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TULARAEMIA
(Rabbit Fever)

by

Dr. James H. Steele
Food and Agriculture Organization Consultant*

* Chief, Veterinary Public Health Section, Epidemiology Branch,
Communicable Disease Centre, Public Health Service,
United States Department of Public Health, Education and
Welfare, Atlanta, Georgia

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TULARAEMIA

Tularaemia is an infectious disease of wild rodents, especially rabbits, hares, muskrats and beavers. Many other animals are susceptible including squirrels, field mice, prairie dogs, chipmunks, opossum, coyotes, fox and deer. It also occurs naturally in the sage hen, quail, grouse but in these birds the disease is less severe. Man and domestic animals are accidentally infected when they come in contact with diseased wild animals and ticks. The disease is widespread in North America, Eastern Europe, the USSR especially European part of the Russian Soviet Federation Republic and Japan. Interestingly, tularaemia is unknown in the southern hemisphere.

The causal agent is a bacterium, Pasteurella tularensis. The organism is pleomorphic and in cultures, bacillary forms up to 2 and even 3 microms in length may be seen. Coccoid forms usually are mixed with the bacillary types. The organism is gram-negative and stains with the usual dyes. It has neither capsules nor spores.

I EPIDEMIOLOGY

The entity was first described in California ground squirrels in 1911, in Tulare County, which gives its name to the disease. Squirrels are quite susceptible to the disease and have lesions resembling those of bubonic plague. The disease has been known in man since 1914. The infection in man usually occurs among hunters, butchers, and fur farmers. Some cases are reported in sheep shearers, laboratory workers and veterinarians.

The disease is transmitted to man through the handling of infected animals, tissues and blood, when skinning, dressing or doing a necropsy. The tularaemia organism is also carried by biting arthropods including the wood tick Dermacentor andersoni; the gog tick, D. variabilis, the Lone Star tick, Amblyomma americanum, and the deer fly, Chrysops discalis. In Southern United States, especially Arkansas, tick borne tularemia is twice as common as rabbit borne infection. The bacterium actually multiplies in A. americanum. The argasid ticks which feed on birds also may transmit tularaemia. Some persons have become infected by crushing or

handling ticks which contained the tularaemia organism. The disease is also transmitted by the ingestion of undercooked contaminated rabbit meat although the organism is quite susceptible to heat, being killed by cooking at 58°C. for 10 minutes. There are also reports that the bacteria may sometimes persist in water holes, small streams and rivers, and has been transmitted to man by the ingestion or contact with such waters. Airborne infections have been described among sheep shearers where their clippers presumably have ground up infected ticks, or among laboratory workers handling the organism. Animal bites, including those of dogs, cats, squirrels, skinks and sheep, have been incriminated as the cause of infection. In these instances it is assumed that the animal's mouth was contaminated from external sources.

II CLINICAL DISEASE-

The disease in man has a sudden onset with chills and fever. The patient is usually prostrated and confined to bed. An ulcer usually appears at the point of the entry of the organism. The lymph nodes draining the site of ulcer becomes swollen, tender, and often suppurate. In generalized infection symptoms and signs are quite variable, including pneumonia, severe toxic manifestations and a variety of hemorrhagic lesions. Various forms of the disease have been described as ranging from an overwhelming acute infection to a chronic disorder with low-grade fever and adenopathy. These are classified into four types: ulceroglandular, oculoglandular, glandular and typhoidal. This latter type is the most serious, formerly having a high case fatality rate.

Before the advent of antibiotics, the case fatality rate ranged from 5 percent to 35 percent depending on the severity of the illness. Today, the antibiotics; streptomycin, the tetracyclines, and chloramphenicol which are specific therapeutic agents, have reduced the case fatality rate considerably. A recent review of 339 cases showed that the case fatality rate which was 31 percent before the advent of streptomycin dropped to 6.5 percent after therapy. Maximum response to streptomycin therapy was obtained with 250 mg. doses every 4 hours. The patients usually became afebrile within 2 to 3 days although

in some cases it was necessary to continue therapy for 4 to 5 days until the temperature became normal. Penicillin and the sulphonamides are of little value in the treatment of tularaemia.

The diagnosis is confirmed by the isolation of P. tularensis from infected tissues including blood and sputum. The guinea pig is quite susceptible and is used in diagnostic work. A generalized fatal disease develops in which the most striking lesions are multiple necrotic areas in the liver and spleen. Laboratory confirmation must be undertaken with great care as many laboratory workers have contracted the infection.

The agglutination test is used extensively and is quite accurate except that cross agglutination may occur between P. tularensis and Brucella agglutinins.

The fluorescent antibody test is now being used in the CDC laboratories. This test is of great value in the rapid identification of the organism in tissues, provided they are not decomposed; also in experimental animals and from cultures grown on artificial media.

III ANIMAL DISEASE

Tularaemia is widespread in wild animals and many species are affected as previously stated. Among domestic or farm animals sheep are most frequently affected although the disease has been reported in calves, swine and chickens. Epizootics have been reported in lambs for many years with severe losses. Death is usually due to severe toxic systemic manifestations due to necrotic foci in the liver and spleen, as well as the lung, kidneys and regional lymph nodes. The necrotic foci are miliary like and numerous, similar to miliary tubercles. Lymph nodes are sometimes hemorrhagic, or caseous, and the lesions may resemble those of bubonic plague. Animals which die within 2 days may show no gross lesions, but usually the organism can be recovered from the liver or spleen by culture. Affected animals and man, respond very well to the antibiotics.

IV CONTROL

An attack of tularaemia confers a solid, lasting immunity. Persons and animals who have had the disease develop agglutinins that persist for long periods. As stated earlier, these agglutinins will cross react with a brucella antigen, or brucella agglutinins will react with a Pasteurella tularensis antigen.

In recent years vaccines have been developed by American and Russian investigators which have proved valuable in protecting against tularaemia. The American vaccine is a phenolized preparation and is of limited value. The Russian vaccine is a live preparation, and has been used extensively in the endemic areas with success.

Other control measures include the education of the public to avoid the handling and dressing of wild cottontail rabbits, and the thorough cooking of wild rabbit meat. Likewise, hunters and farmers should be cautious in handling any sick or strange acting animals. In areas where ticks are known to be infected, sick sheep, calves, dogs and birds should not be handled unless necessary and then only with protective handwear. In these areas people should be warned about the danger of biting arthropods, such as ticks, flies and mosquitos, which may carry the tularaemia agent. Likewise, people should be warned about possible contaminated waters where infection prevails among wild animals.

There is little hope that tularaemia can be eliminated or eradicated in nature, hence it is important that knowledge of the disease be widely disseminated especially as to how it is transmitted, its symptoms in man and animals, diagnosed, treated and prevented