Q Fever

Etiology

Q fever (Query Fever) results from infection by Coxiella burnetii. This organism is an obligate intracellular pathogen and has been traditionally placed in the family Rickettsiaceae; however, this organism is now classified in the family Coxiellaceae and order Legionellales in the gamma subdivision of Proteobacteria. It is a Category B bioterrorism agent.

Species affected

C. burnetii can infect many species. Its reservoirs may be only partially known. Sheep, goats and cattle seem to be the most common domesticated animal reservoirs. Wild rodents may be important reservoirs in some areas, and cats are suspected in urban outbreaks. C. burnetii has been isolated from dogs, rabbits, horses, pigs, camels, buffalo, deer, pigeons, swallows, parrots, crows, geese and other mammals and birds. Antibodies have been found in badgers, coyotes, raccoons, opossums, jackrabbits, black bears, musk ox and other species. C. burnetii has been reported in fish and snakes.

Geographic distribution

Found worldwide, except in New Zealand.

Transmission

C. burnetii can be transmitted by aerosol, direct contact, ingestion and vectors. Infections in animals can persist for several years and possibly lifelong. Organisms localize in the mammary glands, supramammary lymph nodes, uterus, placenta and fetus; and bacteria can be shed in milk, and by the placenta and reproductive discharges during subsequent pregnancies and lactations. C. burnetii can also be found in the feces and urine, and semen. Sexual transmission (direct contact) has been demonstrated in mice. Ticks (vector) may be important in transmission among wildlife, and can also spread infections to domesticated ruminants. In addition, C. burnetii has been found in lice, mites and parasitic flies.

Incubation period

Variable, with reproductive failure as the only sign.

Clinical signs

Many species are susceptible. Most infections are asymptomatic.

Sheep, Goats, and Cattle: Abortion, stillbirth, retained placenta, endometritis, infertility and birth of small or weak offspring occur. Abortions are usually late term. Goats may have a poor appetite and be depressed for 1 to 2 days before aborting. Placental retention for 2-5 days and agalactia have also been reported

Dogs and Cats: stillbirths and weak offspring

Zoonotic potential

C. burnetii is a highly contagious zoonotic organism. Human outbreaks can result from the inhalation of aerosolized organisms. Sporadic cases can occur in people who are occupationally exposed. These cases tend to result from exposure to parturient ruminants; however, cats, dogs, rabbits and other species have also been implicated. Although Q fever is usually asymptomatic to mild in humans, a few people develop serious disease. Pneumonia or hepatitis may occur in acute cases, and chronic infections can result in endocarditis or a variety of other complications.

Diagnosis

Consider Q fever when abortions or infertility are seen in otherwise asymptomatic animals.

Laboratory: the presence of organisms, together with serological tests and clinical findings may be adequate for a diagnosis at the flock or herd level. Bacterial identity can be confirmed by immunohistochemistry or capture enzyme-linked immunosorbent assay (ELISA). Polymerase chain reaction (PCR) is available in some labs. Samples to submit for analysis include blood, placenta and aborted fetal tissue, vaginal swabs, and milk.

Differentials: Other diseases causing abortion in small ruminants, such as brucellosis and chlamydiosis.

Prevention and control

Minimize the introduction of new stock, and prevent contact with wildlife. Practice good vector control. In an infected flock, isolating infected pregnant animals and burning or burying reproductive membranes and placentas can decrease transmission. Regularly clean and disinfect areas with 10% bleach. In the United States vaccines are not available for domesticated ruminants, but they are used in some countries. Vaccines may prevent infections in calves, decrease shedding of organisms, and improve fertility in infected animals, but they do not eliminate shedding of the organism.

Notification of authorities

Q Fever is a reportable disease in many states. Consult state regulations or state health authorities for more specific information.

Federal: Area Veterinarian-in-Charge (AVIC)
http://www.aphis.usda.gov/vs/area_offices.htm
State Animal Health Officials

For more information

- Center for Food Security and Public Health, Iowa State University
http://www.cfsph.iastate.edu/DiseaseInfo/
- The Merck Veterinary Manual, Q Fever, 2006
- World Organization for Animal Health (OIE)
http://www.oie.int/eng/normes/mmmanual/A_00049.htm