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DURATION AND RISKS OF LATENT INFECTION OF THE LUNG BY BACILLUS ANTHRACIS

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DURATION AND RISKS OF LATENT INFECTION OF THE LUNG

BY BACILLUS ANTHRACIS

[Following is the translation of a French-language scientific paper by H. Velu, P. Soulié and B. Bellocq in Comptes Rendus de la Société de Biologie, (Reports of the French Society of Biology), Vol 137, Paris, 1943, pages 224-5.]

After having determined the conditions for infection by pulmonary anthrax resulting from a single and acute exposure to chlorine intoxication (1), we investigated the duration and risk of latent infection. We could have based ourselves on the work done in regard to the persistence of anthrax spores in the lung after nasal instillation or intratracheal injection of high doses as performed by a number of authors. We preferred utilizing the clinical procedure and inhalation of very small doses because this method is much more suitable to our objective.

We initially undertook exploratory tests by subjecting, to severe intoxication by chlorine, the groups of mice which had served as bacteriological controls in earlier research (2). On the basis of these findings, we carried out systematic experiments in order to accurately determine the duration of the interval during which anthrax may be triggered either by severe intoxication combined with intense contamination (300-600 spores retained in the lung) or a discrete contamination (10-30 spores) as well as by a light intoxication subsequent to either an intense or discrete contamination. The experiments were carried out on 43 groups of 4 or 5 mice each which were first infected and then intoxicated between the second and 24th day (not including 86 identical control groups for chlorine irritation and spore infection separately) from which we derived the following conclusions:

1. The persistence of latent infection after pulmonary contamination and made active by intoxication is appreciably longer than admitted by those authors which have investigated the question. It reaches some 20 days after high contamination and drops to about 10 days after discrete inhalation.

2. The danger of a latent intense infection (300-600 spores) if severe but non-fatal intoxication occurs during this interval, is serious because septicemia as a sequel to anthrax occurred in 61% of the cases (25 deaths out of 41).

3. When the intoxication is very heavy, evaluation becomes more difficult because 18 out of 53 animals died of intoxication, i.e., 34% which might otherwise have died of infection. However, during the 24 days of

observation, 24 mice succumbed to the infection which is equal to 45% and brings total mortality to 42 out of 53 or 79%.

4. Relatively severe infection subsequent to a light contamination (10-30 spores) still induced a mortality of 16 out of 43, or 37%, regularly during the first 9 days of latent infection. After this interval, septicemia occurred only irregularly and within a short interval (up to the 12th day).

5. A light intoxication with intense contamination was able to trigger the disease in only 20% of the cases and only during the first 4 days of latent infection.

6. A light intoxication (150 mg per cubic meter for 10 minutes) combined with a light contamination (15 spores) was not able to induce pulmonary anthrax beyond a period of 48 hours.

Summary: Latent anthrax infection in mice subjected to chlorine intoxication constituted a serious risk for an interval varying from 4-10 and/or 20 days, depending on the extent of infection and intoxication. Although of minor importance practically, such a risk does exist.

REFERENCES

1 - Bull. Acad. méd., 1943, Vol. 127

2 - Bull. Acad. méd., 1941, Vol. 125, p. 159

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