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Concerns: Fatal Anthrax in Sverdlovsk

Mathew Meselson
Professor of Biochemistry
and Molecular Biology
Harvard University
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Dear Professor Meselson,

Thank you for sending this interesting paper for review. Unfortunately it arrived just after my leaving for summer vacation. I am sorry to reply so late.

Comments:

The last sentence of the abstract should be put more concisely. The hemorrhagic meningitis is a sign of anthrax septicemia, the intestinal hemorrhages are a sign of intestinal infection with anthrax and not necessarily of septicemia, unless the hemorrhages are a part of a generalized hemorrhagic tendency with hemorrhages and bacterial thrombi in all organs and all mucous membranes. This is particularly important since you are referring in the last sentence of the first paragraph of the paper to the description of cases of gastrointestinal and cutaneous exposure from infested meat.

The authors should distinguish concisely between Toxaemia and Septicaemia throughout the entire paper. Hemorrhagic Leptomeningitis is always a sign of anthrax septicemia, which may be toxic or not, as witnessed by the cure of cases of nontoxic anthrax leptomeningitis with penicillin.

Hemorrhagic lesions of the intestinal tract are, at least in my experience from Iran, specific for intestinal infection. Bacilli need no visible portal of entry. The M cell cover of the lymph-plaques of the gut is permeable to bacilli, as a matter of fact, it is the task of the GALT to remove pathogens from the gut to get the immune reaction started. Cases of primary intestinal anthrax without pulmonary involvement always showed multiple hemorrhages with or without ulceration of the mucosa and hemorrhagic lymphadenopathy with and without ascites, depending on the toxicity of the bacillary strain.

I agree with the conclusion, that bacilli were swallowed at the time of inhalation, or were disseminated similar to intestinal tuberculosis by coughing and swallowing of the expectorate. The latter mechanism is more likely in patients who survived a few days, due to the lack or relatively minor degree of hemorrhagic mesenteric lymphadenopathy.

Page 8 slowing should read: slowly

The following paper describes a good patho-radiologic correlation of the development of inhalation anthrax and death without septicaemia, which might be of help to the authors: Vessal K., Yeganhedoust J., Dutz W. and Kohout E. Radiologic changes in inhalation anthrax. A report of pathological and clinical correlations. Clin. Radiol. 26:471-474,1975.

Opinion:

This is a very worthwhile paper of unusual common interest and should be published by any means as soon as possible. The critique above should be worked into the discussion.

This paper should be followed by a complete report, including the type of accident (explosion, what?); the conditions of the plant; the vaccination state of the employees at the plant and of the community; the type of information available to the workers at the facility - sometimes things are so secret, that the people working with it dont know what they are handling - the amount of spores released; the toxin production of these spores (it is likely that particularly toxic strains were employed as warfare agent); the ventilation at the plant; the spread of the spores; the contamination of the area; the number of animals killed, how come they were eaten etc.

All in all this is a fascinating case of an essentially useless bacterial warfare agent, which up to now has only killed scientists working with the program or people living next to facilities.

Reference should possibly be made to the bombing experiments with anthrax at Gruinald Island near Ullapool on the west coast of Scotland during WW2 as well as the experiments and casualties at Fort Detrick, MD., USA. The latter should be declassified by now. A whole issue of the Proceedings of the American Societies of Experimental Biology has been dedicated to Anthrax work at Fort Detrick and should be referred to: Fed. Proceed. 26 (5): 1967.

Thank your for letting me review this fascinating paper.

With kindest regards,


Werner Butz MD FRCpath.