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Q Fever

Introduction

Q fever is a zoonotic disease, usually associated with ruminants, caused by the rickettsia *Coxiella burnetii*. It has been reported throughout most of the world, including Canada. In Ontario, Q fever has occasionally been diagnosed as a cause of abortion in sheep and goats. Reported human cases have been associated with exposure to abortions in sheep and goats, and drinking unpasteurised goat's milk. Most human infections with *C. burnetii* are asymptomatic or result in only a mild transient flu-like illness. Infection in animals is common, and also largely asymptomatic. In North America, clinical disease is usually limited to abortion in sheep and goats, but cattle are thought to be a significant source of human exposure.

Source of infection and mode of transmission

The reservoirs of infection include wild and domestic mammals, birds and arthropods such as ticks. Serologic studies suggest that infection may be widespread in the animal population, but the real prevalence is unknown. The prevalence will also vary considerably across species, geographic location and time. Studies in Ontario have found evidence of *C. burnetii* infection in 33-82% of cattle herds and 0-35% of sheep flocks (1,2). Cattle, sheep and goats are considered the main source of infection to humans. The rickettsial agent becomes localised in the mammary glands

and placenta of infected ruminants, and is excreted in large numbers in milk, placental tissue, fetal fluids, urine and feces. Consequently, parturition can result in significant environmental contamination and is likely the time of greatest risk for transmission of the disease within herds and flocks, and to humans. Dogs and cats may also be infected and shed the rickettsia. Exposure to placenta and contaminated materials from cats has been a common source of human Q fever infection in Nova Scotia.

C. burnetii is very resistant to environmental and chemical factors, and may persist in the environment for several weeks. The main route of Q fever infection in humans is by aerosol transmission, either directly from the placenta and fetal fluids of infected animals or from contaminated wool, hides or bedding. The organism can be transported long distances on dust particles, and some windborne outbreaks have been documented (3). Despite the presence of the agent in raw milk, clinical infection through the digestive tract in North America is thought to be rare. Ticks may play a role in the natural cycle of infection in wildlife populations, but human disease associated with tick bites has only occasionally been documented (4).

Infection in animals and humans

Naturally infected animals do not show any clinical signs of disease, including fever, at the time of infection. The udder and uterus are

the main sites of infection, with large numbers of the organism being shed in the milk and birth materials. The infection can become chronic, reoccurring at subsequent parturition.

Human Q fever is primarily an occupational disease of farmers, abattoir workers, veterinarians, and laboratory workers. In the majority of cases the disease is a non-specific flu-like illness with a 1-3 week incubation period, often remaining undiagnosed. In a minority of cases there will be a clinical atypical pneumonia or hepatitis. Should the course of disease become chronic, endocarditis and chronic hepatitis can develop. Chronic Q fever is often fatal, and may be more likely to develop in immunocompromised individuals and pregnant women.

Treatment

In animals, once *C. burnetii* has been identified as the cause of an abortion, the rest of the flock or herd can be protected to some degree by the use of long acting injectable tetracyclines. Acute human clinical cases generally respond to appropriate antibiotic therapy. Treatment of the chronic condition has been less successful, with relapses common.

Precautions

1. In assisting any aborting or parturient animal, it is advisable to wear protective clothing, disposable gloves and a mask covering the mouth and nose. Pregnant women or the immunocompromised should not assist in the birthing of animals.

2. Abortng animals should be isolated for 3 weeks. As an extra precaution the hindquarters can be washed to remove any residual organisms. All placental tissue and contaminated material such as bedding should be removed and destroyed, preferably by burning or composting, and the pen thoroughly cleaned and disinfected before being used again. The most effective disinfectant against *C. burnetii* is a 1:100 lysol solution. Even dogs and cats should be allowed to deliver in isolation on disposable bedding.
3. Unpasteurised milk must not be consumed. The recommended time for home pasteurisation is 30 minutes at 63° C or 15 seconds at 72° C (5).

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