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AGROTECHNOLOGY

HEIGHTENING PRODUCTION EXCELLENCE AT PIG COMBINE

Moscow VETERINARIYA in Russian No 8, 1977 pp 25-28

[Article by Yu. I. Ugarov, Director of the Sovkhoz-Combine imeni 50-Letiya SSSR]

[Text] Construction of the Il'inogorsk complex, intended for raising and fattening 108,000 pigs per year, was started in 1970, and this rural industrial giant went into operation after just 2.5 years. The Sovkhoz-Combine imeni 50-Letiya SSSR was organized out of this complex in December 1972. Construction of a second complex with the same output, which went into operation in December 1975, began at the same time. The sovkhoz has a pedigree reproduction farm which delivers 4,500 pedigree pigs to the combines per year.

The work results of the first combine attest to the high economic effectiveness of converting pig farming to an industrial basis. During the Ninth Five-Year Plan 34,171 tons of meat were sold to the state, which is 6,071 tons more than the planning assignment and 14,742 tons more than foreseen by the predicted output. In 1975 the average daily weight increase of pigs undergoing fattening was 638 gm. During the Ninth Five-Year Plan the sovkhoz-combine received a profit of 41.9 million rubles. The capital investments on its construction were compensated 1.5 years ahead of schedule.

The collective of the sovkhoz-combine worked well in the first year of the Tenth Five-Year Plan. In that year 206,971 piglets were obtained, and 14,774 tons of meat were sold to the state, or 1,974 tons more than foreseen by the plan. The average daily weight increase of pigs undergoing fattening was 624 gm, and each kilogram of weight increase required 4.2 feed units. Average survival of the herd was 95 percent. The best operators of the fattening shop, T. A. Aleksandrova and V. I. Fayzulayeva, produced 689 and 674 tons of meat respectively, achieved an average daily weight increase of 645 gm, and maintained herd survival at 99.8 percent.

The sovkhoz-combine's collective was the winner of the all-union socialist competition on the basis of the work results for 1973, 1974, 1975, and 1976, and each year it has been awarded the perpetual red banner of the CPSU Central Committee, the USSR Council of Ministers, the AUCCTU, and the

Komsomol Central Committee. It has been a participant of the Exhibition of the Achievements of the USSR National Economy in all of these years, it has been awarded Certificates of Honor, and it was a participant of the Leipzig and All-Hungarian exhibitions, in which it also received certificates.

The combine's veterinary service made a substantial contribution to the high production indices; its main task is to maintain stable epizootic conditions at the farm, improve maintenance conditions, provide full-valued feed, and implement general and special measures to prevent pig diseases promptly and well. The work experience shows that importation of young replacement stock from a large number of breeding farms, many of which were subsequently found to be unfavorable in relation to a large number of infectious diseases, is the most vulnerable link in the system for protecting the complex from introduction of infectious agents.

The difficulty lies in the fact that due to the absence of effective laboratory diagnostic methods it is impossible to reveal some of these diseases (dysentery, viral gastroenteritis, and a number of others) during the quarantine period, and such stock (latent carriers of infectious agents) are introduced into the main herd. The only solution to this situation, in our opinion, is to build reproduction farms right at the complexes to completely satisfy the need for young replacement stock. Moreover there should be two or three reserve breeding farms in each oblast on the possibility that pigs at the breeding farm might contract diseases. These farms could supply healthy young stock to the complex if such an epizootic situation evolves. Practice has confirmed the need for abandoning importation of breed pigs from farms in other oblasts.

A breeding farm was built and placed into operation at our sovkhoz in 1975, but it cannot satisfy the demand for young stock of the two combines, and we are forced to import it from the farms of a number of oblasts. Thus the problem of creating a closed production cycle within the farm has not been solved.

Decontamination centers are working efficiently at the combine, intrafarm transportation has been established, and loading-unloading areas have been properly set up to prevent introduction of infectious agents from without.

Construction of a containerized pneumatic transportation system to deliver combined feed from the combined feed plant directly to the feed preparation kitchens of the combines was started in 1977 with the purpose of improving veterinary protection for the combines.

We should note that while veterinary protection for the combines against introduction of infectious agents from without has been worked out well and additional measures to improve this protection are being implemented, no significance is attached to this question at the combined feed plants.

Transportation enters the territory of the plant from different farms, feed production wastes are dumped on open-air platforms, the raw materials are sometimes delivered by vehicles not intended for this purpose, and the combined feed production lines are not processed to destroy pathogenic and conditionally pathogenic microflora.

Antiepizootic measures are implemented at the combines in the following way: All breeding stock is checked daily for brucellosis and tuberculosis, boars are checked twice a year, the breeding stock is revaccinated against plague, erysipelas, and Aujeszki's disease each year, and new young stock is vaccinated against these diseases when 55-60 and 75-80 days old by associated vaccines. Gestating sows are immunized against paratyphus and colibacteriosis to prevent colibacteriosis in suckling piglets.

In accordance with the production process, the production sectors are subjected to mechanical cleaning and complex disinfection, and to rat and insect eradication. Regularly, once a week, the buildings are cleaned.

Mineral-vitamin additives (4-percent grass meal, disodium phosphate, sodium selenite, multiple vitamin additives) are introduced into the ration to heighten the resistance of the animals, especially of breed stock and breed young. Gestating sows are regularly irradiated by PRK-4 lamps. Sows and young at the breeding farm are additionally given hay and beets, and pastures are reserved for them. Young replacement stock is actively exercised each day.

The metabolism of the animals is continually monitored through biochemical analysis of blood, and the quality of combined feed delivered is checked. The feed is analyzed for mycotoxicosis, table salt concentration, and biological value. However, absence of tested quick methods slows down such research, and the analytical data sometimes reach the farm after the feed has been issued. This is why the combined feed has to be stored until the results of the analysis are received. The sovkhoz has begun construction of a mechanized warehouse with a capacity of 1,500 tons of combined feed for this purpose.

There is only one way to prevent production of toxic combined feeds by the plant: The raw ingredients must be checked for toxicity, and the analysis results should be recorded on a certificate.

We should note that combined feed being delivered to the sovkhoz-combine is basically unsatisfactory in quality. According to analytical data of 1976 30 percent of the feed had a low crude protein content, 52 percent was low in calcium, and 94 percent was low in phosphorus. Moreover, lysine and antioxidants are not introduced into the combined feed, and interruptions in introduction of vitamins K and E had occurred. In 1976, 2,108 tons of the combined feed, or 3 percent of all deliveries, were toxic. Considering this, we were forced to additionally introduce various vitamin-mineral and protein additives into the ration. It was also decided to organize production of high-quality grass meal right at the farm. With

this purpose in mind 550 hectares of land have been reserved and plans for an irrigation system using waste water from the combines to grow the grass are being written. Improvement operations are already being conducted on 183 hectares. Another 780 hectares must be developed in the future. Thus the problem of utilizing the combine's waste water and protecting the environment from pollution is being solved.

We are devoting a great deal of attention to preventing gastrointestinal disorders among the pigs, which make up 85 percent of the total morbidity at the complex. This is combined with strict compliance with the feeding schedule and norms, control over the quality of combined feeds and the microclimate parameters, appropriate preparations of the production sectors, prevention of the "mastitis-metritis-galactosis" syndrome in suckling sows, and processing of piglets by multiple vitamins, ferrodextran preparations, and various medicines.

Efficient implementation of the system of veterinary-sanitary measures developed at the sovkhoz-combine is helping to prevent pig diseases to a certain degree, and it is promoting improvement of the production indices. However there are negative aspects to the work of veterinarians as well. The farm has been unfavorable in relation to pig dysentery since it was organized. Large sums of money are spent each year on therapeutic-preventive measures, but we have not been able to achieve the desired results in eradicating this disease. We are forced to limit ourselves to just therapeutic processing of individual groups of pigs due to absence of a sufficient quantity of effective medicines and additives.

The production process foresees development and use of medikato additives and tilotratsin, effective against dysentery, at the complexes. But these products are not being produced in our country. We would appreciate the help of science in developing the resources and measures to prevent and eradicate dysentery.

A large proportion of the therapeutic and preventive operations foreseen by the production process requires a good supply of antibiotics, medicines, tools, and instruments at the pig breeding complexes to monitor the microclimate parameters and the health of the pigs; the complexes also require diverse disinfectants and new, effective disinfection equipment. The veterinarians of the complexes have an acute need for syringes, especially automatic syringes, and electric thermometers.

The demands imposed on the complexes in relation to improving pig maintenance and feeding and improving the production process are growing with every year. We would be able to satisfy these requirements only after they are supported by deliveries of new, improved equipment and monitoring instruments.

One foreign company has sent us highly maneuverable, small, general-purpose disinfecting and washing machines which could be delivered easily to any production building by a single person. To wash the sectors, the machines produce a stream of water at a pressure of 50 atmospheres, and for disinfection

they spray disinfectants as aerosols, which insures high quality in mechanical cleaning and disinfection. These machines have been working at the sovkhoz-combine for 6 years now, but certain parts are beginning to break down and there is no place to acquire new parts.

We are experiencing great difficulties in acquiring equipment, instruments, and media for the artificial insemination station. We are improving and perfecting this advanced method every year. This year we are completing construction of an artificial insemination station at the combine providing the necessary conditions for the work of maintenance personnel and for maintenance of boars. However, the Gor'kiy Zoovetsnab Association is not filling our orders for tools, instruments, and equipment. Matters are even worse with acquisition of media used to dilute sperm.

Significant shortcomings have been revealed in the work of the decontamination center. Practice has shown that it must be expanded and provided with 10-15 shower units rather than three, as foreseen by the plan. The formalin vapor chambers used to disinfect overalls are small in volume, and it is impossible to mechanize the loading and unloading of clothing here. These chambers are also a great fire hazard.

The problem of protective footwear causes us anxiety. At present all maintenance personnel at the complexes use rubber boots only, which has an effect on the health of the people. We need to find new materials and develop protective footwear out of these materials so that it would satisfy all the requirements of work within the specific conditions of industrial animal husbandry.

Serious shortcomings were revealed in the work of the sanitary slaughterhouses. Their area is small, they do not foresee areas for storage of skins and salt, rooms are not available for the veterinarian and the butchers, and there is no forwarding office or other auxiliary rooms (for tool storage, for equipment, for knife sharpening). The slaughterhouse has small refrigerators intended for 600-800 kg of meat, at the same time that 1.5-2 tons of meat must be stored in each, resulting in overloading of the low-capacity refrigerators. In addition to enlarging the refrigerators and installing high-output refrigeration units we must seek and develop quick methods for analyzing meat for toxic infections, and we must reduce the analysis time.

By correcting these shortcomings, which are hindering our work, we can significantly increase production excellence, improve the animal maintenance conditions and the production process and, consequently, successfully complete the tasks posed to agricultural workers by the 25th CPSU Congress.

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AGROTECHNOLOGY

DAILY ATTENTION TO BRUCELLOSIS ERADICATION

Moscow VETERINARIYA in Russian No 8, 1977 pp 29-36

[Article by L. I. Talov and Yu. N. Mikheyev]

[Text] The subject of the regular round-table discussion organized yesterday by the editorial board of this journal was brucellosis eradication. Guests of the editorial board--scientists, specialists, and executives of the veterinary services of a number of the country's regions--exchanged their experience in organizing and implementing antibrucellosis measures, and they shared their ideas about the possibilities for further improvement.

Opening the meeting, the journal's editor in chief L. I. Bespalov stated that the Communist Party and the Soviet government have posed a task of great political, economic, and social significance to veterinary science and practice--eliminating chronic diseases in the country, including animal brucellosis. A great deal of work permitting a significant decrease in the number of stricken areas has been done in this direction in recent years with the active assistance and support of party, soviet, and agricultural agencies.

The animals of the Ukrainian SSR, the Belorussian SSR, the Moldavian SSR, the Baltic republics, and many oblasts, krays, and autonomous republics of the RSFSR are practically free of brucellosis, and the fight against brucellosis is being waged successfully in republics of Central Asia and the Transcaucasus. This has been the product of the meticulous, daily work of veterinarians, medical assistants, and orderlies, and executives of the rayon, oblast, and republic veterinary services.

The editorial board regularly offers the pages of this journal to veterinary service executives and specialists enjoying the greatest success in control of animal brucellosis, and it continually acquaints the readers with the latest achievements of science in this direction.

A system of measures guaranteeing recovery of farms from brucellosis in practically all epizootic situations has been worked out thoroughly in our country. But by itself, even the most effective system of measures cannot be successful if people implementing them do not place their hearts and

will, their wisdom and persistence into the work, and if attention is not devoted every day to all elements of the measures. Life itself is a persuasive confirmation of this. There are many examples in which farms enjoying approximately equal conditions have varying success in recovering from chronic infections.

The experience of the best collectives teaches us that veterinary measures are especially effective when the specialists display initiative, professional principles, and persistence in solving organizational and administrative problems--construction of the needed production buildings, improvement of the sanitary conditions of the farms, addition of healthy stock to the herds, and so on.

Victory reigns wherever not only special but also organizational measures are developed competently on adequate economic grounds, wherever people are given proper employment and material resources are used with the greatest effectiveness, and wherever daily business contact is maintained with party, soviet, and agricultural agencies and with farm managers.

V. P. Yaroslavtsev, Chief, Sverdlovskaya Oblast Executive Committee Veterinary Division

Our experience in brucellosis control confirms the fact that animal vaccination is an extremely efficient measure within the complex of recovery measures, but it does not by itself decide the outcome. It was only after the problems of repairing and reconstructing the buildings, the problems of replacing ill stock and reproducing the herd, and others were included into the disease eradication plan and approved by a special decision of the oblast executive committee that improvements began to be felt. The veterinary service is also doing a great deal of organizational work. Experienced, qualified specialists have been assigned to each farm. They monitor the volume, promptness, and correctness of veterinary-sanitary and diagnostic measures. They carefully study the animals and make sure that sick animals are promptly removed from the herd.

As of today there are five areas unfavorable in relation to cattle brucellosis left in the oblast. Veterinary workers see their main task to be to conclude recovery of the oblast from this disease during the present year. A vaccine produced from strain 82 has been highly helpful in our eradication of brucellosis. At the same time we have also encountered the following fact, still incomprehensible to us: We formed an isolated farm out of young animals vaccinated when 5 months old. A year later, four cows aborted at this farm. We are presently studying the animals at this farm in accordance with the instructions, and we are revealing sick animals.

T. I. Malakhova, Senior Scientist, Diagnostic Preparation Control Laboratory, (VGNKI) of Veterinary Preparations, USSR Ministry of Agriculture

A vaccine produced from strain 19 is broadly employed in many countries of the world for specific prevention of cattle brucellosis. Calves are

vaccinated as a rule, adult animals being vaccinated rarely as a rule. Without a doubt, use of the vaccine within the general complex of veterinary, sanitary, and administrative measures is having a positive influence in the recovery of stricken farms. A significant shortcoming of the vaccine is that the blood of immunized adult animals and revaccinated calves retains agglutinins and other antibodies for a relatively long time (up to a year and more), which hinders diagnosis of brucellosis among such animals and deprives us of the possibility for correctly assessing the condition of the herd.

Recently the country's scientists have proposed a number of new vaccine strains of *Brucella* from which to prepare specific preventive agents devoid, according to the preliminary data, of these shortcomings. Twelve *Brucella* strains were studied by commission with the purpose of selecting the strains with the best immunogenic properties characterized by negative or low seropositiveness and suitable for vaccine production. Morphological characteristics and cultural-biochemical properties have been revealed, the selected *Brucella* strains have been typed, and their virulent, antigenic, and immunogenic properties have been studied using laboratory animals and cattle.

Among the weakly agglutinogenic strains, strain 82 has the highest immunogenic properties, while among non-agglutinogenic strains Nevskiy-12 has the best properties, which has provided the grounds for recommending vaccines made from these strains for testing under production conditions.

It would be appreciated if scientific institutions and vaccine creators would turn their attention to developing ways to label vaccine strains so that they could be differentiated from field strains.

M. B. Ashepa, Chief, Krasnoyarskiy Kray Executive Committee Veterinary Division

Recovery of sheep breeding farms from brucellosis was concluded in the kray in 1960. This was achieved through implementation of a complex of measures involving vaccination of the animals, use of only healthy, tested rams for mating purposes, and formation of flocks out of healthy young.

In our conditions we found it significantly more complicated to achieve recovery at farms subject to cattle brucellosis. This work became significantly more active after the All-RSFSR Conference of Veterinary Specialists in Ul'yanovsk. An extraordinary brucellosis control commission was created in the kray to manage all recovery measures and monitor their fulfillment. Such commissions have been created in other regions as well. After thorough examination of the farms, the commission's working group travels to local areas to determine the effectiveness of veterinary measures. Veterinary specialists keep agricultural, soviet, and party agencies informed on progress in farm recovery, and they help to solve complex problems.

As of the beginning of the year the kray had 27 unfavorable areas left, in which we hope to achieve recovery this year. The fact that up to 23 percent non-calving young cows are introduced into the herd each year in the kray's farms, thus creating good conditions for replacement of sick cattle, has great significance to the work's success.

A few words about our experience in using strain 82 vaccine. In 3 years it was used to immunize 600,000 head in unfavorable regions. The vaccine turned out to be extremely effective when young animals were processed. I would like to note that after vaccination we examined the immunized animals not in 3 months as stated in the instructions but somewhat later. The vaccine is inconvenient because adult animals must be vaccinated as calving occurs, which makes it very difficult to keep records.

Farms consisting of immunized cattle have already been created in the kray. Cattle are undergoing revaccination presently. I think this is not a mistake. In October we revaccinated more than 1,000 head, and we will continue this work in the future. In conclusion I would like to emphasize that success in brucellosis control depends in many ways on solution of organizational and administrative problems and on help from the executives of kolkhozes, sovkhozes, and agricultural agencies. We have become persuaded that tangible results could be achieved only through integrated implementation of the measures.

V. I. Runnikov, Senior Physician, Donetskaya Oblast Executive Committee Veterinary Division

We began our fight against brucellosis with development of integrated plans for each unfavorable farm with a consideration for the concrete conditions. The plans were discussed in detail by specialists of the oblast veterinary division and the oblast laboratory, and they were approved by the rayon soviet executive committees.

Successful recovery of farms stricken with brucellosis was the product of a great deal of organizational work. While in 1966 there were 80 such farms in the oblast, today there is only one. This was the result of persistent implementation of brucellosis control measures. The problem of replacing all stock at unfavorable farms was posed and successfully solved. Veterinary workers applied a great deal of effort to organizing herd reproduction. Artificial animal insemination was introduced, which had a favorable effect on the reproduction level of the herd. Today there are many farms in the oblast receiving 100-110 calves per 100 cows each year.

To reduce the economic losses stemming from the need for replacing sick cattle the governing board of the Sovkhoz imeni XIX Parts"yezda, which is unfavorable in relation to brucellosis and tuberculosis, developed measures with the participation of veterinarians to intensify herd reproduction and organize a kolkhoz poultry factory, which has grown into one of the largest in the rayon. It has been able to meet the meat production and sales plan.

When sick animals belonging to kolkhoz farmers were surrendered the farm took it on itself to compensate these people with milk, meat, and other products.

We have attached a great deal of significance to organizing decontamination of separated milk at each dairy plant, which doubtlessly made it easier to implement recovery measures. The fact that manure storehouses have been built at the farms in recent years has also played a major role in improving the sanitary conditions of the farms, the working conditions of stock breeders, and the cattle maintenance conditions. Most farms have been fenced or otherwise enclosed. Veterinary-sanitary decontamination centers are present almost everywhere, and many of them are outfitted with shower stalls. Construction of summer camps and organization of the pasturing of both adult cattle and young animals have been under the control of physicians. This is a necessary prerequisite for farm recovery and prevention of infections. All winter buildings are mandatorily cleaned, repaired, and disinfected during the entire time the animals are at summer camps.

In our work, we make broad use of the capabilities and rights of the technical council of the oblast agricultural administration and the powers of the extraordinary epizootic commission, which regularly discuss the organization and progress of recovery measures, reveal shortcomings and subject them to criticism, and study the experience of successful farm recovery.

S. V. Udodov, Senior Veterinarian, Khabarovskiy Rayon, Altayskiy Kray

As is the case with the plans of each farm, the measures for brucellosis control in the rayon were approved by a decision of the rayon executive committee. In writing these plans we thoroughly examined and weighed the capabilities of the farms and their economic base. Responsibility for particular measures was assigned to individuals in the plans. We began using a strain 82 vaccine in 1974. As of today 11,500 cows in the rayon have been vaccinated as their calving periods occurred, and some animals have already been revaccinated at some farms. We believe that vaccine plays the dominant role in the complex of antibrucellosis measures.

A competition on recovery of farms was announced in the rayon, and its conditions were worked out. Farm veterinary institutions or services which had taken first and second place were awarded a Moskvich motor vehicle, and prizes equal to the monthly pay were established for veterinary specialists who successfully completed the plan of measures; collectives which had taken third place were awarded a motor vehicle and money equal to half the monthly pay. The kray veterinary division intends to extend the conditions of this competition to all rayons.

Eight farms had unfavorable areas. In five of them the animals were not very valuable and were surrendered to the meat processing combine. After vaccination, young animals were sent to isolated farms for final raising

and fattening and were also sent to the slaughterhouse on reaching a weight of 380-400 kg.

About 5,000 blood samples from animals vaccinated earlier were analyzed in January-April. No sick animals were revealed; during this time about half of the vaccinated cows produced calves; everything progressed favorably, and there were no abortions.

Creation of specialized calf rearing farms has made the work easier. Each year they supply 3,000-3,500 animals to recovering farms. During the time that they are raised we innoculate them with strain 82 vaccine twice.

A department of the khozraschet veterinary-sanitary detachment was created in the rayon and has gone to work. We hope that its workers will apply all of their efforts to raise the sanitary level at the farms. Incidentally, I would like to touch upon a certain question: Why is there not an additional payment for hazardous working conditions for an orderly, who is directly involved in both disinfection and pest control, while such an additional payment does exist for the detachment chief?

A high sanitary level at stock breeding facilities is no less important. The sanitary conditions are being improved together with reinforcement of the material-technical base of the farm. But there is still much for us to do. The rayon's farms accumulate 300,000 tons of manure each year. Its conveyance to the fields is organized before field operations, but sometimes there is not enough equipment, loaders especially, which slows down the work, as a result of which we have serious grievances against the fertility detachment of the rayon Sel'khoztekhnika department.

M. S. Abidzhanov, Director, Brucellosis Research Laboratory, Uzbek SSR Scientific Research Veterinary Institute

Quite recently the epizootic situation with respect to brucellosis in our republic was extremely grave at many farms. Many of them suffered substantial material losses. Just the Poyarlyk Sovkhoz alone was forced to process all milk obtained from its farms into butter, suffering a loss of up to 200,000 rubles per year.

I would like to note that vaccination has great but not decisive significance in the complex of antibrucellosis measures. We can be successful only by implementing the entire complex of recovery measures.

Implementing the planned program for brucellosis control, we created khozraschet veterinary-sanitary detachments in the oblasts, and we require that they complete all measures well. Regular training has been set up at the farms for stock breeders and veterinary personnel, and seminars are periodically held for bacteriologists and serologists.

We used Nevskiy-12 strain vaccine strictly according to the instructions, which is very important. Just the quantity of initial diagnostic analyses

was increased to 2 million in connection with use of this vaccine. In addition to vaccination, general administrative and sanitary measures are now being implemented with better quality at the farms.

Veterinary workers of the Scientific Research Veterinary Institute, the Veterinary Administration of the republic's Ministry of Agriculture, and the oblast veterinary divisions are now frequent guests at the farms. They monitor the work being done on the planned measures and reveal and help to eliminate the causes of their low effectiveness when that is the case. We could achieve even better results if we have the needed quantity of vaccine.

We devote a great deal of attention to the animals of individual farms. Almost all of them are subjected to examination and special processing.

This produces good results.

N. A. Rozhdestvenskiy, Chief, Veterinary Division, Karagandinskaya Oblast Executive Committee

We began implementing antibrucellosis measures using strain 19 vaccine at the farms of Karagandinskaya Oblast in 1957, but we were unsuccessful. In 1973, after three to four examinations we revealed 8-10 percent and more animals reacting positively to brucellosis at certain farms.

The veterinary division initiated the conduct of expanded sessions of rayon executive committees with the participation of veterinary workers, specialists, and farm executives. The methods and forms of organization of recovery measures were examined at these sessions.

An integrated plan of recovery measures was written for each farm. Heeding our proposal, the oblast executive committee decided to allocate considerable assets to farms in the suburban zone for construction of veterinary-sanitary facilities. This year a veterinary council was established under the oblast agricultural administration. The plans and schedules for control of brucellosis and other infectious diseases of animals are examined at its monthly meetings.

A decision has been made to set up an isolation ward in each rayon and concentrate all sick animals within it, which will afford a possibility for eliminating small groups of sick cattle. A decision was also made to organize isolated rearing of replacement calves.

G. M. Guliyev, Chief, Brucellosis and Tuberculosis Control Expedition, Azerbaydzhan SSR Ministry of Agriculture

Last year 114 areas unfavorable with respect to brucellosis recovered in the Azerbaydzhan SSR. We should take account of the fact that veterinary-sanitary and recovery measures must be implemented in the complex conditions

of distant pastures and at farms located in hard-to-reach mountain villages. Another difficulty is that the farms are subordinated to various departments, which makes it more difficult to implement therapeutic-preventive measures. An interdepartmental commission chaired by the deputy minister of agriculture was created in the republic as a unique sort of brucellosis control headquarters. It was established that veterinary measures are being implemented one-sidedly in a number of places: The animals are examined, sick ones are separated, and no more. Repair and cleaning of buildings, reconstruction and construction of animal breeding farms and veterinary facilities at these farms, and transfer of cattle from the farms are not tied in with the recovery measures, which reduces their effectiveness. Farm managers do not always help veterinary workers enough in this great and important matter. A plan to improve recovery measures was written after careful study of the evolved situation and determination of the epizootic conditions at the farms.

I should note that both the Central Committee of the Communist Party of the Azerbaydzhan SSR and the Azerbaydzhan SSR Council of Ministers have recently been devoting attention to eradicating chronic infections, which is helping the veterinary service to organize and implement recovery measures more effectively, with minimum outlays and losses for the farms. With the support of the decisions of the Azerbaydzhan SSR Council of Ministers, we have been able to solve such problems as creating an interfarm isolation ward at which to concentrate highly productive animals and use their products temporarily, to replace sick stock with healthy animals, and others.

Detachments have been organized in the republics to control brucellosis and tuberculosis; they are implementing recovery measures at the farms irrespective of their departmental subordination.

We began using strain 82 vaccine in June 1974. Considering the epizootic situation in the republic we decided to use it to immunize all cattle that the instructions would allow. A great deal of diagnostic work had to be done before using the vaccine. At times we discovered sick cattle 3 months after vaccination. We tried to find these animals and send them to the slaughterhouse so that they would not stay at the farms too long.

We have started writing integrated plans for each rayon with the purpose of achieving full recovery of the republic's farms from brucellosis. We will have to make organization and implementation of the measures more efficient, improve the work of decontamination detachments and decontamination stations, coordinate the plans suggested by farms subordinated to different organizations, and insure that they are appropriately financed.

N. S. Ulasevich, Director, Brucellosis Research Laboratory, All-Union Institute of Experimental Veterinary Science

Brucellosis research has been going on for a long time in our country. The instructions on brucellosis control, which have been published since

1934, were written on the basis of scientific data and practical experience. Colleagues of 40 scientific research institutes and stations are presently studying various aspects of the disease. Special attention is being devoted to practical testing of scientific recommendations.

The research plan for the Tenth Five-Year Plan foresees study and improvement of methods for diagnosing animal brucellosis. In this case we are trying to make the research being conducted by regional veterinary laboratories less laboriousness and more effective. With this purpose in mind, in the near future we will propose introducing the laminar agglutination reaction using a rose bengal antigen and a single brucellosis antigen for the agglutination reaction and the complement-fixation reaction, and serological reactions using a micromethod. The antibody neutralization reaction has been developed, and steps are being taken to improve bacteriological diagnosis of brucellosis.

Scientists would like a great favor from practical workers: When testing new antibrucellosis vaccines, adhere fully to the procedures suggested by the vaccine's inventors and approved by the USSR Ministry of Agriculture Main Veterinary Administration. Even the slightest deviations from the recommendations may lead to incorrect conclusions, lengthening the time of farm recovery. As an example strain 82 vaccine cannot be given to pregnant animals. This requirement has been violated in a number of places, and many farms have experienced considerable losses connected with abortions of the animals.

In addition to testing vaccines from strain 82, Nevskiy-12 and Rev-I, in production conditions, we are continuing our search for new vaccines. Scientists are devoting a considerable amount of attention to studying the experience of organizing preventive measures at industrial complexes and to developing measures to protect animal breeding complexes from importation of infectious disease agents with a consideration for local conditions.

We should note that scientists studying various aspects of the brucellosis problem are providing great methodological and practical assistance to veterinary specialists at the farms, rayons, and oblasts in organizing and implementing antibrucellosis measures. I can cite many examples in which they have actively influenced the course of the recovery of farms and helped to unravel complex situations and determine effective measures to prevent and eliminate infection.

There are many shortcomings still present in the work of scientific research institutions and our laboratory; many of the problems could have been solved quicker, and we will doubtlessly try to improve our work.

Question: What is your opinion on strain 82 vaccine?

Answer: Research on this preparation has not been completed. The Scientific-Technical Council of the USSR Ministry of Agriculture has reviewed the

question of testing the vaccine, and it has generally approved the work. A decision has been made to continue testing the vaccine in production conditions. A recommendation was made to scientific research institutions to continue studying the length of immunity, the reactions arising at particular times after immunization, and other problems. We are presently studying the strain itself and defining the conditions for making and controlling the vaccine so that it could be standardized. The USSR Ministry of Agriculture Main Veterinary Administration has approved new instructions. Testing of the vaccine will be continued locally, but now with a consideration for recommendations in the new instructions. By the end of 1977 we plan to generalize and analyze all information on use of strain 82 vaccine, which will permit us to make final conclusions on the strain's properties, the immunogenicity of the vaccine, and its effectiveness in production conditions.

Question: Will strain 19 vaccine be put to use?

Answer: Strain 19 vaccine was proposed in 1933-1934 and is presently being used in all countries of the world. It was recommended for immunization of calves 4-6 months old. It is being used in our country to vaccinate young animals, and it has been used to immunize adult animals. However, prolonged seropositiveness and a number of other problems caused us to stop vaccinating adult cattle. Strain 19 vaccine produces extremely good results when given to calves, and it can be used successfully. But in this case the Main Veterinary Administration must determine the zones in which this vaccine can be included within the complex of recovery measures. It would be improper to use two or three vaccines in the same rayon or oblast.

R. M. Alekhin, Chief, Antiepizootic Administration of the Main Veterinary Administration, USSR Ministry of Agriculture

The discussion being held by the editorial board of VETERINARIYA is useful in that it has permitted us to exchange opinions about the effectiveness of antibrucellosis measures and share experience in their organization and implementation. Such meetings broaden our outlook and afford a possibility for gaining a deeper understanding of the problems facing the country's veterinary service. The fight against chronic animal diseases is one of the main directions of the veterinary service's activity.

Veterinary specialists have done a great deal of work, they have achieved certain successes in eradicating brucellosis, they have improved conditions in significant areas of our country, and they have accumulated valuable experience in preventing this disease. Now we have available to us interesting scientific ideas which are being used successfully in practice; we have been able to train a large army of veterinary specialists to organize antiepizootic measures. All of this is a dependable foundation for eradicating brucellosis of agricultural animals.

The main reason that recovery of farms is taking longer than expected is that sometimes the preventive measures are not tied in with the production and financial activity of the farms, being limited only to veterinary measures specifically. We know, however, that general preventive measures are what are most important in the fight against any infection.

The task is to see that the entire volume of necessary operations is foreseen when we develop antibrucellosis measures.

When the plans are well grounded and when they reflect not only veterinary, zootechnical, organizational, and administrative problems but also those of production and finances, they permit us to effectively implement recovery measures; moreover it is easier for veterinary specialists to work on the basis of such plans.

Immunity generated in animals by strain 82 vaccine persists for up to 2-2.5 years; on this basis we should revaccinate animals, when necessary, after 2-3 years, but not sooner. Animals must not be immunized unsystematically. without need. Brucellosis control measures must be implemented concurrently, both in the public and private sectors. In all areas where we plan to eradicate this disease we must try to improve the health of all cattle. We must deepen our knowledge and improve the methods of our work.

Continually improving the system of antibrucellosis measures, we have done a great deal of work, and we have encouraged the society to participate in the fight against brucellosis. All of this taken together will promote further success.

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ANTHRAX CONTROL MEASURES AT PERSISTENTLY UNFAVORABLE LOCATIONS

Moscow VETERINARIYA in Russian No 8, 1977 pp 59-60

[Article by A. I. Zaviryukha, A. N. Kharchuk, and V. U. Shepchenko, Ukrainian SSR Scientific Research Institute of Experimental Veterinary Medicine]

[Text] Incidence of anthrax has declined dramatically in the last 10 years as a result of planned control measures implemented in our country; now only isolated cases of this disease are noted (S. R. Didovets, 1963; R. M. Alekhin, 1968, 1970; and others).

Comparative analysis of data in state veterinary records has shown that anthrax is usually recorded among animals in unfavorable locations. Thus out of the total number of such locations revealed in the Ukrainian SSR in 1971-1975, anthrax had been noted earlier in 70 percent of them, while in 30 percent of the locations anthrax was revealed for the first time.

According to veterinary-sanitary data cards, there was only one case of animal illness in half (50.4 percent) of the locations persistently unfavorable in relation to anthrax revealed in the Ukrainian SSR in 1920-1970, while repeated outbreaks of infection were observed in the rest of the locations (49.6 percent).

After studying the time intervals between repeated outbreaks of anthrax in unfavorable locations we concluded that they are usually recorded in the first 5 years after illness is discovered. An average of 68 percent of all repeat infections occur during this time, to include 28.9 percent in the first year, 15.5 percent in the second, 10.6 percent in the third, 7.7 percent in the fourth, and 5.8 percent in the fifth. Only 17.9 percent repeat cases of animal anthrax were recorded in the 6-10 years following an outbreak; the figures for subsequent periods are 7.8 percent after 11-15 years, 3.7 percent after 16-20 years, 1.7 percent after 21-25 years, and 2.6 percent after 26 years and more.

Thus the most dangerous period, during which infection arises with the greatest repetition frequency, is the first 5 years after illness. If

during this time anthrax was absent at a given populated location, the probability of repeat animal illness decreases by almost 3-9 times in the next 6-15 years, and by 11-75 times after 16-25 years.

For this reason we need a differential approach to organizing anthrax immunization of animals in unfavorable and threatened locations depending on the amount of time that has passed since the last outbreak of infection.

We know that preventive immunizations are given in unfavorable and threatened locations each year in the fall, irrespective of the length of time since the last anthrax outbreak was recorded.

We suggest dividing all locations unfavorable with respect to anthrax into three categories on the basis of the time since the last outbreak of illness during which repeat infections are recorded most frequently.

1. Locations especially unfavorable with respect to anthrax, in which the disease was recorded during the last 5 years.

2. Attenuating persistently unfavorable locations in which repeat outbreaks of infection have been absent for the last 6-15 years.

3. Old persistently unfavorable locations in which the last outbreak of infection was noted 16 years ago or earlier.

We suggest calling a location especially unfavorable for 5 years after animal anthrax is recorded within it.

We recommend making preventive immunizations against anthrax in such a way that a rather intense immunity would be achieved which would protect the animals from recurrence of illness--that is, we recommend immunizing them in the spring and fall of each year for 5 years after the outbreak.

In our opinion animals should be immunized against anthrax in the winter (December-January) of each year in attenuating persistently unfavorable locations.

Postponing immunizations until winter is dictated by the need for creating more-intensive immunity among susceptible animals in summer-fall (June-September), since the largest numbers of anthrax outbreaks are noted during this period (G. F. Bondarenko et al., 1973; A. I. Zaviryukha et al., 1976; and others). Moreover a third of the animals for which anthrax was established in the summer-fall period during the last 5 years in the Ukrainian SSR fell ill 8-10 months after immunization.

In all persistently unfavorable locations the animals should be immunized in the fall of each year.

There are more than 35 percent old unfavorable locations in the Ukrainian SSR, in which this infection has not been recorded for over 25 years. For this reason we need to study them further, so as to determine the suitability of making preventive immunizations there.

In the general structure of the incidence of anthrax among agricultural animals, cattle contributed 88.5 percent, to include 12.3 percent for young animals up to 1 year old, 65 percent for animals 1-2 years old, and 22.7 percent for animals over 2 years old, sheep contributed 3.2 percent, pigs contributed 8.5 percent, and horses contributed 1 percent in the last 5 years. Illness among calves up to 6 months old is extremely rare, and outbreaks of this infection among old cows have not been noted.

Thus if we are to be more successful in the fight against anthrax, we must properly immunize the growing young of cattle, since they become stricken most frequently.

Conclusions

1. Locations unfavorable in relation to anthrax are divided into three categories to permit organization of control measures--especially unfavorable, attenuating, and old. Preventive immunizations are recommended each year in the spring and fall in locations of the first category; December-January immunizations are recommended for the second category, and fall immunizations are recommended for the third.

2. Cattle, especially young animals 1-2 years old, contract anthrax most frequently in the Ukrainian SSR, contributing 88.5 percent to the total morbidity.

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TOXICOLOGICAL ASSESSMENT OF THE PRODUCTS OF SLAUGHTERED ANIMALS POISONED BY BAZUDIN

Moscow VETERINARIYA in Russian No 8, 1977 pp 105-106

[Article by S. R. Avezov, Uzbek SSR Scientific Research Veterinary Institute]

[Text] Bazudin (diazinon, ekzodin, spektratsid, G-24480), the active ingredient of which is N', N", N'"--tri-(ethylene)-triamidethiophosphate, has important significance among the new organophosphoric compounds used to control animal ectoparasites. Its use against various insects often causes contamination of animal husbandry products by residual quantities of the preparation.

Cattle were sprayed once a week for 4 months with a 0.1-0.05 percent diazinon suspension at a dose of 4-6 liters; a day after the 16th spraying, 0.78 mg/kg of the preparation was discovered in the fat of the omentum of one of the killed animals (A. A. Nepoklonov, 1974).

It has been established (V. V. Leshchev, P. T. Kan, G. A. Talanov, 1972) that after milking cattle is processed once with a 0.2 percent aqueous emulsion of diazinon, residual quantities of this preparation are excreted with milk for 3 days.

However, the quality of products from slaughtered animals poisoned by bazudin has not been assessed from a toxicological standpoint. In this connection we took on the task of determining the sanitary-toxicological indices of meat products and establishing the time of safe slaughtering of animals poisoned by bazudin. The experiments were conducted on 14 Karakul' sheep 1.5-3 years old weighing 40-45 kg; these sheep were divided into two groups (10 experimental and four control).

Bazudin was administered internally once to sheep in group 1 at a dosage of 225 mg/kg (half of the lethal dose) with respect to the active ingredient. Clinical symptoms of poisoning arose after 2.5-3 hours, becoming clearly pronounced in 7-10 hours--salivation, dramatic dilation of the pupils, bronchospasmic phenomena, weakness of skeletal muscles, convulsions, paresis of the limbs, and pollakiuria. All experimental animals survived; after 3 days the signs of intoxication abated significantly, and by the fifth day all sheep appeared clinically healthy.

In order to analyze the sanitary indices of the products of slaughtered animals and to establish the time residual quantities of bazudin remain in the organs and tissues of the animals, the meat and internal organs of sheep killed 1, 5, 10, 14, 18, and 22 days after poisoning were subjected to organoleptic, biochemical, and chemical analytical research. The pesticide level in meat and parenchymatous organs was determined by gas-liquid chromatography using the method suggested by V. V. Leshchev and G. A. Talanov (1974).

According to organoleptic indices the meat of experimental sheep killed within the first few days after intoxication was distinguished from the meat of control animals by poor bleeding. Bouillon had an unpleasant odor and contained flakes. The meat of animals killed after 5 days and more was characterized by the same indices as those of the meat of healthy (control) sheep (see table).

Biochemical Indices of Sheep Meat

(1) Время убоя животных после введения базудина (дни)	pH	(2) Амино-аммиачный азот	(3) Коэффициент кислотность-окисляемость	(4) Реакции: бензидиновая (5)	формольная (6)	цветная окислительная (7)
(8) Опытная группа						
1	6,24	1,96	0,34	–	+	+
1	6,52	1,82	0,32	–	+	+
5	5,75	1,12	0,49	+	–	–
5	5,80	0,96	0,52	+	–	–
10	5,70	1,04	0,50	+	–	–
10	5,90	0,92	0,52	+	–	–
14	5,65	0,96	0,49	+	–	–
14	5,70	0,92	0,48	+	–	–
18	5,85	0,86	0,56	+	–	–
22	5,75	0,70	0,52	+	–	–
(9) Контрольная группа						
	5,85	1,12	0,50	+	–	–
	5,70	1,04	0,48	+	–	–
	5,90	0,96	0,47	+	–	–
	5,65	1,12	0,49	+	–	–

Note: The plus symbol (+) stands for a positive reaction, while (-) stands for a negative reaction.

Key:

1. Time of slaughter of the animals after administration of bazudin (days)
2. Amino-ammonium nitrogen
3. Acidity-oxidizability coefficient
4. Reactions
5. Benzidine
6. Formalin
7. Color oxidation
8. Experimental group
9. Control group

We can see from the table that according to the biochemical indices the meat of sheep killed a short time after intoxication by bazudin differed from that of control animals.

The benzidine reaction readings were highly negative, while in all cases the formalin and color oxidation reactions produced positive results, indicating dramatic inhibition of the activity of the enzyme peroxidase and presence of considerable quantities of readily oxidizable substances--polypeptides and amino acids--in the meat. Five days after intoxication these indices were typical of the meat of healthy (control) animals.

The following indices attested to presence of bazudin residues in the organs and tissues of poisoned sheep. One day after its administration, its concentrations were 12.2-13 mg/kg in fat, 10.2-12.6 in muscles, 7-7.6 in the liver, 2.6-3 in kidneys, 1.6-2.4 in the lungs, 9-15 in the brain, and 5-7.4 mg/kg in the spleen. In subsequent days the level of the toxic chemical gradually decreased, reaching the following concentrations by the 14th day: 1.8 mg/kg in fat, 0.12 in muscles, and 0.05 mg/kg in the liver. Traces of the pesticide were detected in other organs at this time. We detected 0.64 mg/kg in fat on the 18th day. After 22 days, all organs and tissues of one killed animal were free of pesticide residues.

To study the toxicity of the meat of sheep killed different times after bazudin intoxication we conducted biological studies, feeding the meat to white rats daily at a dose of 50 kg/ga [sic] body weight. We established that after 10 days meat containing pesticide residues (0.78-10.2 mg/kg) caused significant inhibition of acetylcholinesterase activity--50-59 percent, which indicates that the meat is toxic. Chemical analysis of muscle samples from rats killed 10 days after first being fed the meat established bazudin at a concentration of 0.05-0.08 µg/gm.

We also studied the effect of long-term storage in a refrigerator (3 months) and cooking of meat products on the level of pesticide residues. With this purpose the meat was boiled for 2.5 hours and fried for 1 hour.

We found that long-term storage and cooking did not completely decompose the bazudin residues in the meat products. Better results were obtained when the meat was boiled for 2.5 hours. This decreased the pesticide residues by 51-57 percent.

Conclusions

1. According to organoleptic and biochemical indices the meat of animals killed in the first few days after being poisoned by bazudin differs sharply from the meat of healthy animals. When animals experience acute intoxication by bazudin, the largest quantities of this preparation accumulate in fatty and muscle tissues.

2. Meat products containing bazudin residues have toxic products, and they cannot be used as food. Long-term storage (3 months) and cooking (boiling for 2.5 hours and frying for 1 hour) do not completely decompose the pesticide residues in the meat.

3. Animals can be slaughtered for meat 22 days after intoxication by bazudin.

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SIXTIETH ANNIVERSARY OF GREAT OCTOBER AND DEVELOPMENT OF FORENSIC MEDICINE IN USSR

Moscow SUDEBNO-MEDITSINSKAYA EKSPERTIZA in Russian Vol 20 No 3, 1977 pp 3-7

[Editorial]

[Text] The 60th anniversary of the Great October Socialist Revolution is an important landmark in the life of the Soviet people and in development of the world liberation movement.

The Great October Socialist Revolution fundamentally altered the course of development of all mankind and initiated a new era--the era of mankind's transition from capitalism to socialism.

During a historically short period of time and in the difficult situation produced by the aftermath of the world and civil wars and then the treacherous attack of fascist Germany, under the guidance of the Communist Party our country's laborers built a developed socialist society. By its successes, the Soviet Union graphically demonstrated that a historically unprecedented case of social progress could be achieved within a socialist state.

The world socialist system took shape and a fundamental change occurred in the balance of power in the world arena under the influence of the great ideas of October.

Following Lenin's policy, the CPSU is supporting the peaceful labor of our people, continuous successful progress of our motherland to communism, dynamic development of its economy, science, and culture, and growth of public welfare.

Preparations for celebration of the glorious jubilee of Great October are being made at a time of active creative activity of the Communist Party and the Soviet government and all Soviet people in the fulfillment of the decisions of the 25th CPSU Congress.

Comrade L. I. Brezhnev deeply analyzed all of the basis aspects of the party's activity and the life of the society of developed socialism, scientifically generalized the tremendous amount of practical experience that has been accumulated, posed tasks for the future, and revealed the basic problems of social development within the country and in the international arena in the

Accountability Report of the CPSU Central Committee to the 25th CPSU Congress from the standpoint of creative Marxism-Leninism.

The CPSU Central Committee decree "On the 60th Anniversary of the Great October Socialist Revolution" states: "The historical revolutionary achievements of the Soviet people, their success in the fight to build a communist society, and the victories enjoyed along the difficult uncharted path our country has been following for 60 years have earned the recognition of the entire world. These achievements are a direct continuation of the work of October, they are an implementation of the ideas of the great Lenin. These successes and achievements and this historical experience have become the guiding star of the modern world revolutionary movement."

During all of the 60 years of the Soviet Union's inception and development Soviet public health and, in particular, forensic medicine experienced development as well.

In prerevolutionary Russia, forensic medical expert examination was performed in the interests of the exploiting classes by urban, police, and district physicians.

The proletarian revolution swept away the old court system down to its foundations. Peoples courts came into being not as a reworking of old court institutions but rather as new entities having the purpose of protecting the young Soviet republic and administering justice in the interests of laborers.

Headed by V. I. Lenin, the Soviet government immediately began truly titanic work in all spheres of the country's political, economic, and cultural life.

A new state forensic medical service also began to be created in 1918, from the moment that a medical expert examination subdivision was organized in the RSFSR Peoples Commissariat for Public Health. This service underwent its initial development in the difficult years of foreign intervention, civil war, and the period of recovery.

The main stages in development of Soviet forensic medicine are associated with approval of a number of legislative documents of the RSFSR Peoples Commissariat for Public Health which defined its objectives, organization, and its forms and methods of work. A decree of the USSR Council of Peoples Commissars (1939), directed at strengthening and developing forensic medical expert examination, played an especially great role.

The most important measures in organizing forensic medical expert examination during the first years after October were implemented under the guidance of N. A. Semashko and Z. P. Solov'yev, prominent organizers of Soviet public health and officials of the Soviet government.

The development of forensic medicine was also promoted by the first all-Russian congresses of experts in forensic medicine.

Lenin's national policy and the fraternal friendship of the peoples of the Soviet Union promoted development of forensic medicine in all union republics, including within the former frontiers of Czarist Russia, where there had essentially been no expert commissions prior to October.

As with all Soviet people, during the Great Patriotic War forensic physicians protected the motherland in the ranks of the Soviet Army, worked selflessly in the rear, and rendered great assistance to the Extraordinary State Commission for Investigation of Fascist German Atrocities.

After its heroic victory in the Great Patriotic War, the Communist Party directed the efforts of the Soviet people at restoring the national economy and building a communist society.

Owing to the concern of public health agencies and the labor and energy of many forensic physicians, the forensic medical service was quickly restored in the Ukrainian SSR, in the Belorussian SSR, and in many oblasts of the Russian Federation which had suffered during the war; it became stronger as a whole and began to develop quickly, especially in the last few years.

Orders, instructions, and other legislative acts of the USSR Ministry of Public Health have been directed at improving all aspects of forensic medical expert examination--its organizational and structural reinforcement, development of its material-technical base to include the number of laboratories with forensic histological, physicotechnical, forensic chemical, and other departments, enlargement of staffs, personnel training, and so on.

After the All-Union Scientific Society of Forensic Physicians was organized in 1946, establishment of its departments in republics and cities began. Today there are 15 republic and 85 oblast, kray, and city scientific societies, which are playing a great role in work on the theoretical and practical problems of forensic medicine and forensic chemistry, in providing ideological and moral education to forensic physicians based on a communist world outlook and the best traditions of domestic medicine, in improving their occupational training, in introducing scientific achievements into practice, and in improving interaction of forensic physicians with police agencies and the public health institutions. This work is being helped along to a significant extent by the Scientific Research Institute of Forensic Medicine of the USSR Ministry of Public Health, which serves as the scientific-methodological organizational center of forensic medicine in the USSR, and by the journal SUDEBNO-MEDITSINSKAYA EKSPERTIZA, which was established by decision of the Communist Party and the Soviet government in 1958.

The Communist Party and Soviet government are continually displaying attention toward and concern over the health of Soviet people. Concern over the health of Soviet people includes not only prevention and treatment of diseases and improvement of conditions at work and at home, but also protection of the life and health of citizens from criminal transgressions.

In the 60 years after October forensic medical expert examination became a branched, efficiently organized structural system of state institutions with well-trained specialists and a modern scientific and material-technical base, capable of solving the problems posed to it by Soviet judicial and public health agencies in the conditions of communist construction in full swing.

Participation of forensic physicians both in the work of public health agencies in their fight against crime affecting the life and health of Soviet people, and in solving the problems of Soviet public health pertaining to upgrading the quality of therapeutic assistance to the public and implementing preventive measures has important social significance and is one of the advantages of the socialist state.

The state nature of the Soviet forensic medical service, which is an inseparable part of Soviet public health, insures true independence and objectiveness of expert examination, growth in its scientific and practical capabilities, and achievement of a number of other advantages over the forensic medical expert examination systems of capitalist countries.

In just the last few years new buildings were erected for a number of forensic medical expert examination offices, or the buildings they occupied have been expanded; new large laboratories have been established for republic, kray, and oblast forensic medical expert examination offices; the staffs have been increased by 27.6 percent, to include a 31.3 percent increase for laboratory staffs due to introduction of new laboratory methods heightening the possibilities of expert examination. Many forensic medical expert examination offices are being supplied new instruments and equipment, and well trained specialists, to include many doctors and candidates of science, are making use of modern research methods at these offices; one out of every three experts is in the highest or first qualification category.

The scientific base of forensic medicine consists of 93 departments and the Scientific Research Institute of Forensic Medicine, which employs 381 highly qualified scientists to include 64 doctors and 234 candidates of sciences. Many scientific studies are being conducted by forensic medical expert examination offices, which attests to the inseparable unity of science and practice.

During the last 5-6 years, 37 doctorate and 168 candidate dissertations pertaining to problems in forensic medicine have been defended, and 44 collections of scientific works, 28 monographs, six textbooks, 45 training aids, and other works have been published.

There have been significant scientific achievements in various divisions of forensic medical traumatology and toxicology, in forensic medical serology, in analysis of material evidence aimed at solving particular problems of forensic medical stomatology, sudden death, and personal identification, in application of cytological research methods, and so on. Soviet forensic medicine is one of the world's leaders in solution of a number of problems.

The achievements of science and new research methods are being introduced into practice promptly and extensively for the most part, which is insuring a high level of expert examination in the investigation of crimes and administration of justice.

Much attention is being devoted to planning and coordinating scientific research and to improving pedagogical methods, and work is being done on methodological problems of forensic medicine and on problems in scientific organization of the labor of forensic physicians.

Forensic physicians and chemists are given possibilities for specializing and upgrading their qualifications at departments of forensic medicine in five institutes for the advanced training of physicians, in the Scientific Research Institute of Forensic Medicine, in certain other departments, and in divisions of forensic medical expert examination offices. In addition to general advanced training courses, short courses on the pressing problems of forensic medicine and special seminars pertaining to introduction of new research methods are being offered. In 1970-1975 2,000 specialists underwent training in just the institutes for advanced training of physicians, while 1,100 specialists underwent training at 20 seminars.

Owing to growth in the economic power of our motherland, the material welfare of the Soviet people is continually improving. The official salaries of workers in forensic medical expert examination were increased, and additional payment for harmful working conditions was increased to 25 percent of the salary in 1973. Moreover the wages of persons in the highest and first qualification categories were increased. Official salaries paid to experts having academic degrees were raised as of 1969. Retirement-age experts continuing to work are receiving their full pay plus 50 percent of their pension.

The First All-Union Congress of Forensic Physicians of the USSR was held in 1976. Its work was influenced by the ideas and historical decisions of the 25th CPSU Congress. Executives of the USSR Ministry of Public Health and of public health agencies at the highest levels, and forensic physicians of a number of socialist countries took part in this representative forum of forensic physicians.

The congress participants deeply and thoroughly analyzed all aspects of activity in forensic medicine during the last 5 years and emphasized its growing role in solving the problems of intensifying the fight against crime, strengthening socialist legality, and heightening its role and significance in the public health system.

The successes achieved in these directions, the promise for further improvement of the science of forensic medicine and expert practice, and the ways and means for correcting the shortcomings still present were noted.

Special attention was turned to the need for:

Improving the activity of forensic medical institutions at all levels by introducing modern management methods and scientific organization of labor, and on the basis of supervision of the work of subordinate institutions and experts by service executives;

implementing a complex of measures to upgrade the scientific and methodological level of expert examination, particularly by improving occupational training and ideological-moral education for forensic physicians, significantly improving the planning, coordination, and efficiency of scientific research, effectively introducing scientific achievements, new, tested research methods, and modern technical resources into expert practice, and purposefully organizing and using scientific information pertaining to forensic medicine;

broadening and strengthening constant interaction between forensic physicians and preliminary investigation agencies in relation to investigation of criminal cases involving crimes against the person and road accidents (examination of the place of accident, initiation of certain investigatory actions, and so on) with the goal of making fuller use of the possiblities of forensic medicine; broadening and strengthening constant interaction between forensic physicians and the expert examination institutions of other departments in order to achieve methodological uniformity in the conduct of integrated medical-criminalistic expert examinations;

significantly heightening the role of the forensic medical service in solving the problems facing public health and practical medicine pertaining to prevention of injuries, intoxications, sudden death, and so on, and in improving the work of therapeutic-preventive institutions aimed at preventing errors in diagnosis and therapy.

These important tasks in heightening the effectiveness and quality of the activity of forensic medicine directed at implementing the decisions of the 25th CPSU Congress by the forms and methods of work inherent to forensic physicians are an elaborate program of action for executives of forensic medical institutions, the scientific society of forensic physicians, and every expert in forensic medicine.

Soviet forensic physicians, of whom almost one out of every three is a communist or Komsomol member, will promote fulfillment of the plans for the Tenth Five-Year Plan and make their contribution to completing the tasks posed in honor of the glorious 60th anniversary of the first socialist state in the world.

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SOME METHODOLOGICAL PROBLEMS OF SOVIET FORENSIC MEDICINE AND FORENSIC PSYCHIATRY

Moscow SUDEBNO-MEDITSINSKAYA EKSPERTIZA in Russian Vol 20 No 3, 1977 pp 7-11

[Article by G. V. Morozov and P. P. Shirinskiy]

[Text] The scientifically grounded program of communist construction adopted by the 25th CPSU Congress represents a new era in the history of the Soviet Union's development. The congress charted the main roads for achieving further progress in our society and heightening the effectiveness of labor and the quality of products in all sectors of the national economy on the basis of continuous and proportionate development of social production. Our country is advancing toward the 60th anniversary of Great October inspired by the perspectives the historical 25th CPSU Congress has opened before the Soviet people.

This date is an important landmark in the life of our country. The Great October Socialist Revolution was a major event of the 20th century which had fundamentally altered the course of all mankind's historical development. Arisal of the first socialist state in the world was the result of its victory. Under the guidance of the Communist Party, in 60 years the laborers of our country have implemented Lenin's plan for socialist construction, they have created a powerful industry and collective agriculture, they have come to a just solution for the national question, they have raised Soviet culture and science to an unprecedented height, and they have transformed the USSR into a strong socialist power. The achievements the Soviet Union has had in these 60 years are clear evidence of the fact that socialism has made a historically unprecedented rate of progress possible in all spheres of the society's life.

The successes of the Soviet Union in developing the spiritual forces of the people are fully reflected in the CPSU Central Committee Decree "On the 60th Anniversary of the Great October Socialist Revolution."

Ten years have passed since the Soviet people took triumphant stock of the results of 50 years of Soviet rule. These years were full of events of tremendous historical significance in the life of our country and in the international arena.

During a single decade the economic potential of the USSR created during the preceding half century was practically doubled. The party had developed and is consistently implementing a scientifically grounded economic strategy directed at fundamental, long-range goals, the highest of which is to achieve continual improvement in the material and cultural standard of living of the people.

The Soviet people know quite well that the party has no interests other than those of the people. A decree on increasing the wages of 31 million workers in the nonproductive sphere, adopted recently by the party and government, is being implemented. A major program of housing construction is going on. The public health of Soviet people is enjoying consistent improvement. Science and education are developing at a rate of unprecedented intensity.

The fundamental problems in intensifying the role of science in the developed socialist society and growth in the responsibility of scientists and in their association with the practice of communist construction were deeply revealed in the CPSU Central Committee Accountability Report to the 25th CPSU Congress, in speeches of CPSU Central Committee General Secretary Comrade L. I. Brezhnev at a solemn meeting devoted to the 250th anniversary of the USSR Academy of Sciences, and at meetings attended by the executives of the academies of sciences of socialist countries.

A great deal of work to establish and develop medical science and practice was done during the years of Soviet rule. The achievements of Soviet public health are closely associated with the tremendous socioeconomic transformations occurring in Soviet society and with the successes of domestic science.

Without a doubt the Tenth Five-Year Plan will be a time of further intense development of medical science, significant improvement of the effectiveness of scientific research, and more-active introduction of its results into public health practice with the goal of successfully conquering cardiovascular, oncological, endocrine, viral, and occupational diseases, and diseases of the nervous system. Progress in these areas will be achieved chiefly through development of the fundamental sciences, such as molecular biology, physiology, biochemistry, immunology, and others.

Comrade L. I. Brezhnev described the significance of the fundamental sciences in his Accountability Report to the 25th CPSU Congress with the following words: "That there is nothing more practical than good theory is true. We know quite well that the full flow of scientific-technical progress would dry up unless it is continually fed by fundamental research."*

Development of integrated biomedical research tied in closely with hygienic and clinical disciplines acquires special significance under these conditions.

*Brezhnev, L. I., "Otchet Tsentral'nogo Komiteta KPSS i ocherednyye zadachi partii v oblasti vnutrenney i vneshney politiki. Doklad XXV s"yezdu KPSS 24/II 1976 g." (Report of the CPSU Central Commitee and the Present Objectives of the Party in Domestic and Foreign Policy. Report to the 25th CPSU Congress, 24 February 1976), Moscow, Izd-vo Politicheskoy Literatury, 1976, p 57.

Maximum reduction of the time required to introduce the new achievements of medical science into practice is acquiring priority importance.

The subject of research of modern medicine as a science includes the causes of arisal of human diseases, the laws behind their development, and the methods for treating and preventing them. A typical trait of modern medicine is synthesis of information from the natural and social sciences; it is precisely on this basis that the laws governing the arisal and course of diseases could be revealed and new approaches to treating diseases could be developed with the greatest success.

Medicine studies man living in certain socioeconomic conditions. The goal of this study is to prevent disease and lengthen the active period of human life, which corresponds to the preventive direction of socialist public health. The unity of biological and social problems is visible here with special clarity, since the extensive social-preventive measures strengthen the biological foundation of the protective functions of the human body. The process of differentiation of scientific disciplines on one hand and integration, mutual penetration of the methods and ideas of one sector of medicine into another on the other make up an important trend in the development of medical science, a trend which will undergo intensification in the forthcoming years. Rapid development of medical science and technology and broad introduction of scientific achievements into practice require that we heighten the training level of specialists, who must now possess rather high qualifications in various areas of medicine as well as in associated sciences. All of this has priority significance to successful solution of the new problems which the 25th CPSU Congress posed to Soviet public health.

Solution of the theoretical and organizational problems of modern socialist public health, substantiated demonstration of our achievements, and revelation of the advantages the socialist society enjoys in solving the most important problems of protecting and improving the health of the people have great ideological and political significance.

We must also emphasize the importance of solving methodological problems at the present stage of medicine's development.

The scientific-technical revolution is such an important phenomenon today that assessment of its socioeconomic essence and consequences has become an object of acute ideological struggle between the bourgeois and Marxist-Leninist world outlooks. The role of scientific research methodology is growing considerably in this connection. Both of these processes are manifested specifically in such sectors of scientific knowledge and practical activity as forensic medicine and forensic psychiatry. These sciences are at the front ranks of medicine, interacting directly with the problems of human social life, with the theory and practice of justice in its application to protection of the life, health, freedom, and dignity of the individual.

We must do everything possible to promote improvement of therapeutic-preventive assistance to the public, and to strength socialist law and order in light of the tasks posed by the 25th CPSU Congress to public health and medical science pertaining to developing both forensic medicine and forensic psychiatry.

Soviet forensic medicine is a science based on an aggregate of medical, general biological, and other disciplines oriented toward solution of the problems of Soviet public health and justice.

Introduction of new biological, chemical, physicotechnical, and other research methods has significantly broadened the range of issues being resolved by forensic medical expert examination.

The methodological problems facing forensic medicine are extensive as well. Their complexity and urgency stem to a significant extent from the special position Soviet medicine occupies within the complex of medical sciences. These problems include, chiefly, determining the qualitative, material features of the examination process and its relationship to external influences, which have fundamental significance to expert conclusions.

The problem of the dialectic mutual relationships and interaction of morphological and functional phenomena occupy an important place in medicine, particularly in forensic medicine. Introduction of modern research methods (electron microscopic, biochemical, biophysical, and others) is permitting us to establish that all functional diseases are accompanied by certain structural changes. Use of integrated research methods, limitation of the area of application of subjective methods, and continually broader use of precise quantitative methods are presently typical of forensic medicine.

The social significance of Soviet forensic medicine is chiefly the product of its important role in helping to reveal crimes against the life, health, and dignity of the individual and in determining the ethics of the Soviet physician. Forensic medicine is to a certain extent promoting improvement of the activity of public health institutions, and it is making a great contribution to prevention of injuries, intoxications, and sudden death.

Conferences on forensic medicine and clinical anatomy are aiding revelation and analysis of errors made in diagnosis and treatment of patients, and in arriving at constructive proposals for eliminating and preventing these errors.

While it is a branch of general psychiatry, forensic psychiatry does have its unique features and its special objectives, and it is an independent scientific medical discipline. It studies mental disorders pertaining to the issues of criminal and civil action. Forensic psychiatric expert examination is promoting implementation of the humanitarian principles of Soviet justice directed at protecting the rights of the mentally ill.

The present stage of development of forensic psychiatry is characterized by profound work on the science's theory and methodology and by continued improvement of the organizational forms of forensic psychiatric expert examination.

One of the most important divisions of the theory of forensic psychiatry is the problem of responsibility.

Being legal categories, the concepts responsibility and irresponsibility are generalizations of phenomena in real life, of objectively existing relationships. The responsibility-irresponsibility issue is resolved on the basis of an assessment of the individual's mental state; this is why a scientific-materialistic understanding of mental activity expressed by the deeds and actions of the individual is an important prerequisite for solution of the irresponsiblity problem.

Pathological disturbances of mental activity may be the product of the patient's inability to understand and evaluate his actions and control his behavior, which naturally relieves him of personal legal liability, making him irresponsible.

Forensic psychiatry has the job of writing concrete recommendations on preventing socially dangerous actions of such persons, and on their work and social rehabilitation.

Improvement of diagnosis and expert assessment pertaining to various forms of mental disturbances on the basis of the broad use of clinical-catamnestic and laboratory research methods has great significance. Soviet psychiatry has been making broad use of the achievements of physiology, biochemistry, genetics, and immunology in recent years. Significant results have been obtained in research on the chemical and morphological substrates of psychoses, including the mechanisms behind hereditary predisposition toward development of mental illnesses. Epidemiological studies are now a major part of research on mental illnesses. The main objective of such studies is to acquire data on the incidence of mental illness in the population; the results of such studies serve as the grounds for scientific planning of psychiatric care and for revealing the role of various factors in the arisal and development of mental illnesses.

A system of differentiated, clinically substantiated treatment of mental illnesses, closely associated with prevention of the socially dangerous actions of the mentally ill, has been developed in Soviet psychiatry.

Research on the clinical pattern of alcoholism and alcoholic diseases and on the specific features of forensic psychiatric and forensic medical expert examination of chronic alcoholics and alcoholic psychotics has broadened significantly.

"Zones of overlapping competency" (O. V. Kerbikov), in which representatives of different areas of knowledge approach the same problem from different aspects, are taking shape today in some directions of medical science. Forensic psychiatry and forensic medicine overlap in relation to an especially large number of common problems of great social significance. The agenda calls for joint scientific work on such problems as alcoholism, sexual pathology, juvenile offenses, problems in medical deontology and ethics, and so on.

Among the most important methodological problems of forensic medicine and forensic psychiatry requiring joint effort, we should note that of the relationship between social and biological phenomena, interaction of structure and function, the relationships between causes, conditions, and motives, the relationship between the subjective and the objective. The "personality and environment" problem, chiefly the problem of determination of behavior, also has great methodological and philosophical significance to forensic psychiatry.

We should state in conclusion that significant expansion of the arsenal of research methods being used in medical science is creating new possibilities and perspectives for research on the essence of pathological processes and states. There can be no doubt that close cooperation of both representatives of the various medical disciplines and medicine with other sciences, all of which have Marxist-Leninist philosophy as their common theoretical foundation, should be the most fruitful way to solve these problems.

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FORENSIC MEDICINE

ACADEMY OF MEDICAL SCIENCES RESOLUTION ESTABLISHES NEW COMMISSION

Moscow SUDEBNO-MEDITSINSKAYA EKSPERTIZA in Russian Vol 20 No 3, 1977 pp 60-62

[Resolution No 92 of the Presidium of the USSR Academy of Medical Sciences: "On Organization of the Problematic Commission 'Scientific Foundations of Forensic Medicine and Toxicological and Forensic Chemistry'," 6 April 1977]

[Text] Moscow, Protocol No 10, § 19

In supplementation of Resolution No 296, 29 Septermber 1976, the Presidium of the USSR Academy of Medical Sciences decrees:

1. To organize an independent national problematic commission titled "Scientific Foundations of Forensic Medicine and Toxicological and Forensic Chemistry" under the Presidium of the USSR Academy of Medical Sciences.

2. To confirm the Scientific Research Institute of Forensic Medicine of the USSR Ministry of Public Health as the head institute on the problem "Scientific Foundations of Forensic Medicine and Toxicological and Forensic Chemistry."

3. To confirm the personnel of the problematic commission "Scientific Foundations of Forensic Medicine and Toxicological and Forensic Chemistry" in accordance with the Attachment.

For the President of the
USSR Academy of Medical
Sciences, USSR Academy of
Medical Sciences Academician.
A. M. Chernukh

Chief Scientific Secretary
of the Presidium of the
USSR Academy of Medical
Sciences, USSR Academy
of Medical Sciences
Academician G. I. Sidorenko

Attachment to Resolution No 92 (Protocol No 10, § 14, 6 April 1977): The staff of the Problematic Commission on the Problem "Scientific Foundations of Forensic Medicine and Toxicological and Forensic Chemistry"

Chairman

Prozorovskiy, V. I. --RSFSR Distinguished Scientist, Doctor of Medical Sciences, Professor, Director of the Scientific Research Institute of Forensic Medicine of the USSR Ministry of Public Health

Assistant Chairman

Gromov, A. P. --Doctor of Medical Sciences, Professor, Chairman of the Department of Forensic Medicine, Moscow Medical Institute No 1 imeni I. M. Sechenov

Scientific Secretary

Panov, I. Ye. --Candidate of Medical Sciences, Senior Scientist of the Scientific Research Institute of Forensic Medicine of the USSR Ministry of Public Health

Members of the Problematic Commission

1. Barsegyants, L. O. --Doctor of Medical Sciences, Director, Division of Forensic Medical Research on Material Evidence, Scientific Research Institute of Forensic Medicine, USSR Ministry of Public Health
2. Bedrin, L. M. --Doctor of Medical Sciences, Professor, Chairman, Department of Forensic Medicine, Yaroslavl' Medical Institute
3. Boguslavskiy, V. B. --Candidate of Medical Sciences, Chief Forensic Medical Expert, Main Administration No 3 of the USSR Ministry of Public Health
4. Velisheva, L. S. --RSFSR Distinguished Physician, Candidate of Medical Sciences, Chief, Forensic Medical Expert Examination Office of the Main Public Health Administration, Moscow City Executive Committee
5. Zagryadskaya, A. P. --Doctor of Medical Sciences, Professor, Chairman, Department of Forensic Medicine of the Gor'kiy Medical Institute imeni S. M. Kirov
6. Kanter, E. I. --Candidate of Medical Sciences, Senior Scientist, Director, Organizational-Methodological Division, Scientific Research Institute of Forensic Medicine, USSR Ministry of Public Health
7. Litvak, A. S. --RSFSR Distinguished Scientist, Doctor of Medical Sciences, Professor, Chairman, Department of Forensic Medicine of the Stavropol' Medical Institute

8. Marchenko, N. P. --Doctor of Medical Sciences, Professor, Chairman, Department of Forensic Medicine of the Khar'kov Medical Institute
9. Naumenko, V. G. --Doctor of Medical Sciences, Professor, Director, Thanatological Division of the Scientific Research Institute of Forensic Medicine, USSR Ministry of Public Health
10. Pashkova, V. I. --Doctor of Medical Sciences, Senior Scientist, Scientific Research Institute of Forensic Medicine, USSR Ministry of Public Health
11. Porksheyan, O. Kh. --RSFSR Distinguished Scientist, Doctor of Medical Sciences, Professor, Chairman, Department of Forensic Medicine of the Leningrad Institute for Advanced Training of Physicians imeni S. M. Kirov
12. Rubezhanskiy, A. F. --Doctor of Medical Sciences, Professor, Chairman, Department of Forensic Medicine of the Dnepropetrovsk Medical Institute
13. Rubtsov, A. F. --Candidate of Pharmaceutical Sciences, Senior Scientist, Director, Division of Forensic Chemistry, Scientific Research Institute of Forensic Medicine, USSR Ministry of Public Health
14. Svadkovskiy, B. S. --Doctor of Medical Sciences, Professor, Chairman, Department of Forensic Medicine of the Moscow Medical Stomatological Institute imeni N. A. Semashko
15. Smusin, Ya. S. --Doctor of Medical Sciences, Professor, Chairman, Department of Forensic Medicine of the Leningrad Medical Institute No 1 imeni I. P. Pavlov
16. Solokhin, A. A. --Doctor of Medical Sciences, Chairman, Department of Forensic Medicine of the Central Institute for the Advanced Training of Physicians
17. Sytsyanko, G. A. --Candidate of Medical Sciences, Senior Scientist, Director, Division of Scientific Medical Information, Scientific Research Institute of Forensic Medicine, USSR Ministry of Public Health
18. Tomilin, V. V. --Doctor of Medical Sciences, Professor, Chief Forensic Medical Expert, USSR Ministry of Public Health
19. Shmidt, V. K. --Candidate of Medical Sciences, Chief Forensic Medical Expert, Latvian SSR Ministry of Public Health
20. Shupik, Yu. P. --Doctor of Medical Sciences, Chief Forensic Medical Expert, Ukrainian SSR Ministry of Public Health

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MEDICAL PROBLEMS IN BLOOD THERAPY EXAMINED

Artificial Blood Replacements and Hemal Correctives

Moscow SOVETSKAYA MEDITSINA in Russian No 8, 1977 pp 3-8

[Article by Academician B. V. Petrovskiy, received 9 Mar 77]

[Text] This year the Soviet people are observing the 60th anniversary of the Great October Socialist Revolution. The victory of October was the outstanding event of the 20th century, a fundamental eventuality which changed the course of development of all mankind. Six decades ago the heroic proletariat of Russia, under the leadership of the party of Bolsheviks headed by V. I. Lenin, decisively took the bourgeois landowner system by storm and smashed it. The triumph of the revolution resulted in the rise of the world's first socialist state. In the heroic annals of communist construction an outstanding place is occupied by the last 10 years, a decade filled with events of great historical significance. This period is characterized by fulfillment of the far-reaching and comprehensive plans for the social and economic development inherent in a mature socialist society.

This decade is also characterized by the unprecedented scope of the development of Soviet public health service in all the regions of our country. The health of the population has been improved, the potency of the public health care resources has continued to escalate and the medical assistance available to the population has been perfected. Impressive stature has been acquired by the work of the army of 6 million medical workers. In all the Union republics Soviet medical workers are greeting the 60th anniversary of October with new achievements in fulfillment of the 10th Five-Year Plan assignments mapped out by the 25th Congress of the Communist Party of the Soviet Union.

The scientific-technical revolution, as a powerful stimulant for the rapid progress of the medical and biological sciences in the developed socialist society, has had a substantial impact on surgery and the science of transfusion. We have seen the development in a relatively short period of essentially new methods of surgical treatment and transfusion media which produce some of the important properties of donor blood with respect to the basic characteristics.

At the present time the clinical science of transfusion has available to it a considerable number of infusion media which possess a diversity of physiological effects. The medium and low molecular colloidal blood replacements possess a wide action spectrum and are capable of effectively normalizing the hemodynamics--the macro- and microcirculation. Great importance attaches to the hemocorrectives, which exert a purposeful specific effect in normalizing the various types of hemostatic disturbance (water-salt metabolism, ion and oncotic pressure, hemostasis, etc.) as well as possessing detoxicating and other properties.

Today's task is the development of clear evidence for utilization of the constantly growing number of new infusion media suitable for diverse surgical pathology. This is enabling us to increase their effectiveness and to maximize their use in all cases where the use of whole blood (donor's) is undesirable or needs to be limited.

Whole donor blood is an effective transfusion medium for replacement of severe blood loss. However, with the development of our knowledge of the pathogenesis of disturbances occurring in the body when there is severe blood loss and surgical aggression (operative intervention, pre- and postoperative period, etc.) or traumatic and burn shock, it becomes apparent that the supporting evidence for the transfusion of whole blood should be substantially narrowed. In addition to the danger of development of some complications (incompatibility of the blood, the syndrome of massive transfusion of homologous blood, transmission of virus hepatitis and other infections), blood transfusion is less effective in some pathological conditions than transfusion of modern directional-effect blood replacements.

The clinical science of transfusion provides for management of body functions through purposeful action on the morphological composition and physiological properties of blood and noncellular fluid, aided by the parenteral introduction of organic and inorganic transfusion media. The pharmaceutical industry is now producing a large number of blood replacements which possess a diversity of action mechanisms.

There are many classes of blood replacements, the classification being based on the source providing them, the physicochemical properties and the action mechanism. The latter classification principle is the most expedient for clinical purposes. Although most of the present-day blood replacements have a complex effect on the body, from a practical standpoint it is most convenient to classify them according to their basic functional characteristics.

The most widely used classification, that suggested by D. M. Grozdov and P. S. Vasil'yev (1960), singles out three groups of blood replacements on the basis of the maximum effect of their therapeutic action 1) antishock replacements, 2) detoxicating ones and 3) media for parenteral feeding. The classification is suitable for a general practitioner but it does not include a number of specific action preparations (rheopoliglucose, saline buffer solutions,

mannitol, and hemostatic and thrombolytic transfusion media) and places artificial limitations on the range of the effect of the preparation on the vital functions of the body. The existing classifications cannot embrace all the existing and newly evolved blood replacements of complex or specific action. In addition, when assigning blood replacements to one group or another, people frequently fail to take into account the supplementary but no less important functional characteristics of the preparation.

The emergence of many preparations of complex or narrowly specific action dictates the need not only for further improvement of the classification of blood replacements but also the development of transfusion programs for the use of blood replacements in optimum combinations under various pathological conditions.

A number of transfusion specialists have now already brought up the matter of the need for improvement of the classification of transfusion means (A. N. Filatov and O. K. Gavrilov, 1973).

There has been suggested a list of tasks and objectives of transfusion therapy and a functional distribution of transfusion means based on an understanding that what is required is corrective action by infusion of fluid. This list formulated 12 basic directions of transfusion effect: 1) increase of the respiratory capacity of the blood and control of hypoxemia; 2) filling the blood vessel with fluid to improve blood circulation; 3) improvement of the rheological properties of blood and elimination of microcirculatory disorders; 4) control of shock; 5) hemal dilution--thinning of the blood with fluids; 6) detoxification; 7) action on organs and systems for the purpose of stimulating and intensifying the regenerative processes; 8) strengthening of diuresis; 9) parenteral feeding; 10) increases of the body's immunogenic activity; 11) replacement of the blood or part of it through the use of artificial blood circulation apparatus, medical perforations and hemodialysis; 12) hemorrhage control.

These tasks of transfusion therapy conform to the basic functions of the blood and are directed to corrective action with respect to these functions. However, the tasks of transfusion therapy and the classification of modern transfusion media are not one and the same. It is quite apparent that the classification cannot be drawn up without taking into account the tasks of transfusion therapy. As the foundation for it we must however set down the clearly formulated morphological and functional characteristics of the blood system and describe the mechanism for control of these characteristics.

The blood and the nervous system provide for homeokinesis, homeostasis and uniformity of all the systems of the organism. The morphological composition of the blood, the physical and chemical structure of its elements, the mineral, fermentation and morphological composition and molecular and biological structure of plasma and cellular formations of the blood, the kinetics of blood generation, etc.--under normal conditions all these provide for full discharge of all the functions of the blood: respiration, conveyance of substances, feeding, excretion, water balance maintenance, hemodynamics, regulation

of the body temperature, safeguarding of the organism from the action of various adverse factors, and humoral control.

Pathological conditions disrupt these or other morphological, physical and chemical structures of the blood system and its functions; this is reflected in the activity of all the organs and systems of the body. In these instances the transfusion media serve as components which correct the disturbances in the structure and functions of the blood. Also, in the overall physiological structure the hemal correctors may have the following classes (groups).

1. Correctors for the blood formation processes (acceleration, retardation and qualitative changes in some embryo and changes in the relations between embryos).

2. Hemal correctors which simulate the respiratory functions of the blood (carriers of gases in the blood).

3. Regulators of hemodynamics (feeders, rheocorrectors, blood thinners, electrolytic composition regulators, perforation media, interoceptive inhibitors, and stimulators of the reflexogenic zones and the hemodynamic control centers).

4. Detoxicants (antidotes, toxinicides, regulators of the acid-alkaline balance).

5. Diuretics.

6. Means of parenteral feeding (carbohydrates, fats and amino acids).

7. Stimulators and inhibitors of the protective functions of the blood.

8. Regulators of the coagulative properties of the blood.

9. Stimulators and inhibitors of enzymogenesis of the cells of the blood system.

10. Polyfunctional hemal correctors.

11. Artificial blood.

The treatment of most of the pathological processes, particularly shock and blood loss, cannot be managed with one type of directed action preparation. It is necessary to employ, either in a fixed sequence or practically simultaneously, various means to eliminate volume irregularities, prevent intoxication and control other changes in the internal medium.

To compile programs for infusion and transfusion treatment in a concrete clinical situation, it is necessary to arrive at a knowledge and accurate

evaluation of the pathology which was developed or can be developed in a particular situation as well as an awareness of the consequences which are the chief goal of the therapy. At the same time, it is necessary to keep in mind the individual characteristics of the afflicted organism and to be familiar with basic theories concerning the action mechanism of the blood replacements.

In the course of modern surgical interventions it is necessary to adjust the physical constants of blood (the concentration of hydrogen ions, the alkaline reserve, the osmotic pressure, viscosity, etc.), the percentage of albumens, ferments and hormones, organic substances (carbohydrates, fats and vitamins) and inorganic elements (sodium, potassium, magnesium and others). Also requiring correction are the basic blood functions: conveying, respiratory, feeding, excretory, detoxifying, protective, regulatory, the function of maintenance of the water balance of tissues, clotting of the blood, etc.

The organism's reaction to transfusion of a blood replacement solution is a complex and multistage process which includes changes in the volume and composition of the circulating blood, the mechanisms of circulation, and the course of the metabolic processes and their regulation at all levels. The action of the blood replacements is closely tied in with the duration of their circulation and the "fate" of the preparation in the organism (injection and retention in the tissues and incorporation in the metabolic processes).

Thus, the blood replacement fluids have a quantitative and qualitative effect. The quantitative, volumed effect of the transfused medium stems from filling of the vascular system, liquidation to make up the deficiency in the circulation volume and that resulting from disturbances of the central blood circulation, and distribution of the fluid in the various sectors; it is dependent on the colloidal and osmotic activity of the preparation and its molecular mass, i.e. the duration of its circulation in the vascular system and the rapidity of discharge from the organism. The qualitative effect of blood replacement transfusions is manifested in the rheologic action (the effect on the mechanism of movement of blood through the vessels, regulation of the flow of blood, maintenance of the suspension structure of the blood) and also in the indirect and direct effect on the metabolic processes (correction of acidosis and electrolytic disorders, removal of toxic agents, admission of substances of albuminous, carbohydrate and adipose nourishment, etc.).

In surgical practice the indications for the use of blood replacements arise primarily with development of the conditions which accompany circulatory disturbance--hypertension and marked reduction of the cystolic arterial pressure. These conditions are mainly associated with acute hypovolemia stemming from massive traumatic and operation blood losses and gastrointestinal bleeding just as in the plasmatic loss which accompanies burn shock, intestinal blockage and destruction of tissue.

This circulation deficiency develops not only as a result of loss of part of the blood and its components to the outside--to the enclosed cavities or tissues of the organism. This deficiency may be the result of disturbances of the capillary blood flow, exclusion of whole areas of the microvessels from the overall circulation by retardation of the blood flow and aggregation of the regular elements of the blood (precipitation and sequestration of blood). When the treatment of the disorder is tardy and inadequate, the circulation remains in the postoperative and postraumatic periods while maintaining the condition of hypovolemia.

In cases of this kind and in chronic hypovolemia accompanying a number of illnesses, disturbances of the microcirculation are closely bound up with disturbances of the albuminous and water-salt balance.

Hypovolemia leads to the development of compensatory and pathological reactions in the organism. Maintenance of the central circulation and the supplying of blood to the vitally important organs (the brain and heart) take place through centralization of the flow of blood, spasm of the peripheral vessels, sharp limitation of the supply of blood to the organs of the abdominal cavity, disturbances of the microcirculation, and circulatory hypoxemia.

The compensatory mechanisms for restoration of the volume of blood which develop almost immediately promote inflow of fluid from the interstitial area in the blood flow and restoration of the volume of circulating blood by increasing the volume of plasma. The deficiency in globular volume continues to build up for several days. The flow of extracellular fluid into the blood leads to dehydration of the tissues and reduction of the oncotic pressure of the plasma because of a reduction in the albumen content. There is disruption of the water-electrolytic metabolism and disturbance of the conveyance function of the blood linked with the albumen.

The disruption in the circulation and microcirculation leads to deep-seated changes in the metabolism, disruption of the oxidizing processes, accumulation of underoxidized metabolites, and acidosis. As has been demonstrated in experiment and in clinical practice, in the first 1 and 1/2 hours after traumatic shock a high degree of toxicity is found in the blood and the urine. This justifies earlier inclusion of detoxicating preparations in the overall transfusion treatment.

In massive hemorrhaging, traumatic shock or extensive traumatic surgery when there is prolonged hypotension, i.e. with acute development of hypovolemia and marked circulatory deterioration to a life-endangering level, the important thing is not so much the quality of the preparation as its quantity and the promptness and adequacy of the speed of introduction of fluid for filling the blood vessels and restoring normal circulation. Permissible injection includes not only colloidal but also crystalloid solutions. However, it must be borne in mind that saline solutions leave the vascular system rapidly and so their effect as fillers is brief. Their action requires

injection of sufficient volume to fill the extravascular, extracellular area, i.e. 3-4 times the volume of the plasma.

Tests of controlled blood thinning in extracorporeal circulation demonstrate the positive aspects of the use of saline solutions. These make it possible to normalize the hemodynamics in a certain amount of time but they alter the process of fluid interchange at the capillary-tissue area-cell level. Because of the reduction in the oncotic gradient, the inflow of water and electrolytes from the tissue areas will be disrupted and this will lead to a secondary redistribution of the fluid in the extracellular area with a consequent reduction in the volume of blood circulation and an increase in the hydration of the intertissue area.

In severe disturbances of the hemodynamics or when there is delay in treatment and in order to intensify the effect obtained from the use of saline solutions, it is desirable to introduce colloidal media. Their colloidal-osmotic capacities and the continuous circulation make it possible to restore the blood circulation volume and to maintain it for a sufficient period while eliminating the condition of hypocirculation.

Research on the oxygen and conveyance function of blood, gas exchange, the effect of blood thinning on the level of plasmic albumens and the factors of blood coagulation--all this research enables us to consider a hemodilution up to 30 percent as permissible. In current clinical practice 9-10 percent is accepted as the critical level of concentration of hemoglobin and up to 30 percent as the permissible reduction of hematocryte. In light of this, use of blood replacements in the treatment of acute hypovolemia enables us to postpone blood transfusion, cut down the volume of necessary blood and in cases of moderate blood loss confine ourselves to the injection only of blood replacements.

In the second period of the treatment of hypovolemia, if complications have developed with this condition (acute disturbance of the microcirculation, metabolic processes, gas exchange, coagulation of the blood, etc.), then the transfusion therapy is quite complicated and it must be a multicomponent procedure. Liquidation of the hypovolemia is not indicated for the accomplishment of transfusion therapy. It is necessary to prolong the treatment in order to correct the surviving and evolving homeostatic changes. Indicated in this period are the use of rheological active preparations of hemodynamic action, such as polyglucin, rheopolyglucin, etc., buffered solutions which normalize the electrolytic composition--Ringer's solution, lactosalt, detoxifying preparations (hemodetoxicants) and immunization preparations (antistaphylococcus plasma, gamma globulin, convalescent burn control serum, etc.), hemostatically active preparations (fibrinogen and others) and parenteral feeding means. In this period there is a definite place in transfusion therapy for correction of the globular and albuminous composition of the blood (erythrocytic mass, albumen, protein, etc.).

The task of transfusion of surgical patients includes not only treatment of the aforementioned extreme conditions (traumatic, burn shock, acute blood

loss) but also management of the pre- and postoperative period for the purpose of correcting disturbances of the water-electrolyte and acid-alkiline equilibrium, liquidation of the intoxication conditions, maintenance of adequate nourishment, normalization of disorders of the coagulating blood system and maintenance of the apparatuses for artificial circulation and hemodialysis. In every specific case the transfusion program may allow a wide variation of the combinations of media employed. The selection of procedures must take into account the pathogenesis of the clinical pathology.

Under modern clinical conditions it is possible to effectively direct the transfussion procedure, to check its effectiveness and to introduce the necessary correctives. Transfusion therapy must be a precise and controlled treatment method which helps to normalize the patient's condition.

Soviet health care now possesses the modern blood replacements and correctors necessary for successful treatment of the seriously ill. In view of the ever increasing number of highly effective preparations developed by our institutes and our medical industry, it is necessary to broaden the introduction of these preparations into practice and to intensify the dissemination of the science of transfusion among the practicing physicians of various specialties.

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Urgent Tasks of the Blood Service

Moscow SOVETSKAYA MEDITSINA in Russian No 8, 1977 pp 8-13

[Article by A. V. Sergeyev, submitted 29 Mar 77]

[Text] The key problem of health care in the 10th Five-Year Plan is the problem of increasing its effectiveness and quality. Achievement of these aims is dependent on further improvement of the work of the specialized public health services, among them the blood service, since the results of the treatment of many serious illnesses, including cardiovascular and oncological, are to a significant degree determined by the skillful and prompt full-volume use of the means of transfusion therapy.

In the Ninth Five-Year Plan the blood service of the Russian Federation did a great deal of work for further build-up of the network of blood service institutions, for acceleration of the rates of procurement of blood components and preparations, development of new preparations and widespread introduction of them into medical practice, improvement of the material and technical base, and advancement of the organization of transfusion therapy in the medical institutions.

During the last five-year plan period procurement of preserved blood underwnet a 50-percent rise and there was an increase in the yearly quantity of blood procured per inhabitant and per bed. There has been a significant increase in the production of blood preparations--dry plasma, fibrinogen, albumin, protein, gamma globulin, cryoprecipitate, antihemophilic globulin, directed-action immunization preparations and various hemostatic means. There has been widespread dissemination of the plasmapheresis method, which

makes possible a considerable increase in the procurement of blood plasma and avoids reproduction of the erythrocyte mass. The system of medical screening of donors has been improved by putting into practice a method of detecting the B hepatitis antigen (the Australian antigen) in the blood of every donor.

Production of blood preparations and components in large quantities has created the necessary conditions for the introduction and clinical use of component therapy, which considerably increases the effectiveness of transfusion treatment and allows for the most rational use of donor blood. Component therapy opens up broad perspectives for further progress in the science of transfusion. Maximum preparation of component therapy and acceleration of its introduction into practice in the 10th Five-Year Plan in the republic require the solution of a number of organizational problems: expanding the network of blood transfusion departments; increasing the production capacities of blood service institutions, improving the quality of the blood preparations and components, and bringing to planned capacity the production of blood preparations under industrial conditions; improving the organization of the blood service; building up the number of gratuitous donors and increasing a single blood donation to the full amount (400 ml); putting into practice new blood procurement and preservation methods employing plastic equipment and ultralow temperatures. In addition, because of the development of organ and tissue transplantion, the blood institutions are evolving a new and important function--typing of tissue. To fulfill this task it is planned to organize tissue typing laboratories in the large blood service institutions of RSFSR.

In the Ninth Five-Year Plan period RSFSR accumulated a great deal of experience in the organization of blood transfusion departments (OPK) and developed an extensive OPK network. These small OPK's in hospitals, maternity homes and scientific research institutes play a major role in the practice of transfusion therapy on a contemporary level. They procure 27 percent of all the blood obtained in the republic every day. Many OPK's fully satisfy the blood requirements of the medical institutions for which they provide a basis. The close connection between the OPK and the clinical departments of the medical institution makes it possible to achieve a significant increase in the effectiveness of transfusion therapy by direct transfers of blood and by transfers of blood which has been preserved for brief storage periods. The participation of the transfusion specialists in determination of the indications for transfusion therapy and in the individual selection of compatible blood makes for the use of transfusion therapy with maximum effectiveness and minimum risk. And, finally, the OPK's have constituted the material base for the continued growth of the number of gratuitous donors in the republic, a number which has been substantially increased as a result of the enlistment of friends and relatives of the patients for blood donations.

Experience has shown that in many instances the work of the OPK is not confined to the walls of the medical insitution. Even though the table of organization in the OPK does not provide for mobile crews, many OPK's have used their internal resources in support of the chief physicians of the

hospitals and have organized blood procurement under mobile conditions. In this way the OPK's are performing important work in organizing and publicizing gratuitous blood donations among the population. The OPK's also frequently become centers for blood transfusions on a regional scale. The associates of the OPK's provide advisory and methodological assistance for the doctors of the medical institutions, disseminate information on the methods and means of transfusion therapy, instruct the hospital personnel in the methods of determining blood types and selecting compatible blood, and teach them the blood transfusion procedures and the blood components and replacements.

The OPK's differ considerably among themselves according to the volume of work and the existing conditions. Among them are found OPK's with a personnel of 1.5 table of organization units (at the rate of .5 of a doctor and one nurse) and OPK's which employ 20 and more staff workers. The largest OPK's were organized in the scientific research institutes and the oblast hospitals. The organization of the work in these dissimilar OPK's is extremely varied and must be more clearly regulated in accordance with the four-category OPK structure recently adopted.

The organization of a network of OPK's has made a substantial contribution to the strengthening of the material and technical base of the blood service and the enhancement of the quality of the transfusion therapy in the medical institutions of the republic. The OPK associates are carrying on work to publicize blood donation programs, are participating in the training of transfusion personnel, are organizing practical conferences on the urgent problems of blood transfusion, and are making control inspections in the medical institutions in the other areas.

The 10th Five-Year Plan is tasking us with important work for further expansion of the network of OPK's. New OPK's must first be opened in the large clinical institutions. The existing OPK's must be supplied with the latest apparatus and equipment, including facilities for procurement of blood under mobile conditions. Great importance attaches to the compilation of manuals and methodological materials which will regulate the work of all the categories of OPK's.

The work of organizing the OPK's is a first-priority task of the local health care organs. The blood service scientific research institutes of RSFSR must focus a great deal of attention on the development of methodological materials for the OPK's.

The 10th Five-Year Plan provides for further growth of the capacities of the blood transfusion stations and expansion of their production activity. In the accomplishment of this task paramount importance attaches to further increase of the volume of procurement of blood from gratuitous donors under mobile conditions, putting into operation new plastic apparatuses for procurement and transfusion of blood through the use of plasmapheresis, and

supplying of blood replacements to the medical institutions. Special urgency has been acquired by the production of blood components and preparations for the application of component therapy. The modern large blood transfusion stations must have at their disposal the conditions necessary for production of blood components and preparations. With this in mind, the large blood transfusion stations have set up laboratories for fractionation of plasma albumens. In the next few years it is planned to achieve a significant increase in their production capacity.

One of the greatest achievements in the field of blood transfusion in the last two decades was the development of methods of long-term preservation of erythrocytes through the use of low and ultralow temperatures. These methods have been put into widespread practice in the blood service of RSFSR. Experience has shown that the cryological laboratories or departments for long-term storage of blood in the frozen state are necessary subdivisions in the structure of the large blood transfusion stations. For optimum utilization of donor blood it is essential that these stations be equipped with laboratories for fractionation of blood plasma and cryopreservation of the blood.

The present-day scope of the work of the blood service requires constant improvement of the management which is instrumental in coordinating the work of the numerous stations and OPK's. To implement the planned measures for expansion of the production of blood preparations and components it is necessary to set up large regional complexes for the blood service institutions. The republic has acquired experience in amalgamating the blood transfusion stations of several areas for the purpose of supplying plasma for industrial production of blood preparations in the industrial buildings. Seven such associations are functioning in the territory of RSFSR and it is through their work that raw material is being supplied for industrial production. The blood transfusion stations which deliver the plasma obtain finished output in the form of valuable blood preparations of high quality. The links forged in this way among the blood service institutions will be strengthened and extended not just in the interests of production of blood preparations but also for improved supplying of rare blood types, diagnostic serums and blood replacements for the medical institutions.

For further enhancement of the effectiveness and safety of blood transfusion great importance attaches to the centralization and standardization of production of diagnostic serums. To resolve this problem the Gor'kovskaya oblast blood transfusion station in 1973 opened a republic center for the preparation of isoserological standards. Its functions include the classification of donors' blood for the purpose of identifying persons with rare blood types and the establishment of a special card file. Also, immunization of donors, production of suitable isoimmunogenic standard serums and obtaining serums for the Combs test by immunization of animals.

The work of the republic center is done according to a plan approved by the Ministry of Health RSFSR and under the supervision and control of the Leningrad Institute of Hematology and Blood Transfusion.

The workers of the center have established contacts with the maternity homes and the artificial hemodialysis department of the oblast hospital imeni N. A. Semashko and have organized procurement of isoimmunogenic serums there. The center also detects sensitized persons among the gratuitous donors. It supplies diagnostic serums to 423 health care institutions and performs work on a regular basis for checking of the serums manufactured in the blood service institutions of RSFSR. The work of the center is thus disseminated to a considerable part of the republic's blood service.

Because of the great need for diagnostic serums, the center must in the near future increase the volume of production of universal anti-Rh serum, serum for the Combs test, and rare anti-Rh serums. It must also develop new methods of obtaining rare serums for classification of the blood of donors and patients.

The medical institutions' increased need for blood and its preparations and components is accentuating the task of developing a mass gratuitous donor program in RSFSR. Under the public health principle the donor program is recognized as a lofty humanitarian project; every able-bodied citizen of our country should be ready for this type of voluntary cooperation. The socialist state has created the conditions necessary for the successful development of the donor program. Donors have no difficulty in being allowed working time for giving blood and undergoing a medical examination and they are paid their wages in full. After each blood donation, the donor receives a paid day off, which he can, if he wishes, add to his leave. There has been extensive development of moral incentive measures for the donor program on the part of both the state and the public organizations.

The development of the gratuitous donor program has been stimulated by the great amount of work done by the public health organs and the Red Cross and Red Crescent Society. The relatives and friends of the patient are being extensively recruited for the donor program. The average indicator for the number of unpaid donors per 1,000 of population rose from 15.8 in 1970 to 33.5 in 1975. In 30 territories of RSFSR this indicator went above the republic average. Particularly high levels of unpaid donor participation are 45.5 for Sverdlovskaya Oblast, 45.3 for Kostromskaya Oblast, 44.2 for Tyumenskaya Oblast, 44 for Yaroslavskaya Oblast and 44.2 for Mordvinian ASSR.

In addition to the increase in the number of donors, great importance attaches to the propaganda conducted in recent years for increasing the volume of a single blood donation to 400 ml. Under the present-day transfusion level the blood taken in full quantity (400 ml) is considerably more effective than the blood in a 200 ml amount both in transfusing patients with it in whole form and in production of blood components and preparations.

Thanks to the high degree of consciousness in the unpaid donors and the great explanatory and propagandist work, the average blood quantity obtained from a gratuitous donor in 1975 was 228 ml in RSFSR, 274 ml in Kemerovskaya and

Chelyabinskaya oblasts and 284 ml in Leningrad. More than half of the blood obtained from gratuitous donors (65.9 percent) was procured under mobile conditions.

In the recruitment of people as gratuitous donors and in publicizing the donor program a major role is played by the donor councils which at this time have been established in 54 administrative territories of RSFSR. The donor councils, headed by the directors of the party and soviet organs, include representatives of the interested organizations and departments and these representatives make decisions on questions pertaining to the organization and development of the gratuitous donor program.

The propaganda work on the gratuitous donor program has been stimulated to significantly greater activity among the Komsomol members and young people of RSFSR. In the Ninth Five-Year Plan period the number of gratuitous donors per 1,000 students in the VUZ's of the republic doubled in quantity and encompassed 147 persons in 1975.

The greatest successes in recruitment of students for the gratuitous donor program were achieved in Novosibirskaya, Kalininskaya and Sverdlovskaya oblasts. Thus, in Sverdlovskaya Oblast 60 percent of the students became unpaid donors. In the pedagogical and agricultural institutes in Kursk every other student is an unpaid donor and in the Armavir institute one-third of the students are donors.

For the purpose of improving the organization of gratuitous donor programs a statute has been approved for the establishment of unified donor centers which are tasked with the planning, recording and distribution of donors among all the blood procurement institutions. The organization of unified donor centers will help the coordination of the activity of the blood service institutions, the public health organs, and the committees and active workers of the society of the Red Cross and Red Crescent in the development of a mass gratuitous donor program. The centers will also exercise control over fulfillment of the entire complex of measures designed to ward off the danger of transmission of some infectious diseases through donor blood.

Together with all the workers of the country, the associates of the blood service are preparing themselves for a worthy greeting to the 60th anniversary of the Great October and, with the support of millions of gratuitous donors, are striving to commemorate the glorious historic date with new achievements.

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CONCENTRATION OF BENZ(A)PYRENE IN AMBIENT ATMOSPHERIC AIR OF A PETROCHEMICAL ENTERPRISE

Kazan' KAZANSKIY MEDITSINSKIY ZHURNAL in Russian Vol 58 No 2, 197- pp 83-85

[Article by Cand Med Sci F. F. Dautov, Department of Municipal Hygiene (Director--Dr Med Sci M. M. Gimadeyev) of the Kazan' Order of the Red Labor Banner Medical Institute imeni S. V. Kurashov]

[Text] Abstract: The greatest benz(a)pyrene contamination was discovered 100 meters away from the petrochemical enterprise. At 500 meters the interval of benz(a)pyrene concentration fluctuations was lower than 1,000 meters away. A direct dependence between the concentration of toxic substances and the concentration of benz(a)pyrene in atmospheric air at different distances from the plant was not revealed.

The goal of the present work was to study the level of contamination of atmospheric air about a petrochemical enterprise by a complex of carcinogenic and toxic substances. Inadequate airtightness of production apparatus is the main factor leading to contamination of air by toxic wastes at the plant; this factor is what served as the object of examination. Moreover the production processes involve atmospheric discharge of gases and vapors containing saturated and unsaturated hydrocarbons, phenol, acetone, isopropylbenzol, organic peroxides, and other compounds. The concentrations of these substances were at the maximum permissible level (with the exception of phenol and ethylene oxide, which exceeded the MPL by 1.2-1.5 times in 5 percent of the samples).

The research results were laid at the basis of production, technical, and planning improvements promoting reduction, trapping, and dispersal of production wastes. In just the last few years alone 92 measures directed at decreasing discharges of toxic vapors and gases into the air were implemented at the plant's shop. Among them we should note construction of a device to neutralize gases in the ethylene oxide production operation, reconstruction of individual columns in the phenol and acetone shops, and so on. All of this has afforded the possibility for decreasing contamination of the air basin and, consequently, for improving the environment. As an example after the measures we had suggested were introduced, the concentrations of benzol and isopropylbenzol decreased by 2-5 times as compared

to 1967, while the concentration of saturated hydrocarbons, acetone, ethylene, and propylene dropped below the MPL. The dynamics of the decline in air contamination at the same observation point over a period of 8 years indicate that the measures implemented at the plant and directed at improving the air were effective.

In summer 1974 64 samples of air were taken with a suction apparatus to determine carcinogenic substances. The air sampling points were selected 100, 500, and 1,000 meters from the plant with the purpose of studying diffuse propagation of benz(a)pyrene (BP). Air was sampled at least 50 meters from the traffic lanes of paved roads to avoid the possibility of trapping motor vehicle exhausts while sampling the air. The third point (1,000 meters from the plant) is in a residential complex. The control point was selected far away from industrial enterprises and motor highways.

Interval of Fluctuations in Benz(a)pyrene Concentration in Air at Observation Points

Air Sampling Point	Number of Samples	Benz(a)pyrene Concentration, μg/100 m^3 of Air
100 meters from plant	14	0.009-0.3
500 meters from plant	18	0.006-0.042
1,000 meters from plant (residential complex)	20	0.0007-0.078
Control point	12	0.0003-0.004

Note: The MPL for benz(a)pyrene is 0.1 μg/100 m^3 of air.

The greatest contamination by BP was noted 100 meters from the plant, where its average concentration fluctuated from 0.009 to 0.1 μg per 100 m^3 of air (the MPL is 0.1 μg/100 m^3 of air), while in some cases it reached 0.18-0.3 μg (see table). The BP concentrations were 0.0007-0.078 μg/100 m^3 of air 100 meters from the plant (in the residential zone). We should note that the interval of fluctuations in the BP concentration was lower 500 meters from the plant (0.006-0.042 μg/100 m^3 of air) than 1,000 meters away. On the other hand the interval of fluctuations in the concentrations of isopropylbenzol and benzol was always larger 500 meters away than 1,000 meters away. Moreover the BP concentration was not observed to be higher on days when the concentration of phenol and ethylene oxide exceeded the maximum permissible value 1,000 meters away.

Wind direction has a large influence on the degree and nature of contamination of the atmosphere about the plant by benz(a)pyrene. The most frequently encountered BP concentrations on the leeward side were 0.013-0.1 μg/100 m^3 of air (up to 0.3 μg in some cases), while on the windward side they were 0.009-0.07 μg/100 m^3 of air.

The BP concentration at the control point varied from 0.0003 to 0.004 µg/ /100 m^3 of air--that is, it was 15-18 times lower than 1,000 meters away from the plant.

Thus some modern petrochemical enterprises are sources of atmospheric contamination by BP. A direct dependence was not revealed between the concentration of toxic substances and the BP concentration in atmospheric air different distances away from the plant. One of the main sources of air contamination by BP about the plant is smoke gases and pyrolytic furnaces.

Discharges containing hydrocarbon gases have an effect on the level of contamination of atmospheric air. Production gases produced by the principal production shops are regularly combusted in "torches" which do not insure complete combustion. The products of incomplete combustion formed during the burning of the plant's gaseous discharges contaminate atmospheric air for a significant distance from the production operations. Some of the gases from the ethylene oxide, phenol, and acetone production operations are ejected into the atmosphere through an air duct. Discharges of the thermal electric power plant, which uses fuel oil, apparently have a significant influence on the cleanliness of the air about the plant.

A number of recommendations were developed during the research to decrease contamination of atmospheric air by toxic substances and BP. The enterprise has written up a long-term air recovery plan on the basis of these recommendations. Construction of facilities which will utilize the plant's discharges are fuel for the thermal electric power plant is presently nearing its conclusion. This will lead to a drastic drop in the quantity of gases combusted in the "torches." Recuperation has eliminated discharge of toxic substances into the atmosphere by the recommissioned ethylene and ethylene oxide production operations. New devices are being built to neutralize and trap toxic chemicals prior to discharge of spent gases into atmospheric air.

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EXPERIMENTAL INVESTIGATION OF INTERMITTENT ACTION OF NOXIOUS VAPORS

Moscow GIGIYENA TRUDA I PROFESSIONAL'NYYE ZABOLEVANIYA in Russian, No 5, 1977, pp 27-31

[Article by Ye. I. Lyublina, V.V. Dobrynina, and R.Ye. Livshits(Leningrad) Institute of Labor Hygiene and Occupational Diseases]

[Text] Usually, experiments involving intermittent exposure to noxious substances are performed with the same mean concentration of the substance calculated both for the total experimental time, i.e., total exposure time (Σt) and the total time of interruptions ($\Sigma \tau$) together (Ye. V. Klenova; Ye. I. Lyublina; I. P. Ulanov, et. al.). This approach creates significantly different values of concentration, and the intermittent mode may result in more harmful aftereffects, due to the fact that the concentration during the time of the exposure is higher than with continuous poisoning with the same mean concentration for the total experimental time.

However, there is reason to believe that with great frequency of interruptions, even with the same concentration of harmful substance in the air, the results of repeated poisoning in the intermittent mode will be more severe than in the continuous mode. The reason for these differences lies in the necessary frequent adaption of the organism to the changing external conditions, which in and of itself is a harmful factor.

We know that accumulation of foreign substances with high values of the coefficient of distribution of their vapor between the blood and the air (amounting to hundreds and thousands) cannot create sharp fluctuations of the concentration in the blood, due to the slow accumulation and excretion, so that intermittent action of substances of this type is not dangerous. Since we wanted to conduct an experiment involving comparison of the two modes of poisoning using a substance which was rapidly excreted upon inhalation of pure air, we had to know, at least approximately, the accumulation in the intermittent mode. We performed our experiment with

xylene in a concentration of 2 mg/l, with its vapor inhaled by rats in a mode involving 2 hours of continuous inhalation of air containing xylene vapor and in a mode involving inhalation interrupted each 3 minutes. Xylene is in group VI of the system of nonelectrolytes of N. V. Lazarov, for which the blood/air distribution factor (λ) is not over 40, and may be much lower. Xylene is easily dissolved in oil, and therefore can penetrate into the cells of the organism; it is metabolized relatively slowly in the organism and is rapidly excreted when pure air is breathed.

Mathematical modeling of the accumulation of the inhaled foreign substance in the organism with continuous poisoning for a slowly metabolizing substance can be expressed by the following equation:

$$C_t = C_0\lambda(1 - e^{-Kt}),$$

where C_t is the concentration in the blood by the end of time t; C_0 is the concentration of the substance in the air inhaled; λ is the distribtuion factor of the substance between blood and air; e is the base of the natural logarithms; K is the accumulation factor of the substance.

It was shown in one work of Ye. I. Lyublina (1972a) that for rats weighing 200 g, the accumulation factor of a foreign substance penetrating into the cell is $K \simeq \frac{1}{\lambda}$. From this, the accumulation with continuous exposure of a slowly metabolizing substance (in our case xylene) in a time of 120 minutes when $C_0 = 2$ mg/l, $\lambda = 40$ will be: $C_{120} = 2 \cdot 40 \cdot (1-e^{-120/40}) = 80(1-e^{-3}) = 80(1-0.05) = 76$.

Calculation of the accumulation of the substance with equal modes of continuous action was performed using a formula published by V. A. Filov for models of the accumulation of gases and vapors of substances periodically inhaled:

$$C_n^{max} = \frac{\lambda C_0 (1 - e^{-Kt}) \cdot [1 - e^{n(Kt+\varkappa\tau)}]}{1 - e^{-(Kt+\varkappa\tau)}},$$

where C_n^{max} is the maximum concentration of the substance in the volume of distribution (in particular, in the blood) after n exposures, alternating with n-1 interruptions; C_0 is the concentration of the substance in the air; $\varkappa$ is the constant of elimination of the substance during the interruptions between exposures; t is the duration of each exposure; τ is the duration of each interruption. In our case, $t = \tau = 3$ min; $\varkappa = K = 0.025$. Substituting all quantities, we derive:

$$C_{40}^{max} = \frac{2 \cdot 40(1 - e^{-0,075})[1 - e^{-40(0,075+0,075)}]}{1 - e^{-0,15}} = \frac{80 \cdot 0,07 \cdot 1}{0,14} = 40.$$

Taking the concentration in the blood with continuous poisoning as 100, we find that with intermittent exposure, the accumulation is: $\frac{40 \cdot 100}{76} \simeq 53\%$.

The calculations were performed for various values of λ, t, τ and n when $K = \kappa$ and C_0 is a constant. It was found that in the case when $t = \tau$ and $\lambda = 10{,}000$, the difference in accumulation in the organism depends only on the total exposure time. When $\lambda = 1{,}000$, the intermittent mode can yield up to 91% of the accumulation which occurs in the continuous mode. When $\lambda = 100$, the difference reaches not 9, but 35%, when $\lambda = 10$-50%. Consequently, the intermittent mode with low values of λ (less than 100) involves a significant decrease in the accumulation of the substance in the organism; we note that the decrease is greater, the more frequent the interruptions.

An experiment was performed over a period of ten weeks (2/IV-8/VI) on white rats. The animals were poisoned 5 times per week with xylene vapor in 2 modes: intermittent and continuous with dynamic input of the substance into the individual poisoning chambers, which were designed by N. S. Vol'berg and A. A. Golubev. The 60 animals were divided into 3 equal groups: the first was poisoned by the continuous mode (2 hours poisoning - 2 hours inhalation of pure air with daily changing of the sequence); the second group was poisoned for 4 hours in the intermittent mode. Xylene and pure air were alternated automatically by means of contact clock-driven mechanisms and electromagnets; the third group was the control: for 4 hours the rats breathed pure air. The concentration of xylene vapor fed into the area of respiration of the animals was tested by a type UG-2 instrument, and averaged 3 times the threshold dose as determined by changes in SPP [expansion unknown - tr.] (S. V. Speranskiy) in rats in our experiments, i.e., $\sim$ 2.0 mg/l. We recall that the concentration of xylene was the same in the first and second experimental groups, as was the total experimental time for them - 2 hours.

Symptoms of both toxic effect and accommodation were observed during the course of the experiments in the rats in both groups[1].

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[1] The toxic effect was judged on the basis of unfavorable changes in the indicators considered, for example: a drop in the time of acid resistance of the erythrocytes, a drop in the lysozyme or complement titer, etc. Accommodation was determined on the basis of the disappearance of the unfavorable changes initially observed, an increase in threshold concentration of xylene changing the SPP, and a relative drop in the concentration xylene in the blood after short-term poisoning (see next footnote). Accomodation to a harmful substance is a sign of adaption of the organism and, if the factor continues to be applied, may be replaced by an increase in the sensitivity to the substance (Ye. I. Lyublina et. al.).

However, there were certain differences between the first and second groups. For example, the threshold concentrations (direct indication of accommodation) during the third week in the first group increased by an average of 7 times and were reliably different from the same indicators in the control group. In the second group, the threshold increased by 5.8 times. During the 9th week, the threshold concentrations were still higher, reaching 8.4 times the initial value in the first group and 6.8 times in the second group. This dynamic of thresholds is explained by the increase in accommodation to xylene in the experimental groups, which was more clearly expressed in the first or "continuous" group (during the 9th week, none of the animals reacted to a concentration equal to twice the initial threshold, i. e., 1.32 mg/l). In the control group, there was also an increase in the threshold concentrations, but to a lesser extent.

The duration of hexene narcosis also correlates with the threshold picture; during the second and eighth weeks, there was a difference between the 1st experimental and the control group (duration of narcosis in continuous group 56.8 and 65.5%, respectively, at these times). The nature of these differences indicates a higher level of excitability of the central nervous system in the first experimental group, and this state is considered characteristic for accommodation to poisons. The data in the second experimental group differ from the control unreliably as concerns concentration of the blood.[2] During the seventh week in both groups the mean concentration of xylene in the blood were higher than in the control (109.9% in the second group and 118.4% in the first group). During the 10th week, in the second experimental group there was clear sensitization - 133.7% in relationship to the values in the control group (in the first group, the previous level was retained - 115.7%). The blood concentration criteria are quite indicative for accommodation: in this case, a clearly expressed interruption in accommodation occurred only in the second group. The threshold concentrations based on SPP remained more greatly increased in the second group by the end of the experiment, although there is no contradiction in this: usually, increases in thresholds based on the status of the nervous system are stable and last for a long time, even when other (specific) tests fail to find any indication of accommodation.

Without discussing the results of the other functional studies, we emphasize simply that the data of the immunological studies indicate less favorable status of immunity factors at all periods of the investigation in the second experimental group (see table).

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[2] On the day of measurement of the concentration in the blood, some of the experimental animals in the first and second groups and some of the control rats, in place of the poisoning usual for them, inhaled xylene vapors in a concentration of 10 mg/l for 40 minutes. Blood was taken from the animals immediately after this and analyzed for xylene by the method of Carpenter et. al.

Results obtained in a group with continuous poisoning in comparison to a group subjected to intermittent exposure to xylene vapor.

Criterion	Experimental time, weeks									
	1	2	3	4	5	6	7	8	9	10
Body weight	0	0	0	0	0	0	0	0	0	0
Time of sleep after administration of hexenal		0						++		
Static working capacity		-				+			0	
AChE activity		0				0			0	
SPP	0		0		0				0	
SPP threshold			+						+	
Concentration criterion			-				0			++
Acid resistance of erythrocytes:										
critical time;		-				-			0	
% extinction;		0				0			0	
Lysozyme titer			-			0			-	
Complement titer			0			-			--	
Bactericidal activity of serum			0			0			0	
Swimming time until death										0

Notes: +,increase; -,decrease in indicator; ++, significant increase in indicator; --, significant decrease in indicator; 0, no definite differences.

The tabular data indicate changes in the indicators studied in the group subjected to intermittent poisoning in comparison to the continuous group. On the whole, based on tne number of tests, the status of the intermittent animals in the experiment was clearly worse than in the group with continuous poisoning (longer hexenal sleep, higher concentration of poison in blood, drop in immunity indicators).

Thus, the negative significance of intermittent effects was confirmed experimentally with initial lower accumulation of the substance in the organism than under conditions of continuous exposure. Naturally, mathematical modeling considers only the physical aspect of the phenomenon, while the development of accommodation includes phase changes in the constants of accummulation and excretion. Thus, in the third week of poisoning, the blood of the rats of the intermittent group showed a lower quantity of xylene than in the continous group; in the tenth week, on the other hand, the blood of the rats of the intermittent group contained significantly higher concentrations of xylene than in the continuous group. We know that the effects of unusual temperatures, barometric pressure, noise, high frequency current and electric shock when applied intermittently or with sharp fluctuations are more harmful than when the intensity of the factor is constant throughout the period of its application. The inhalation of chemical substances is no exception to this rule. The overall cause is the harmful effect of repeated adaptation to changing conditions.

Conclusions. 1. It was shown in an experiment on rats that exposure to a substance, the distribution factor of which between the blood and the air is not over 40 (xylene-2 mg/l) with frequent interruptions (3 minutes exposure and 3 minute interruptions) caused more sharply expressed changes in the organism than continuous exposure for the same (total 2 hours) time to the same concentration.

2. The results produced clearly show the particularly negative effect of intermittent or sharply varying concentrations of noxious substances in the production of substances which have relatively low blood/air distribution factors. Sharp fluctuations in the concentrations of such substances may be more dangerous than more constant but slightly higher concentrations.

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