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Tularemia in Alaska

On September 1, 1996, a 23-year-old white male was admitted to Bassett Army Community Hospital (Fairbanks) complaining of fever, night sweats, non-productive cough, postural dizziness, vomiting, and diarrhea. He had an oral temperature of 103.3 ° F and was mildly orthostatic. Auscultation revealed decreased breath sounds with rales in the left lung base. No rashes or sores were noted. The remainder of the physical exam was unremarkable. The patient's chest radiograph showed a left lower lobe infiltrate. His white blood cell count was 10,700 with 90% polymorphonucleocytes, serum sodium was 117, and liver enzymes were mildly elevated with an SGOT of 102, SGPT of 62, and LDH of 1705. Alkaline phosphatase and total bilirubin were normal.

After obtaining blood cultures and serologic specimens, he was started on ampicillin-clavulanic acid for presumptive bacterial pneumonia. On the second hospital day, he remained febrile and was changed to intravenous ceftriaxone. Azithromycin was added on day 4. On day 8, ciprofloxacin was given for 24 hours, then discontinued. On day 9, after a chest radiograph showed a pleural effusion and increasing infiltrate, a thoracentesis was performed and clindamycin was added since he still had not improved. The fluid was a clear exudate. The patient continued to have oral temperatures above 101 ° F.

On day 17, the serum specimen obtained on admission was reported as showing evidence of *Francisella tularensis* infection. The patient was started on doxycycline and all other antibiotics were discontinued. Within 24 hours, he became afebrile and felt better. He was discharged on day 20 with a 10-day course of doxycycline.

On October 28, 1996, a follow-up chest radiograph and CT revealed a left hydropneumothorax. Attempted thoracentesis was unsuccessful. The patient complained of mild chest pain, but denied shortness of breath, night sweats, chills, or fever. He was started on ciprofloxacin and, with a chest tube in place, transferred to a regional medical center. A bronchopulmonary fistula was confirmed and treated successfully with urokinase. The patient has done well since.

After serologic testing identified tularemia, the patient recalled that he had shot and skinned an arctic hare 5 days before becoming ill. Although his family and hunting partner were nearby when the hare was prepared, no one touched it except the patient. Since the partner's wife complained of fever and cough, blood specimens were taken from her for *F. tularensis* testing. The result was negative and her symptoms resolved spontaneously. While discussing tularemia with the patient's family, a US Army Preventive Medicine physician discovered that the frozen carcass of the suspect hare was going to be dinner the night he called. The family was persuaded not to eat the animal and arrangements were made to ship it to the US Centers for Disease Control and Prevention. Culture results confirmed *F. tularensis*.

**Discussion:** Tularemia occurs sporadically in Alaska. During 1972 to June 1997, 22 cases were reported to the Section of Epidemiology. Many of the cases were 20-40 years of age (n=10; range 19-54 years) and most were male (n=16). Interior Alaska accounted for the greatest number of cases (n=12), followed by the Anchorage/Matanuska-Susitna region (n=7), the Northwest (n=2), and the Southeast (n=1).

Tularemia has variable manifestations depending upon the portal of entry and virulence of the infecting strain of *F. tularensis*. The five basic presentations are:

1. *Ulceroglandular* - Characterized by a painful maculopapular skin lesion at the point of entry with ulceration and slow healing. This is followed by acutely enlarged and tender lymph nodes proximal to the lesion. It is the commonest form of tularemia.
2. *Glandular* - No skin lesions are seen but there are enlarged and painful lymph nodes that may drain.
3. *Oropharyngeal* - This form causes a severe exudative pharyngitis, sometimes with ulceration. It is caused by ingestion of the etiologic agent in food or water and can also result in vomiting, abdominal pain, and diarrhea.
4. *Typhoidal* - Presents with fever, pneumonia, septicemia, and hepatosplenomegaly. This is the most severe form (and the form presented above) with a fatality rate, if untreated, of up to 60%.
5. *Oculoglandular* - Presents as severe conjunctivitis with lymph node involvement. This is the rarest form of tularemia.

*F. tularensis* commonly infects hares, rabbits, muskrats, and voles. It has also been found in foxes, bears, beavers, and squirrels. Transmission results from exposure to an infected animal, the bite of an infected arthropod (tick or deer fly), ingestion of contaminated food or water, or inhalation of dust from contaminated soil, hay, or grain. The bacterium is highly infectious; aerosolization has resulted in illness among laboratory workers. Person-to-person transmission has not been described. In Alaska, several cases have been associated with skinning wild animals - these might have been prevented by use of protective gloves. Freezing will not kill the bacteria, although cooking does.

Since special media (and precautions) are required to culture the organism, diagnosis is best made by serologic testing of acute and convalescent sera. The drug of choice for treatment is gentamicin or streptomycin. There is limited evidence for using ciprofloxacin or possibly other drugs. It is important to report suspected cases to the Section of Epidemiology since the occurrence of a single case suggests that other persons may be at risk.