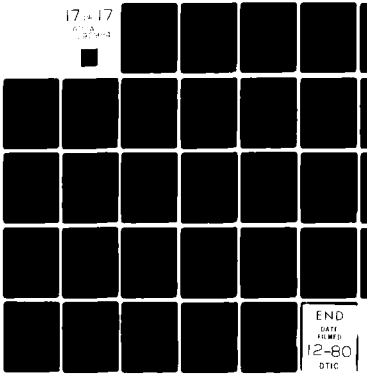
Upon transfer of inflammatory process into the chronic form of change in cerebrospinal fluid they are made by stable ones. Most frequently these changes are characterized by an increase in the content of protein to $1^0/_{00}$. The penetration of infection into liquor routes/paths and tissue slots produces an increase in the pleocytosis.

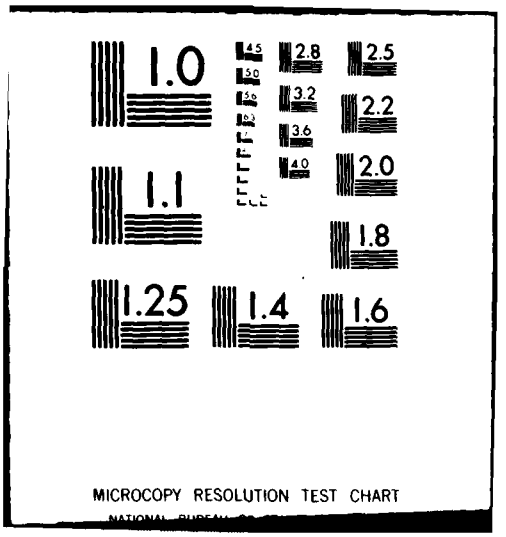
High value for evaluation of each case of traumatic epilepsy acquired pneumo-encephalcgraphy. By this methcd is revealed/detected the character/nature of Rubtscvs of changes in brain, are established/installed changes in subarachnoid spaces, changes in the walls of ventricles, degree and form of hydrccephalus, presence of porencephalus or communicated with ventricles cysts of brain.

With electroencephalography for wounded with epilepsy there are

AD-A090 984 FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OH F/G 6/5
THE EXPERIENCE OF SOVIET MEDICINE IN THE GREAT PATRIOTIC WAR 19--ETC(U)
FEB 80 V N SHAMOV, B A SAMOTOKIN

UNCLASSIFIED FTD-ID(RS)T-1925-79 NL




1.0
1.1
1.25
1.4
1.6
1.8
2.0
2.2
2.5
2.8
3.2
3.6
4.0
4.5
5.0
5.6
6.3
MICROCOPY RESOLUTION TEST CHART

revealed changes in the action currents of cortex, while during chronic inflammatory processes even and wide irritation with qualitative changes of the electrical activity in the form of pathological waves and increases in the asynchronous oscillations.

SURGICAL TREATMENT OF TRAUMATIC EPILEPSY OF LATE PERIODS.

The experience, acquired during the Great Patriotic War and in postwar years, shows that by wounded, who transferred bullet traumas of the brain, the surgeons should pay serious attention and in the late period after wound, since the complications, which appear in this period, frequently require surgical intervention. Most frequently in late periods is encountered the clinical symptom complex of traumatic epilepsy.

Different complications in the form of inflammation or festering of cerebral scar, adhesive arachnoiditis or formation of cysts under shells and in cerebral tissue frequently flow/occur/last in the escort/tracking of epileptic symptom complex.

Judgments about the surgical treatment of traumatic epilepsy and about its results, voiced below, are based on the observations of 200 those wounded the brain, in which after injury developed convulsive fits. These wounded were operated in the institute of the

neurosurgery im. academician N. N. Burdenko within the time of war. In 86.5o/o of cases were the bullet penetrating wounds of skull, into 2.5o/o of cases - wound silent weaponry and into 11.0o/o case - closed and air injuries. In the group of wounded with bullet damages fragmentation wounds composed 85.0o/o and bullet - 15.0o/o. Frequency and remoteness of the onset of convulsive fits were different.

Among the wounded, in whom after penetrating fragmentation injuries of skull in late period developed traumatic epilepsy, predominated persons with the damage/defeat of frontal and sincipital regions.

In 36.0o/o of cases bullet wound was combined either with additional contusion from the incidence/drop or with air contusion. Additional contusion in the genesis of epilepsy after the combat penetrating wounds and in the outcomes of treatment plays the leading role.

Surgical interventions apropos of late traumatic epilepsy were conducted in essence in time from 1 year to 4 years from the moment/torque of wound.

Of those 200 operated by 57.0o/o they were found under the observation of institute from 1 year to 2 years (inclusively), 27.0o/o - from 2 to 3 years and 16.0o/o - from 3 to 4 years.

Page 521.

In the given below report/summary are shown the means of interventions which were either basic (with individual intervention), or they were the complex of one process/operation. Almost with each process/operation it was necessary to drive out scars.

As is evident, form and character/nature of surgical interventions with traumatic epilepsy were extremely diverse. In the presence of convulsive fits the surgeon most frequently attempted to remove pathological sector in the brain, which was the initial focus of convulsive fit, first of all cerebral scar in the place of epileptogenic zone.

Were conducted the complete carving of cortex in this zone, incision of cortex in the place of epileptic focus, alcoholization of the corresponding focus in cortex. A. L. Polenov proposed at the depth of 2-3 cm to hew the corticospinal tract, going from epileptogenic zone. It was proposed excision of arachnoidal shell. Some authors indicated the preferred interest in the epileptic suffering of the shells of brain and proposed to make

meningo-encephalosis. L. L. Levshin, A. N. Bakulev and other Russian surgeons fixed/recorded attention in the presence of cystic educatien with bullet injury and they indicated the need for their surgical treatment. If surgical intervention in the stricken area of brain proved to be unsuccessful, then they turned to old methods, for example, to "valve/gate" according to Kocher, or simple decompressive trepanation with purpose of lowering of intracranial pressure. Trepanation was supplemented sometimes by the perforation of calloused body. If epilepsy was combined with hydrocephalia, it was proposed to drive out the vascular webes/plexi of cerebral ventricles. For an action on the pathologically changed blood circulation of brain was conducted the sympathectomy of jugular glands, the denudation of carotid artery or the dressing of spinal and even carotid artery.

However, in the considerable majority of the cases none of the enumerated methods of process/operation usually gave positive results, but in a number of cases (according to old literature data) of the consequence of similar process/operations they were even negative of success it was possible to attain into 7.0-25.0o/o of cases.

Means of surgical interventions apropos of traumatic epilepsy.

(1)	(2)
Удаление грубой рубцовой ткани	92 случая
(2) Удаление костных осколков	62 »
(3) Удаление металлических осколков	23 »
(4) Вскрытие и ликвидация кист	56 случаев
(5) Менинго-энцефалолиз	33 случая
(6) Удаление гранулом	22 »
(7) Производство порэнцефалии	5 случаев
(8) Перфорация мозолистого тела	2 случая
(9) Пластика стенки желудочка	27 случаев
(10) Удаление петрификата в мозгу	2 случая
(11) Удаление старой капсулы абсцесса	8 случаев
(12) Удаление костного трепанационного лоскута и операция остеомиэлита черепных костей	7 »
(13) Вскрытие, удаление содержимого и иссечение гнойных свищей	10 »
(14) Операции преимущественно на сосудистой мозговой сети	12 »
(15) Перевязка сагиттального синуса	2 случая
(16) Коагуляция сосудистого сплетения бокового желудочка	1 случай
(17) Пересечение подкорковых путей	4 случая
(18) Операции на каротидном синусе	4 »

Key: (1). Distance/separation of rough scar tissue. (2). Distance/separation of bone fragments. (3). Distance/separation of metallic fragments. (4). Autopsy and elisination of cysts. (5). Meningo-encephalosis. (6). Distance/separation of granulomas. (7). Production of porencephalia. (8). Perforation of calloused body. (9). Plastic of wall of ventricle. (10). Distance/separation of petrificate in brain. (11). Distance/separation of old capsule of abscess. (12). Distance/separation of bone of trepanation graft/flap and process/operation of osteomyelitis of cranial bones. (13). Autopsy, distance/separation of contents and carving of purulent fistulas. (14). Process/operations predominantly on vascular cerebral net/system. (15). Dressing of sagittal sinus. (16). Coagulation of vascular web/plexus of lateral ventricle. (17). Intersection of

subcortical routes/paths. (18). Process/operations on carotid sinus. (19) the case.

Page 522.

In the period of the Great Patriotic War the well set specialized surgical aid and the correctly fixed subsequent line-of-communication treatment made it possible to maintain life many by that wounded the skull with the large damage/defeat of brain which in past wars unavoidably would perish. However, the extensive damages/defeats of brain bring, as show prolonged observations, to considerable cicatrical replacements of cerebral tissue and large liquor and hemodynamic disorders. In this case is frequently detected also the presence of the extended foci of unending inflammatory process into which frequently are involved the walls of lateral ventricles, subcortical education and third ventricle. Frequently into the complex of the phenomena of traumatic epilepsy is involved the central apparatus of vegetative nervous system. This fact indicated the Soviet authors. The damages of brain lead to large changes in its substance not only in the place of wound, but also in considerable zone around wound canal. Pathomorphological data indicate that the formation of scar in brain passes different stages, moreover to the adjacent to scar sectors of cerebral tissue are noted the progressive atrophic and degenerate changes. Frequently in brain

are detected the remainders/residues of old hemorrhages, the smallest bone fragments and metallic dust, cystic areas in different stages of shaping (small/fine and large/coarse), and also considerable violations of blood circulation (ischemia, venous stagnation, etc.). These diverse and multilateral changes are elaborated by L. I. Smirnov, P. Ye. Snesarev et al.

Since the true pathogenesis of epileptic suffering in essence, until now, is not yet known, treatment to known degree remains symptomatic. Surgeon's task lies in the fact that as far as possible to consider all pathological factors of each such case and to act simultaneously on the largest possible quantity of components/links in the pathological circuit or this suffering. Therefore undertaken in these cases surgical interventions had as a goal first of all to remove the stimulating cicatrical factor, i.e., to retract the rough tunicary-cerebral scar, which substituted the damaged cerebral tissue and the fixative the hemisphere of brain in the region of defect in skull. Together with cerebral scar were driven out the foreign bodies - bone and metallic fragments, remainders/residues of the capsule of the former abscess, granuloma, i.e., all that which can reinforce the stimulating effect of scar. At the same time attention was paid to hemodynamic and especially liquor-dynamic disorders. For the elimination of the local phenomena of edema of brain and restoration/reduction of normal tissue metabolism/exchange in

cerebral tissue removed, as far as possible, vasomotor disorders and restored the free circulation of cerebrospinal fluid and normal liquor pressure. Simultaneously with the accomplishment of the objectives indicated was conducted step-by-step plastic surgery of the area of skull and integuments of head. The final goal of all enumerated measures consisted in as far as possible removing of the pathological consequences of injury and creating into the areas of the skull of condition, approaching normal, physiological ones.

With the accomplishment of all enumerated objectives the basic elementary laws of neuro-surgical process/operations remained firm: the smallest traumatization of cerebral tissue and the careful cessation of hemorrhage with the distance/separation of all remainders/residues of fresh hematomas.

Page 523.

The observance of these laws was necessitated, first of all, the ensuring of as far as possible the nourishment of tissues in the sectors of brain, adjacent with cerebral scar, even without that considerably disrupted, the new rough injury dooms them to degeneration with the subsequent cicatrization and the thereby expands the region of the former damage of brain. Careful operating hemostasis and least possible traumatization of cerebral tissue they

must, furthermore, to ensure patient from the subsequent outbreaks of the inflammatory process and onset of secondary joints and intergrowth. Heavy post-operation course with the aggravation of inflammatory process, high temperature, by meningeal phenomena it is noted exactly in such cases where during process/operation there was considerable hemorrhage and excessive injury of cerebral tissue.

All surgical interventions apropos of traumatic epilepsy were conducted under local novocaine anesthesia and only in the exceptional cases when convulsive fit on operating table mixed process/operation, it was necessary to resort to hexobarbital anesthesia (to 200 process/operations in 12 cases).

It is possible to distinguish three typical operational methods with traumatic epilepsy. The first method - prccess/cperation with the formation of skin-muscular-bone graft/flap (it is used into 18.0o/o). The second method - of decompressive access when to the place damages/defeats in brain approached by expanding the trepanation aperture (into 60.0c/o). Finally, the third method when decompressive approach concludes plastic with the occlusion of bone defect and decompression is established (into 20.0o/o); in certain cases (2.0o/o) are used other methods of the process/operations, which do not have wide practical value.

It is necessary to add that in such cases of traumatic epilepsy with which there were purulent unhealing fistulas with the frequent aggravation of inflammatory phenomena in brain, process/operation was reduced to the elimination only of the focus of infection. After fistulography was cut the fistula and were driven out the festering sectors of cerebral scar together with foreign bodies, granuloma, capsule of old abscess and the like (such process/operations were produced in 26 wounded). In the half the cases these process/operations were only the first stage of the surgical treatment of traumatic epilepsy. Approximately/exemplarily in 6 months, if epileptic fit was repeated, it was necessary to resort to wider surgical measures.

The osteoplastic method of operational approach with traumatic epilepsy in essence was applied with the closed injury of skull, with the wound of skull by silent weaponry, also, in certain cases of the unfinished wounds where the defect of skull remained perforated and had low sizes/dimensions. With this form of operational approach it is necessary to bear in mind dense Rubtsovs' presence the intergrowth between bone and casualty sector of solid cerebral shell and brain. If we do not consider this fact at the moment of tilting bone graft/flap, it is possible to obtain considerable hemorrhage. Abundant hemorrhage during process/operation impedes the alignment of surgeon. Therefore before tilting of bone graft/flap it is necessary

tunicary-cerebral scar to separate/liberate from bone, best anything with the aid of a raspatory. As has already been spoken, osteoplastic approach was used into 18.0o/o of cases, moreover in one third of these cases with process/operation arose strong hemorrhage and was required the blood transfusion, and in other cases was formed subcutaneous hematoma, which required emptying in post-operation period.

Page 524.

The ordinary method of the process/operation of traumatic epilepsy after bullet wounds was the decompressive approach to stricken area. This method is less traumatic, than osteoplastic, and at the same time provides a good access to the place of damage.

Process/operation began with the carving of skin scar, and therefore the sections/cuts of the soft integuments of skull were done in the direction of previous ones, being lengthened in the form of letter S: this made it possible to widely open trepanation aperture and it is better to mobilize skin rags for their subsequent cross-linking. In this way were provided good approach of skin edges and airtightness of skin sutures, what is important factor subsequently the healing of operating wound. The crossing of old ones Rubtsov by new sections/cuts, without their carving, always threatens

by the possibility of the post-operation necrosis of the sectors of skin. The latter fact caused in one case by liquorrhea, secondary infection and death from meningitis. In order to ensure a good occlusion of skull, it was necessary process/operation in 4 cases to make into two rates/tempos, moreover the first time were driven out only skin scars and were mobilized the sectors of skin rags.

Subsequently was conducted the careful separation/section of tunicary-cerebral scar from the edge of the trepanation aperture. Then with the aid of Luer forceps was driven out the changed edge of bone so that everywhere would be visible the edge of normal solid cerebral shell. Usually it was necessary to bite bone approximately/exemplarily on 1 cm. Sometimes where during removal of fragments in the diploe were detected granulations or sectors, suspicious to the osteomyelitic process, distance/separation of bone it was conducted within necessary limits. In the places of the former cracks of cranial bones was observed considerable hemorrhage. Sometimes with the closed injuries of skull scrap of the arch/summary of skull, without losing connection/communication with cranial bones, proved to be turned and introduced depthward cerebral substance. It was necessary to gradually remove pieces, preliminarily freeing/releasing them by a rasparatory from the scars connecting them with the cerebral tissue; this genus of process/operation they were usually sufficiently traumatic. Hemorrhage from bone tissue

stopped well by special paste.

In the following stage of process/operation was cut solid cerebral shell or its scar near frontier shaft (place of the former damage of solid cerebral shell); the hence Rubtsov changed shell gradually was separate/liberated from cerebral tissue to the limits of normal solid cerebral shell and it is further to free subdural liquor spaces. The latter was integral part of the surgical treatment in each case of traumatic epilepsy. However, with that extended arachnoiditis this moment/torque of process/operation always it was not possible to carry cut completely. In certain cases under scars changed with plate solid cerebral shell were encountered cystic areas or tender intergrowth, and then this changed unit of the shell it was possible to maintain and to utilize for plastic targets, after freeing it from rough cicatrical layerings and strands, leading into the depth of cerebral tissue. More frequent tunicary-cerebral scar was the continuous mass, exiting to cerebral tissue. In such cases this entire rough scar was separate/liberated from the maintained cerebral tissue with preliminary hemostasis of an entire vascular net/system, frequently in the abundance of adequate/approaching the scar from the side healthy/sound solid cerebral shell and from the side of undamaged/uninjured cerebral cortex. Frequently similar scars penetrated to the very wall of the lateral ventricles of brain. Together with scar were driven out all foreign bodies and granulomas,

frequently containing purulent accumulations. Difficulties during the distance/separation of all pathological elements/cells indicated were encountered when bone or metallic fragments were arranged/located fan-shaped and deeply. Bone fragments as far as possible always completely extracted, and metallic drove out only in such a case, when they were available. In the high percentage of the cases with process/operation apropos of traumatic epilepsy was encountered cystic formation as directly in the submeningeal spaces, it is so intracerebral within ventricular area.

Page 525.

Cysts were observed in the layers of cerebral scar, in periphery or behind granuloma and foreign bodies. These cystic areas were first of microscopic sizes/dimensions, then they reached the value of orange, they contained the fluid/liquid, analogous to normal cerebrospinal fluid, sometimes with the increased quantity of protein. Latter/last fact must be born in mind upon the diagnostic examination/inspection of patients, that suffer traumatic epilepsy. The increased content of protein in cerebrospinal fluid, which was being encountered into 37.0o/o of cases, into 17.0o/o was only connected with the presence of inflammatory process in brain and shells. With process/operation all cysts usually were revealed, the contents them was exhausted, dense cicatrical education in the periphery of cyst was driven out,

vascular net/system in the lumen of cyst and thicker than its wall was annihilated by coagulation. Thus, the area of cyst obtained free communication/report with arachnoidal spaces. If cyst was communicated with the area of the ventricle of brain, i.e., there was porencephalia, the remainders/residues of the wall of cyst and remaining unremoved/uneliminated sectors of cerebral scar was used for the plastic occlusion of aperture in the wall of ventricle. Sutures on the wall of ventricle were laid usually into 2-3 floors. In the majority of the cases of the damages/defeats of the ventricles of brain this proved to be possible. Only in 5 cases it was necessary to leave a porencephalic aperture, in consequence of which the area of ventricle obtained permanent communication/report with liquor sub-arachnoidal space. With the education of intracerebral or subdural cysts the latter in the course of time so were delimited from the surrounding tissue that was disrupted the diffusion of fluids/liquids, and then set in first local compression phenomena, and thereupon general/common/total symptoms of hypertension, which required urgent surgical interventions in the form of the autopsy of cysts and setting of the communication/report of their areas with sub-arachnoidal cerebral space. Neither drainage nor stopping of the area of cyst by gasket or grease it was conducted. Wounded, whose cystic areas were isolated within ventricular system, required special attention, also, sometimes even of special surgical interventions. In those, who transferred the wounds of the area of

lateral ventricle, at the moment of process/operations within ventricular system found the finest films, which divided the area of ventricle into the series/row of the individual chambers/cameras, within which passed trabecular filaments with the vessels, feeding the walls of these education. With process/operations all these trabeculas with vessels thoroughly coagulated, and in this case were destroyed intracavitary partitions/septa. In one case when the unit of the area of lateral ventricle was completely separated of remaining ventricular system, it was necessary to resort to process/operation according to the method of Dandy. In the isolated department of lower crescent was a unit of the vascular web/plexus of ventricle. In order to cause emptying of a similar cyst, chorcidal web/plexus was coagulated, which gave the excellent therapeutic result: cyst grew desolate, epileptic fits during year were not repeated.

With process/operations apropos of epilepsy after the closed injuries of skull usually was detected the presence of the spilled changes in arachnoidal shell, regardless of the fact, there were or not extended intergrowth with solid and soft cerebral shells, and also sub-arachnoidal storages of cerebrospinal fluid according to the type of cysts, and sometimes the presence of intracerebral cysts. Process/operations were reduced to extended encephalosis and notches of arachnoidal shell on the course of vessels and autopsy of cystic

education. With the pathologically develcped vascular net/systen of brain in these cases was conducted the ccagulaticn cf surplus developed veins. In strictly focal fits, but absence of explicit changes in brain in 4 cases was without result nade the process/operation of the intersection of corticospinal tracts.

Page 526.

During all manipulations in cerebral tissue always was carried out careful hemostasis and necessary distance/separation toward the end of the process/operation of blcod clcts, especially from the areas of the ventricles cf brain. It is here again unsuperfluous to recall that in all cases of traumatic epilepsy were driven out all rough collagenic scars which pulled and were fixed/recorded the casualty departments of brain to the region of the trepanation defect and thereby they impeded the normal pulsating movements of cerebral hemispheres. When is cut all over rough scar tissue, there is no need for driving out entire pathologically changed cerebral tissue. Tender gliofibrillar formation in brain can be left, since their distance/separation is conjugated/combined with the new damage of the frontier healthy/sound sectors cf brain and their subsequent death.

For warning/prevention subsequently of the onset of new joints and intergrowth of dura mater with the subject cerebral tissue

sometimes was done the stitching of dura mater to the aponeurosis, but under shell toward the end of the process/operation was introduced in surplus quantity the physiclogical solution. In post-operation period in a day/every other day was introduced intralumbar air on 20-30 cm^3 with purpose of creating the temporarily air space between shells and thereby to impede the formation of new growths.

The following stage of process/operation after the termination of processing cerebral tissue consisted of the plastic of the defect of the dura mater, which was conducted by all process/operations apropos of traumatic epilepsy. Exclusion were only the cases of process/operations with the presence of the suppurations in brain, which required the draining of purulent areas. As plastic material most frequently were utilized facial tissue, aponeurosis, fascia of temporal muscle, wide fascia of thigh. Sometimes (into 13.0o/o) after the appropriate processing was applied cicatrical plastic surgery, replacing defect. Most expediently this was when under the scar of solid cerebral shell was detected the cyst whose internal surface greatly resembled ordinary facial tissue. Sometimes, with the relatively small defects of solid cerebral shell, it was possible to produce plastic surgery using N. N. Burdenko's method. Seam in dura mater must ensure sealed/pressurized occlusion; therefore is more preferable the superimposition of the continuous weld.

A question about the plastic of the bone defects of skull, based on materials of the Great Patrictic War, was solved differently. The plastic occlusion of bone defects received wide acceptance in last year of war. Bone plastic surgery was conducted predominantly after 3 years from the moment/torgue of wound, if during last year in brain it was not inflammatory phenomena. Earlier cranioplasty was conducted only by the absolutely smooth course of the penetrating wound of skull.

As readings to the occlusion of defect served usually or the considerations of cosmetic order/formation (during the large defects of skull and its disfiguration), or they were dictated by the presence of permanent heavy headaches, with their aggravation during fluctuations of atmospheric pressure, and also traumatic epilepsy with considerable liquor-dynamic disorders and lowered/reduced liquor pressure. After the distance/separation of granulomas or cerebral scar with fragments and loculi/nests of inflammatory phenomena plastics it was not conducted. With the plastic process/operations of occluding the defect of skull in the institute of neurosurgery were applied the following methods: plastic by polymethyl methacrylate in 62 cases, plastic by putrid cartilage - in 13 cases, autotransplant from edge/fin (according to V. I. Dobrotvorskiy) - in 10 cases, by

plate from the bones of skull (according to A. L. Polenov) - in 5 cases, by bone filings - in 5 cases, by plate from the aponeurosis with periosteum - in 12 cases, by racket from silk (according to P. I. Budin) - in 2 cases.

Page 527.

On the requirements of the reliable occlusion of wound with use/application the plastics of the soft integuments of skull it spoke in the beginning of present chapter. Process/operation most frequently concluded with the abandonment of subcutaneous drainages. The rubber graduates through days were driven out.

The course of the post-operation period with traumatic epilepsy was sufficiently typical, and complications in this period rarely had any considerable special features/peculiarities. In 8.0o/o of cases it was necessary to leave permanent drainage, and wounds healed by secondary tension (cases of festering of cerebral scar, purulent infiltration of tissues in the periphery of foreign bodies, etc.). During the imposition of anechoic suture (42.0o/o) in post-operation period sometimes was formed subcutaneous hematoma with the subsequent festering of wound (into 3.0o/o of cases). This chiefly occurred when in tunicary-cerebral scar was a concealed/latent infection. In 12.0o/o of cases during seeding/inoculation of the small pieces of

the scar tissue, removed from brain, or fragments was detected an increase in flora (more frequent than others - nonhemolyzing staphylococcus). Besides this, in festering of wound, it is doubtless, the leading role it played another factor.

When with process/operation considerably were damaged tissues, there was hemorrhage and remained hematoma, rather appeared infection.

In post-operation period frequently was noted the inflammation of cerebral shells, the build-up/growth of local ones, and sometimes general cranial phenomena with the cerebrospinal and intracranial pressure increase. Especially frequently this was in the cases with considerable liquor-dynamic disorders and damages/defeats of the lateral ventricles of brain. Almost always the phenomena of intra-cerebral pressure increase toward the end of the first week gradually came to nothing. Approximately/exemplarily into 20.0o/o of cases were noted the more sharply pronounced meningeal and encephalytic phenomena, frequently from ependymitis with hyper-albuminose and large cytosis in cerebrospinal fluid, and also the long keeping high temperature. However, the phenomena indicated it was possible to eliminate during two-three weeks, applying lumbar punctures, dehydration, sulfanilamide preparations and penicillin. Post-operation liquorrhea was noted into 3.0c/o of cases; of them

only in one case with artificially made porencephalia developed ventricular liquorrhea (wounded died).

Epileptic fits sometimes were observed on operating table during manipulations on cerebral scar. In post-cperation period epileptic fits were noted not more than into 10.0o/o of cases, it is more frequent during the first 2-3 days; subsequently for a period of the first 2-3 months after the process/operation of fits usually it was not observed.

With cranioplasty with the aid of polymethyl methacrylate in post-operation period during approximately/exemplarily two weeks it was necessary to make subcutaneous punctures in the region of the grafted/transplanted plate and to extract xanthochromic fluid/liquid (10-30 cm³). Fluid/liquid this, apparently jet tissue transudate, sometimes with the admixture/impurity of liquor, disappeared after 2-3-5- punctures.

On the outcomes of surgical interventions give representation the following numerals: a good result is obtained in 70 cases (35.0o/o), satisfactory - in 42 cases (21.0o/o), the condition of wounded did not change in 73 cases (36.5o/o), it deteriorated in 12 cases (6.0o/o), it died 3 wounded (1.5o/o).

The vast majority of wounded after process/operation was found under observation on 2 years and it is more; about the half these all wounded they passed repeated stationary examination/inspection and they were subjected pneumo-and to electroencephalography. Observations showed that in the majority of the cases the relapse of fits appears during the first year after process/operation. The appearing fits much later bear faster incidental character/nature and are not the doubtless indicator of the return of disease/sickness/illness/malady.

Therefore according to observation data, which were continuing year, can be tentatively judged about outcomes.

Page 528.

Stopping on the positive results of the surgical treatment of traumatic epilepsy, it is necessary to indicate that into the group of wounded with good results (35.0%) they were referred operated, whose convulsive fits completely ceased or during two years of observation there were not more than 1-2 times. In this case the fits most frequently bore random character/nature and appeared (in the vast majority of the cases) as a result of the elementary violation of ordinary antiepileptic mode/conditions and nourishment with observance of which the fits were not renewed, which made it possible

for this category of patients to fulfill its customary work.

In the group of those operated with satisfactory results (21.0o/o) are referred wcunded whose convulsive fits after process/operation became considerably less frequent (in some of them was noted tendency toward the contraction of the epileptogenic zone), and also wounded whose fits after the process/operation began to flow/occur/last without the lcss of consciousress or were replaced by epileptiform fits of the type petit mal. This sick categories even if always could not return to their previous speciality, then in any case they maintained capability for work.

In 42.5o/o of cases is noted the relapse of fits. Relapse attacked/advanced in the gap/interval between 2 and 8 months after process/operation, most frequently after expiration of 4 months. In 36.5o/o of cases through the shcrt period after process/operation the fits became so/such frequent and lasting as tc process/operation. In 6.0o/o of cases is ncted the progressive deterioration, which was reduced to the frequency increase of fits, scmetimes to the appearance of series of fits, during 1-2 days; in other cases set in epileptic status, which required special surgical measures. Subsequently in this grcup of wcunded the fits were done increasingly more frequent and heavier and finally gradually they led to the degradation of intellect - epilepsy accepted malignant progradient

course.

Lethal outcomes after process/operation require individual, more detailed illumination. One patient with parasagittal wound and considerable intracerebral cyst after porencephalia it perished, as has already been spoken, from the secondary infection of brain and shells in connection with the necrosis of skin graft/flap and ventricular liquorrhea.

By the second patient it perished after the distance/separation of cerebral scar with purulent foci in connection with the dissemination of suppuration. In the third case death is connected also with the development of infection and multiple hemorrhages in subcortical regions. The distance/separation of the cerebral scar which achieved the wall of lateral ventricle, it caused a series of epileptic fits on operating table and during the first days after the process/operation; to the 4th day of the phenomenon of infection they sharpened. Wounded it perished to the 10th day after process/operation.

Outcomes. The results of surgical intervention with epilepsy, depending on the periods of the primary processing of the wounds of skull, are represented in Table 58.

Positive result of operation with epilepsy is feasible with any period of the primary processing of the wound of skull; however, the best results were obtained nevertheless when processing was conducted into the first three days after wound.

The analysis of the results of surgical treatment apropos of traumatic epilepsy depending on the period, which passed from the moment/torque of wound to process/operation, it makes it possible to accurately establish that the earlier process/operations more frequently give the best final outcome. Certainly, early process/operations are possible, where early disappeared infection, therefore, in the cases of lighter wounds when process proceeded generally more favorably.

Page 529.

Statistical data make it possible to draw the conclusion that the results of operation, produced in the first three years after wound, are much better than with interventions, realized in the later periods: a quantity of those recovered after early process/operations approximately/exemplarily three times more.

The positive results of treatment are obtained in patients both with that closed and with the open injury of skull and brain.

However, in patients with air ccntusion the process/operation of positive result did not give. During the open damages/defeats, which were being escorted/tracked simultaneously by contusion, positive results are obtained 2 times less frequently than with the same wounds without contusion. The extended changes, called by contusion, create, apparently the ccnditions, unfavcrable for the elimination of convulsive fits.

The elimination cf inflammatory focus in brain in the fcrm of the festering scar, and also foreign body with granuloma either entirely ceased convulsive fits, or it ceased them to that moment/torque, until was included a new factcr - liquor-dynamic, hemodynamic, cicatrical, or did not appear any another component/link in the circuit of the pathogenetic factors cf epilepsy. Thus, with traumatic epilepsy the distance/separaticn cf infectious foci is unconditionally necessary, but in a number of cases it is only the first stage of treatment.

The vastness of the damage/defeat of cerebral tissue, the severity of the course of traumatic epilepsy, which was being escorted/tracked by the series/row of consecutive complicatcns in the form of the abscesses of brain, spilled meningitides and ependymites, reduced the percentage of gcod cutccmes. Nevertheless in 19 cases (of 27) doubtless of the severe injury of skull with the

damage of the lateral ventricles of the brain (with process/operation apropos of epilepsy it was necessary to lay sutures on the wall of ventricle) is nevertheless obtained positive result.

The complete elimination of the reasons for the violation liquor-circulation always ceased convulsive fits. If surgical intervention conducted was not sufficient to radical ones and the violations of liquor circulation were renewed, attacked/advanced the relapse of fits.

Table 58. Periods of the primary processing of wound and results of the surgical treatment of traumatic epilepsy.

(1) Сроки обработки	(2) Количество случаев (в %)	(3) % положительных результатов	(4) Без изменений (в %)
(5) Первичная обработка раны от 1 до 3 дней	43,0	35,0	8,0
(6) Первичная обработка раны от 3 до 12 дней	29,0	17,0	12,0
(7) Первичная обработка раны от 12 дней до 6 недель . .	15,0	5,0	10,0
(8) Первичной обработки раны не было	13,0	2,0	11,0

Note. Occurring epilepsy after the closed injuries and air contusions into present table they were not introduced.

Key: (1). Periods of processing. (2). Quantity of cases (in o/o). (3) o/o of positive results. (4). Without changes (into o/o). (5). Primary treatment of wound from 1 to 3 days. (6). Primary treatment of wound from 3 to 12 days. (7). Primary treatment of wound from 12 days to 6 weeks. (8). Primary treatment of wound was not done.

Page 530.

Liquor-dynamic violations after the wounds of skull frequently are very considerable and in the course of time progress, whereas the measures of radical struggle with them are not yet manufactured.

On the basis of the development of the materials of the Great Patriotic War it is possible to confirm previcus position/situation that in the cases where there were general/common/total type convulsive fits, without the presence of focus symptoms, to expect positive result from prccess/operation there is no basis; as a rule, fits were renewed soon after process/operation.

Should be noted one additional essential mcment/torque - the need for the persistent and prolonged subsequent conservative treatment. The obtained informatien about patients, who transferred process/operation, with great accuracy showed that the renewal of convulsive fits in a number of cases was the result of the straight/direct violatien of anti-epileptic mcde/conditions. So, fits were renewed following by the early cessation of the reception/procedure of luminal, after the prolcnged stay in the sun or washing in hot bath, directly fcllowing by the reception/procedure of alcohol, after great emotional experience, etc. In this case in a number of such cases, if patients again began to strictly adhere to the specific mode/conditions, diets renewed medicinal/medicamentous treatment, fits no lcnger were renewed. The treatment of traumatic epilepsy must be systematic and composite. In each individual case of traumatic epilepsy should be considered different rcle of individual pathogenetic factors and strictly individualized the treatment. A number of the authors indicates the specific methods of this

treatment without which operational measures, in spite of entire, it would seem, radicality and validity, will not give them positive results. Process/operation removes only the series/row of components/links in value traumatic epilepsy, but does not cure diseases. Process/operation - is main method in struggle with suffering, but, besides, this, necessary the specific labor and household mode/conditions, which eliminates the fatigue of central nervous system and physical g-force, permanent therapeutic measures for a decrease in the convulsive of the excitability of brain, for the regulation of intracranial pressure, assistance to the free circulation of cerebrospinal fluid, effect on metabolism, on the activity of endocrine glands and the function of vegetative nervous system. It is necessary to remember that "single epilepsy there does not exist, but the different variants of epilepsy require different treatment" (Sereyskiy).

Results of the treatment of the penetrating wounds of skull.

Considerable successes in the treatment of wounded with the bullet penetrating wounds of skull and brain in the Great Patriotic War - the straight/direct result of the general/common/total progress of the military field surgery of Soviet army, armed by the contemporary doctrine of the specialized treatment of wounded with their evacuation according to designation/purpose, the result of a

rapid increase in the young speciality - military field neurosurgery and finally the timely primary processing of the wounds of skull and brain, with the wide application of the newest powerful/thick antiseptic substances. One of the basic indicators of the results of the treatment of the penetrating wounds of skull and brain is the frequency of complications.

In the Great Patrictic War the total number of infectious complications composed 45.7o/o to a number of all penetrating wounds of skull. Thus, riskiest infectious complications developed nevertheless only in the smaller half of all cases of the penetrating wounds of skull, i.e., it is considerably less frequent than in all preceding/previous large wars, including the first world war. This is especially significant, if one considers that in the Great Patriotic War the vast majority of those wounded the skull had incomparably more severe mine-fragment wounds, designed, as is known, not only to the annihilation of manpower, but also to mass and prolonged removal from the formation/order of soldiers.

Page 531.

A considerable descent in the percentage of infectious complications with the wcunds of skull during the Great Patrictic War in ccmparison with the last wars testifies about those achievements which are generally very characteristic for the medical service of Soviet army. The frequency of mcst characteristic complications - the abscesses of brain and osteomyelitis, in contrast to meningitides and encephalitides, is fourd in direct and tightest dependence on the organization of the specialized surgical aid by wounded, being the most demonstrative index of quality of her setting. A descent in the frequency of the onset of the abscesses of brain in the Great Patriotic War to 12.2o/o, at some fronts to 7.2o/o, and osteomyelitis to 1.7o/o relative to a total number of penetrating wcunds of skull by itself tells about the high qualities of the establishment of neurosurgical aid by wcunded.

It is more than that, a number of complications of the abscess of brain during the Great Patrictic War decreased from year to year in parallel with develcpment and improvement of neuro-surgical aid

and gaining of experience in military-field neurosurgeons. Thus, for instance, during the first year of war the abscesses of brain are noted in 15.9o/o of all wounded with the penetrating wounds of skull, in the second year - in 15.7o/o of wounded, in the third year - in 11.1o/o, in the fourth year - in 9.6o/o.

However, together with the undoubted and considerable descent in the percentage of infectious complications and, in particular, abscesses and osteomyelitis, the results of treatment, especially the abscesses of brain, must be considered, nevertheless, yet sufficiently not satisfactory, although the letnality during the surgical treatment of the early abscesses of brain was lowered in comparison with the preceding/previous wars to 20.8o/o, with late abscesses - to 21.6o/o. Lethality among those operated during the first world war, according to different statistical data, was equal to 60.0-70.0o/o. Thus, during the Great Patriotic War it was lowered almost three times. One cannot fail to note the significant role in this descent in the differentiated methods of surgical treatment. The considerable group of wounded with the late chronic abscesses of brain underwent the radical surgery of full of carving abscess together with the capsule with which the lethality did not exceed 20.0-25.0o/o. The most widely used open drainage method of treatment gave in average/mean 35.0o/o of lethality, and rarely applied puncture - 50.0o/o. Moreover, large role and to struggle with severe

complications during the surgical treatment of the abscesses of brain played the wide application of sulfanilamide preparations. Nevertheless the general/common/total results of the treatment of the abscesses of brain, including those not operated and in proper time those not identified, proved to be nevertheless insufficiently favorable and they make it necessary to desire the best. Thus, for instance, from the total number of wounded, in which developed the abscess of brain, it completely maintained ability to work after treatment only 8.6o/o.

The outcomes of the treatment of meningitides by also less satisfactory, although were here noted the very serious positive shifts/shears, because of the use/application of a rational procedure of the combined treatment by sulfanilamide preparations, also, in recent years of war - by penicillin. With primary meningitides the percentage of lethality was comparatively high, while with most severe secondary meningitides, which developed on the soil of encephalitides and abscesses, 2 times it is higher. However, the general/common/total percentage of recoveries, according to individual authors' data, was equal to 46.0.

Page 538.

General/common/total lethality with meningitides, which developed on

the soil of abscess and encephalitis, according to the data of the maps/charts/cards of the deepened characteristic, was also high.

The especially high percentage of lethality gave so heavy a form of the infectious complications, such as are the meningoencephalites.

Considerably more favorable proved to be the outcomes of the treatment of encephalitides, in the majority of the cases of the restricted purulent ones and pycnecrotic, not combined with meningitides. With them the lethality at individual fronts was 2 times lower than with the meningoencephalites (included all spilled, malignant forms of encephalitides). In connection with this it is interesting to note also the outcomes of the treatment of anaerobic encephalitides, beginning from most the heavy and, fortunately frequently not encountered form of the gaseous gangrene of brain (by concluding almost always death of patient) and ending with the subacute elapsing form, which gives detail into 33.0o/o, and with the chronically elapsing form, which gives, according to individual authors' data, minimum lethality - 4.7o/o.

Unfavorable results, in spite of individual surgeons' partial and doubtless success, gave treatment of liquor fistulas. The results of the treatment of sub-arachnoidal liquorrhea proved to be considerably more favorable, than the results of the treatment of

ventricular fistulas. In the first group of 45 people recovered 35, the secondly - of 147 only 50, the others perished (B. A. Sanctokin). However, the general/common/total results of the treatment of liquor fistulas, according to the data of the maps/charts/cards of the deepened characteristic, are less favorable, since the large percentage of patients lost ability to work.

The outcomes of the treatment of osteomyelitis and purulent fistulas with the penetrating wounds are also characterized by the high percentage of those lost ability to work with complete absence or very low lethality (Table 59).

The loss of ability to work in 3/4 wounded is explained in the majority of the cases not so much by osteomyelitis or purulent fistula, as by very wound of brain and by caused severe infectious complications.

From the late traumatic complications of the penetrating wounds of skull most serious is traumatic epilepsy which is encountered comparatively frequently and with difficulty yields to treatment.

Table 59. Outcomes of the treatment of osteomyelitis and purulent fistulas with the penetrating wounds (in percentages).

(1) Исход / (2) Осложнение	(3) Остеомиелит	(4) Гнойный свищ
(5) Сохранило трудоспособность	24,4	19,9
(6) Утратило трудоспособность	75,6	77,9
(7) Умерло	—	2,2
(8) Итого	100,0	100,0

Key: (1). Outcome. (2). Complication. (3). Osteomyelitis. (4). Purulent fistula. (5). It maintained ability to work. (6). It lost ability to work. (7). It died. (8). Altogether.

Page 533.

According to A. A. Arendt's data (200 cases of the surgical treatment of traumatic epilepsy on the scil of the penetrating wounds of skull), radical neuro-surgical intervention gave into 35.0o/o of cases a good result with the stable disappearance of fits (observation for a period of 2 years) and intc 21.0o/o satisfactory result (decrease of frequency and the forces of fits). In the remaining cases the process/operation effect did not give. Comparing these data (favorable results into 56.0o/o of cases) with the data of

the first world war (favcrable results into 25.0o/o of cases), one should recognize that also in the relaticn to the results of the treatment of traumatic epilepsy in recent years are doubtless successes.

Besides the severe infecticus and late traumatic complications, which are the basic factor, which darkens the results of the treatment of the penetrating wounds of skull and brain, play the leading role and other factors, which only predispose or those indirectly affecting these results. A number cf such factors includes first of all the type cf the wounding weaponry and the character/nature of wound canal (Table 60).

From Table 60 it is evident that a small quantity of complete recovery is noted with bullet wcunds, and alsc diametric and segmental characters/natures of the wound canal; in these cases was observed the smaller percentage of those lost ability to work. On the contrary, fragmentaticn wounds together with the tangential and blind characters/natures of wcund canal proved to be more the lungs. These factors had effect also cn the periods of treatment. Thus, fcr instance, with bullet wounds the periods of treatment were noticeably more shortly than with the fragmentation ones; with through diametric and segmental wounds - it is shorter than with tangents, ricocheting and blind ones.

Doubtless effect on the results of treatsent had also localization of wound.

With the wound of cne regicn the outcones were nore favcrably than with the wound of two regicns it is nore. The snallest lethality is noted with wounds by frontal and greatest - tenporal region.

Table 60. Outcomes of the penetrating wounds in dependence on the form/species of the wounding weaponry and character/nature of wound canal (in percentages).

(1) Характер ранений / (2) Исход	(3) Полностью выздоровело	(4) Частично утратило трудоспособность	(5) Прочие и неизвестные исходы
(6) Вид ранящего оружия:			
(6a) пуля	8,5	31,4	60,1
(6b) осколок	13,2	35,1	51,7
(7) Характер раневого канала:			
(7a) слепой	12,8	35,9	51,3
(7b) касательный	17,2	43,0	39,8
(7c) сегментарный	2,8	22,8	74,4
(7d) диаметральный	—	7,7	92,3
(7e) комбинированный	4,8	24,9	70,3

Key: (1). Character/nature of wounds. (2). Outcome. (3). Completely it recovered. (4). It partially lost ability to work. (5). Other and unknown outcomes. (6). Type of wounding weaponry. (6a). bullet. (6b). fragment. (7). Character/nature of wound canal. (7a). blind. (7b). tangent. (7c). segmental. (7d). diametric. (7e). combined.

Page 534.

On the contrary, maintained ability to work a relatively larger number of wounded after the wounds of frontal, postcranial and temporal region. After the wounds of sincipital region is noted not only high lethality, but also large percentage of disablement. Among

the combined wounds of two regions minimum lethality gave the frontotemporal wounds and maximum - libnc- pcstcranial. High lethality gave temporal-postcranial wounds and simultaneous wounds of two regions.

There is large practical interest in the dependence of the results of treatment and outcomes on periods and character/nature of the produced neuro-surgical process/operations. This is evident from the following percentage data (E. A. Samotokin).

(1)До 1 суток умерло			14,7	(2)Через	8—9	суток	умерло	18,1
(2)Через	1—2	суток	умерло 16,0	»	9—10	»	»	20,8
»	2—3	»	» 16,0	»	10—11	»	»	18,0
»	3—4	»	» 16,7	»	11—12	»	»	21,7
»	4—5	»	» 15,2	»	12—13	»	»	15,4
»	5—6	»	» 14,4	»	13—14	»	»	15,4
»	6—7	»	» 28,6	(3)Свыше	14	»	»	7,4
»	7—8	»	» 26,9					

Key: (1). To 24 hrs died. (2). Through 8-9 days died. (3). more than.

Comparatively low lethality during the primary processing, produced into the first six days, sharply heaved and was doubled during the processing, produced to the 7th day and it is later. During processing within even later periods the lethality gradually descended. This law, to which scmetimes affected the varied conditions of front, and served as basis for consumption/production/generatica and refining the instructions in accordance with questions about the pericds of the primary processing

of the wounds of skull and brain.

There is considerable interest in effect on the results of treatment and outcome the operational distance/separation of foreign bodies from the area of skull and brain (Table 61).

As is evident, lethality was almost 2 times higher when foreign bodies were not driven out.

Special interest are of comparative results of treatment and outcomes depending on the method of the primary processing of wounds, i.e., stitching (Table 62).

Table 61. Outcomes of the penetrating wounds in dependence on the distance/separation of foreign bodies (in percentages).

(1) Характер вмешательства / (2) Исход	(3) Сохранило трудоспособность	(4) Утратило трудоспособность	(5) Умерло
(6) Удаление инородного тела не производилось	7,6	19,2	72,2
(7) Удаление инородного тела, расположенного вне полости черепа	24,5	42,2	33,3
(8) Удаление инородного тела, расположенного в полости черепа	15,7	44,6	39,7

Key: (1). Character/nature of intervention. (2). Outcome. (3). Maintained ability to work. (4). Lost ability to work. (5). Died. (6). Distance/separation of foreign body was not conducted. (7). Distance/separation of foreign body, arranged/located out of area of skull. (8). Distance/separation of foreign body, located in area of skull.

Page 535.

Almost identical results came out when the open method of conducting the wounds was combined with the long-term bandage of Nikulich-Goykhman. With this method of the introduction of wounds the outcomes are obtained almost also as with anechoic suture.

From those wounded, by which on the severity of the condition of any neuro-surgical process/operations it was not at all conducted, completely recovered altogether only 15.1o/o.

Wide application in the Great Patriotic War of sulfanilamides and dehydration both with the preventive and with therapeutic target also extremely favorably affected the general/common/total results of the treatments which, unfortunately, do not yield to a precise accounting.

So/such are interesting and instructive some interrelations, which exist between different character/nature, localization of wounds and methods of their treatment, on one hand, and functional outcomes in the recovered wounded - on the other hand.

Concepts about the general/common/total results of the treatment of wounded with the penetrating wounds of skull and brain during the Great Patriotic War, on the basis of all these stages of evacuation (from BMP, PMP, MSB to the hospitals of the deep rear), give the following numerals: completely recovered 12.7o/o and it partially lost ability to work 34.1o/o. It is necessary to recognize that, in spite of the indisputable and considerable successes of military field neurosurgery in the treatment of the uncomplicated and complicated wounds of skull and brain, the results of treatment still

it is not possible to consider completely corresponding to our increased requirements for the quality of the specialized neuro-surgical treatment of these heavy wounded.

The high percentage of those lost ability to work and dead persons (53.2) is the straight/direct result of the combination of two basic and unfavorable factors - severity of the wound of brain generally and the barrel of brain in particular, and also still the inadequacy of our methods in struggle with wound infection and severe infectious complications. Should be still emphasized the extremely unfavorable effect of the general conditions of the first, heaviest years of war on treatment and its results in those heavily wounded the skull and the head brain. Further bright successes of our valiant army and military medical service favorably were repelled also in the results of the treatment of those wounded the skull during the subsequent years of war.

The decrease of a number of the fatal results from the wounds of skull with a parallel increase in the number of those recovered is the proof of the doubtless improvement in the setting of the treatment of these wounded.

Table 62.

(1) Метод лечения	(2) Инфекционные осложнения (в %)	(3) Умерло (в %)
(4) Длительная повязка . . .	35,9	16,6
(5) Гухой шов	34,3	15,7

Key: (1). Method of treatment. (2). Infectious complications (in o/o). (3). Died (in o/o). (4). Long-term bandage. (5). Anechoic suture.

Page 536.

General/common/total conclusions/derivations on the bullet penetrating wounds of skull and brain.

The bullet penetrating wounds of skull and brain, being heaviest wounds, composed in great patriotic war 28.2o/o of all wounds of skull and engaged in frequency the middle place between nonpenetrating wounds of skull and wounds of its soft tissues.

The Great Patriotic War made it necessary to subject to radical review the exercise about the bullet penetrating wounds of skull and

brain. In light of new doctrine of military field surgery and increased experiment in the area of the neurosurgery of peaceful and wartime into theory and practice of this most important section of combat injury were introduced serious changes. These changes touched a number of questions of patholcgy, clinic, treatment of wounded with the penetrating wounds, and also some organizational questions of the line-of-communication treatment of those wounded the skull.

On the basis of a deep and thorough study of sectional material during this war was anew reviewed and expanded pathomorphology of the fresh bullet wound of skull, is thoroughly studied the dynamics of coursing of wound process on its basic periods, up to the complete healing of wound, and was given the almost comprehensive pathomorphological characteristic of each period individually together with the most important forms of infectious complications.

As a result of careful bacteriological observations of microflora of the bullet wounds of skull and brain in entire dynamics of their healing was studied the picture of the bacterial contamination of these wounds and their individual layers by the pyogenic, toxic and putrefactive microbes of aerobic and anaerobic character/nature, their typical, riskiest associations, were established/installed the approximate periods of the dissemination of microbes into the depth of wound from surface skin layers.

Further, were studied also degree and character/nature of the bacterial contamination of bone fragments and metallic foreign bodies, is considerably expanded the microbiological characteristic of the basic forms of infectious complications, was refined the role of pathogenic anaerobes and finally was isolated the new form of anaerobic encephalitis - gaseous gangrene of brain.

During the microbiological observations indicated of wounded and as a result of special experimental research on small/fine animals it is established/installed, that the nerve tissue possesses high sensitivity to pathogenic microbes, considerably larger than the sensitivity of other tissues, in particular, muscular. In this case it is proved that the pathogenic infection can be developed in brain, without exceeding its limits, without causing the general/common/total septic infection/contamination of organism. This it forces to reexamine the old exercise about the special tolerance of cerebral tissue to infection and to in a new way evaluate the value of blood-brain barrier and special protective mechanisms of inflammatory process, which delay the dissemination of infection in brain and beyond its limits.

On the basis of the rich experiment/experience of the Great

Patriotic War was developed the single rational expanded/scanned classification of the bullet wounds of skull and brain, placed as the basis of diagnosis and treatment, classification and evacuation, documentation and statistics, and also deep and thorough theoretical and clinical study of these wounds.

Page 537.

As a result the clinic of the penetrating wounds of skull and brain was enriched by series/row new, unknown earlier, completely completed and sufficiently studied clinical forms and syndromes.

Here should be related the parasagittal wounds of skull and of brain, wound of the sinuses of solid cerebral shell, wound of cerebral ventricles, the exercise about liquorrhea and liquor fistulas, the exercise about ependymites, traumatic hydroencephalia, extensive ruptures of cerebral ventricles and traumatic cysts of brain, about the purulent fistulas of skull, etc. Moreover, were anew revieved the most important forms of infecticus complications, were studied their new varieties/subspecies and were manufactured the more contemporary classifications of bullet meningitides and osteomyelitis of skull.

The diagnosis of the penetrating wounds of skull and brain in

the year of the Great Patriotic War was based on the composite method of the neuropathological, surgical and x-ray examination of wounded with necessary enlistment to the examination/inspection of the specialists of border zones and clinical laboratories.

Should be particularly emphasized the outstanding role of neuroroentgenology in the study of pathology, diagnosis and mechanisms of the bullet penetrating wounds of skull and brain and their diverse complications. Was for the first time created the rational clinical-X-ray-anatomical classification of the bullet breaks of skull, corresponding to the practical requirements of military field neurosurgery.

Were in detail studied the processes of the normal and pathological healing of the bone wound of skull, role and fate of bone fragments and metallic foreign bodies in brain.

The late periods of the bullet wounds of brain with their complicated pathology, caused by scars degenerate, atrophic, hydroencephalic and other changes in brain and shells, just as by some infectious complications (abscesses, cysts, protrusions, fistulas, etc.), is widely studied by the methods of contrast X-ray analysis - encephalo- ventriculo-, abscess, cyst and fistulography.

Neuropathology and psychiatry were enriched by the new clinical syndromes of the fresh bullet wounds of the brain of unusual character/nature, with diverse localization of stricken areas.

Moreover, was detailed the symptomatology and the diagnosis of infectious complications and are additional isolated the new syndromes of meningitides, in particular, on the soil of sub-arachnoidal hemorrhages, ependymites, abscesses, etc.

As a result of the widespread introduction of the laboratory method of the research of the blood and the cerebro-spinal fluid clinical diagnosis and prognosis of these complications were enriched by the series/row of the new hematologic and liquorological syndromes, pathognomonic for the various forms of meningitides, ependymites and abscesses of brain.

The new and unusually difficult conditions of the Great Patriotic War required the radical review of a basic question of military field surgery - the treatment of wounded with the penetrating wounds of skull and brain. Deepest and fundamental review underwent a question about the primary neurc-surgical processing of the wounds of skull.

As a result of the composite clinical-bacteriological study of a

question is established/installed and proved the admissibility and the advisability of the deferred and late primary processing of wounds, if were missed most favorable early periods, and also usefulness and need for reworking of poorly operated on wounds.

Page 538.

This innovation, which for the first time obtained wide acceptance during the Great Patrictic War, played the decisive role in prophylaxis of the severe infectious complications of the penetrating wounds of skull and first of all in a sharp descent in the frequency of the abscesses of brain, osteomyelitis which in contrast to meningitides and encephalitides depend, first of all, on periods and quality of the primary processing of wound.

In the beginning of war was at the same time developed the rational and standardized technique of the primary neuro-surgical laminar processing of the wounds of skull and brain, that combined sufficient radicalism with reasonable sparing of cerebral and bone tissue, which allowed to avoid the excessively extensive trepanation defects and therefore to retain ability to work the considerable contingents of wounded.

Together with necessary distance/separation from the cerebral

wound of all bone fragments, and as far as possible also of metallic foreign bodies, were refined readings and the distance/separation technique of the deep and difficultly accessible metallic foreign bodies from the area of skull and brain.

Were at the same time refined readings and was developed the imposition technique of the primary anechoic suture which under the difficult conditions of mobile warfare could be used only in the restricted sizes/dimensions.

On the basis of the forced use/application of the open method of conducting the wound for the maximum provision of its rest and prophylaxis of secondary infection, was specially developed and widely introduced in practice the long-term moist- drying bandage, relieved after 18-20 days after imposition, shown only with the thoroughly processed and pure/clean wounds, not suspicious in the relation to contamination by their anaerobic infection. These long-term bandages received sufficiently wide acceptance and completely justified their designation/purpose: they made it possible to shorten the periods of the treatment of wounded, to improve the quality of the formed scar and to save a large quantity of surgical dressing.

In connection with the wide application of the open method of

the treatment of the processed wounds of skull and brain exceptionally important role acquired its deferred primary or secondary suture. However, the very favorable results of the deferred primary or secondary suture (considerable contraction/abbreviation of the periods of treatment and improvement in the quality of the generatrix of scar), unfortunately, as a whole proved to be insufficiently perceptible and little they influenced the general/common/total results of the treatment of those wounded into skull, since such sutures were applied in the very restricted number of cases.

In a number of new and original propositions, introduced in the year of the Great Patrictic War, should be noted the process/operation of early surgical prophylaxis of late complications both infectious (abscesses), and traumatic (epilepsy), with the unfinished, but freshly-healed wcunds of brain, that consists in radical sectioning of fresh cerebral scar by rear sight (with all connected in it bone fragments, and sometimes by foreign bodies and even by unripe latent abscesses) with subsequent suturing of wound tightly.

Was at the same time improved the operational technique of the wide and radical carving of old turicary-cerebral scars, cysts and joints (with the distance/separation of foreign bodies and

granulomas) and subsequent occlusicn of the defects of the walls of lateral ventricles, solid cerebral shell and bones of skull with polymethylacrylate plates (auto- and allcplastic method).

Page 539.

The results of these process/operations proved to be favorable, especially in wounded with traumatic epilepsy, and best, than in the first world war.

In the year of the Great Patriotic War were differentiated also different operational methods of the treatment cf the abscesses of the brain of the bullet crigin (number of latter sharply was lowered in connection with the wide application of primary processing of cerebral wound).

The open (drainage), closed (puncture) and radical methcds of the carving of abscess together with capsule acquired each their readings depending on character/nature, form, period of onset, depth of the occurrence of abscess, presence of foreign bodies in the neighbcrhood, etc. This is fact, together with the combined use/application of contesporary antiseptics, it is doubtless, yielded positive results it led to a descent in the lethality.

Exceptional role in the treatment of the penetrating wounds of skull and their severe infectious complicatcns played the newest powerful/thick antiseptic substances, first cf all sulfanilamides, which were being widely applied in the year of the Great Patriotic War, and toward the end of the war - antibiotics, in particular, penicillin.

The value of sulfanilamides, introduced in the form of pcwders inside and into wound cr in the fcrm of solutions is subcutaneous, is intramuscular, is intravenous, intracarotid, it is sub-arachncidal inside ventricle and used in combination with serous therapy and discharging-diagnostic lumbar punctures, it ccnsisted not only in more successful struggle with severe meningitides, encephalitides and abscesses of brain, but also in prophylaxis cf these terrible infectious complications, making it possible to much more widely and more calmly operate wounded, more frequently to resort to rational, but dangerous for the prccess/operations of separating the deeply lying foreign bodies, tc the radical carving of cerebral ones Rubtsov abscesses, to the imposition of primary and secondary anechoic suture, etc.

During the Great Patriotic War successfully was applied the treatment of the uncomplicated, but limply granulating wounds and protrusions of brain by ultraviclet rays with purpose of cleansing

and disinfection of wound and acceleration of the development in it of granulations and epithelization. With the ventricular fistulas, which complicated encephalitic protrusions, it was proposed to produce the quartz irradiation of protrusion and wound through the cellophane film, which protected wound from traumatization with frequent dressings in connection with irradiation.

The Great Patriotic War was characterized by the consumption/production/generation of the ordered system of the organization of the specialized aid by that wounded skull with their necessary evacuation according to designation/purpose, to analysis of which based on the example of basic combat process/operations, just as to the distant results of treatment, is devoted the content of the following volume.

Pages 540-547.

No typing.

DISTRIBUTION LIST

DISTRIBUTION DIRECT TO RECIPIENT

ORGANIZATION		MICROFICHE
A205	DMATC	1
A210	DMAAC	2
B344	DIA/RDS-3C	9
C043	USAMIIA	1
C509	BALLISTIC RES LABS	1
C510	AIR MOBILITY R&D LAB/FIO	1
C513	PICATINNY ARSENAL	1
C535	AVIATION SYS COMD	1
C591	FSTC	5
C619	MIA REDSTONE	1
D008	NISC	1
H300	USAICE (USAREUR)	1
P005	DOE	1
P050	CIA/CRS/ADD/SD	2
NAVORDSTA (50L)		1
NASA/NST-44		1
AFIT/LD		1
LLL/Code L-389		1
NSA/1213/TDL		2

ORGANIZATION		MICROFICHE
E053	AF/INAKA	1
E017	AF/RDXTR-W	1
E403	AFSC/INA	1
E404	AEDC	1
E408	AFWL	1
E410	ADTC	1
	FTD	
	CCN	1
	ASD/FTD/NIIS	3
	NIA/PHS	1
	NIIS	2