Q fever

Duhok Veterinary Directorate

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Overview

Q fever is a zoonotic disease caused by *Coxiella burnetii*, a species of bacteria that is distributed globally. In 1999, Q fever became a notifiable disease in the United States but reporting is not required in many other countries. Because the disease is underreported, scientists cannot reliably assess how many cases of Q fever have actually occurred worldwide. Many human infections are inapparent.

Cattle, sheep, and goats are the primary reservoirs of *C. burnetii*. Infection has been noted in a wide variety of other animals, including other species of livestock and in domesticated pets. *Coxiella burnetii* does not usually cause clinical disease in these animals, although abortion in goats and sheep has been linked to *C. burnetii* infection. Organisms are excreted in milk, urine, and feces of infected animals. Most importantly, during birthing the organisms are shed in high numbers within the amniotic fluids and the placenta. The organisms are resistant to heat, drying, and many common disinfectants. These features enable the bacteria to survive for long periods in the environment. Infection of humans usually occurs by inhalation of these organisms from air that contains airborne barnyard dust contaminated by dried placental material, birth fluids, and excreta of infected herd animals. Humans are often very susceptible to the disease, and very few organisms may be required to cause infection.

Ingestion of contaminated milk, followed by regurgitation and inspiration of the contaminated food, is a less common mode of transmission. Other modes of transmission to humans, including tick bites and human to human transmission, are rare.

Signs and Symptoms in Humans

Only about one-half of all people infected with *C. burnetii* show signs of clinical illness. Most acute cases of Q fever begin with sudden onset of one or more of the following: high fevers (up to $1 \cdot i - 1 \cdot o^\circ$ F), severe headache, general <u>malaise</u>, <u>myalgia</u>, confusion, sore throat, chills, sweats, non-productive cough, nausea, vomiting, diarrhea, abdominal pain, and chest pain. Fever usually lasts for 1 to 1 weeks. Weight loss can occur and persist for some time. Thirty to fifty percent of patients with a symptomatic infection will develop pneumonia. Additionally, a majority of patients have abnormal results on liver function tests and some will develop <u>hepatitis</u>. In general, most patients will recover to good health within several months without any treatment. Only 1%-1% of people with acute Q fever die of the disease.

Chronic Q fever, characterized by infection that persists for more than $\$ months is uncommon but is a much more serious disease. Patients who have had acute Q fever may develop the chronic form as soon as $\$ year or as long as $\$ years after initial infection. A serious complication of chronic Q fever is <u>endocarditis</u>, generally involving the aortic heart valves, less commonly the mitral valve. Most patients who develop chronic Q fever have pre-existing valvular heart disease or have a history of vascular graft. Transplant recipients, patients with cancer, and those with chronic kidney disease are also at risk of developing chronic Q fever. As many as $\$ of persons with chronic Q fever may die of the disease. The <u>incubation period</u> for Q fever varies depending on the number of organisms that initially infect the patient. Infection with greater numbers of organisms will result in shorter incubation periods. Most patients become ill within ^Y-^Y weeks after exposure. Those who recover fully from infection may possess lifelong <u>immunity</u> against re-infection.

Diagnosis

Because the signs and symptoms of Q fever are not specific to this disease, it is difficult to make an accurate diagnosis without appropriate laboratory testing. Results from some types of routine laboratory tests in the appropriate clinical and epidemiologic settings may suggest a diagnosis of Q fever. For example, a platelet count may be suggestive because persons with Q fever may show a transient thrombocytopenia. Confirming a diagnosis of Q fever requires serologic testing to detect the presence of antibodies to *Coxiella burnetii* antigens. In most laboratories, the indirect immunofluorescence assay (IFA) is the most dependable and widely used method. *Coxiella burnetii* may also be identified in infected tissues by using immunohistochemical staining and DNA detection methods.

Coxiella burnetii exists in two antigenic phases called phase I and phase II. This antigenic difference is important in diagnosis. In acute cases of Q fever, the antibody level to phase II is usually higher than that to phase I, often by several orders of magnitude, and generally is first detected during the second week of illness. In chronic Q fever, the reverse situation is true. Antibodies to phase I antigens of *C. burnetii* generally require longer to appear and indicate continued exposure to the bacteria. Thus, high levels of antibody to phase I in later specimens in combination with constant or falling levels of phase II antibodies and other signs of inflammatory disease suggest chronic Q fever. Antibodies to phase I antigens have been known to persist for months or years after initial infection.

Recent studies have shown that greater accuracy in the diagnosis of Q fever can be achieved by looking at specific levels of classes of antibodies other than IgG, namely IgA and IgM. Combined detection of IgM and IgA in addition to IgG improves the specificity of the assays and provides better accuracy in diagnosis. IgM levels are helpful in the determination of a recent infection. In acute Q fever, patients will have IgG antibodies to phase II and IgM antibodies to phases I and II. Increased IgG and IgA antibodies to phase I are often indicative of Q fever endocarditis.

Treatment

Doxycycline is the treatment of choice for acute Q fever. Antibiotic treatment is most effective when initiated within the first r days of illness. A dose of \cdots mg of doxycycline taken orally twice daily for 10.71 days is a frequently prescribed therapy. Quinolone antibiotics have demonstrated good in vitro activity against *C. burnetii* and may be considered by the physician. Therapy should be started again if the disease relapses.

Chronic Q fever endocarditis is much more difficult to treat effectively and often requires the use of multiple drugs. Two different treatment protocols have been evaluated: `) doxycycline in combination with quinolones for at least $\frac{1}{2}$ years and $\frac{1}{2}$ doxycycline in combination with hydroxychloroquine for $\frac{1}{2}$ to $\frac{1}{2}$ years. The second therapy leads to fewer relapses, but requires routine eye exams to detect accumulation of chloroquine. Surgery to remove damaged valves may be required for some cases of *C. burnetii* endocarditis.

Prevention

In the United States, Q fever outbreaks have resulted mainly from occupational exposure involving veterinarians, meat processing plant workers, sheep and dairy workers, livestock farmers, and researchers at facilities housing sheep. Prevention and control efforts should be directed primarily toward these groups and environments.

The following measures should be used in the prevention and control of Q fever:

- Educate the public on sources of infection.
- Appropriately dispose of placenta, birth products, fetal membranes, and aborted fetuses at facilities housing sheep and goats.
- Restrict access to barns and laboratories used in housing potentially infected animals.
- Use only <u>pasteurized</u> milk and milk products.
- Use appropriate procedures for bagging, autoclaving, and washing of laboratory clothing.
- Vaccinate (where possible) individuals engaged in research with pregnant sheep or live *C. burnetii*.
- Quarantine imported animals.
- Ensure that holding facilities for sheep should be located away from populated areas.
- Counsel persons at highest risk for developing chronic Q fever, especially persons with pre-existing cardiac valvular disease or individuals with vascular grafts.

A vaccine for Q fever has been developed and has successfully protected humans in occupational settings in Australia. However, this vaccine is not commercially available in the United States. Persons wishing to be vaccinated should first have a skin test to determine a history of previous exposure. Individuals who have previously been exposed to *C. burnetii* should not receive the vaccine because severe reactions, localized to the area of the injected vaccine, may occur. A vaccine for use in animals has also been developed, but it is not available in the United States.

Significance for Bioterrorism

Coxiella burnetii is a highly infectious agent that is rather resistant to heat and drying. It can become airborne and inhaled by humans. A single *C. burnetii* organism may cause disease in a susceptible person. This agent could be developed for use in biological warfare and is considered a potential terrorist threat.

نەخوشيا ئەنفلونزا بزنا(كيو فيڤر)

نەخوشىيەكا بەكتىريە ھەمو ئاژەلىن خوين گەرم دگريتن و دھنتە قەگوھاستن بو مروڤا،

همر ژ سالا ۱۹۳۵ ل وهلاتی ئوسترالیا هاتیه دهسنیشان کرن و لهممی وهلاتا یا همی تنی نیوزیلهندا نهبیت. نهخوشی دهنِته ڤهگوهاستن بو مروڤا برێکا ههناسێ و پیسبونا ههوای ب تایبهتی ل دهمیّ بهر هاڤنِتنیّ یان بونیّ، و بهکتریا دناڤ شیر و پهنیر و هندهک جارا د ناڤ گوشتی دا همیه.

نیشانیّت ئەنفلونزایی لدەڤ ئاژەلی و مروڤا دیاردکەت، مەترسیا وێ ل سەر كەسیّن نەخوشییّن مەناعی ھەین زیدەیە.

جار مسهريا وي بريكا دهر مانيّت هەڤ دژه (ئەنتى بايوتک) و دڤيّت ل ۳ روژيّن دەسپيّكي بهيّته ومرگرتن.

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