Coxiella burnetii

Coxiella burnetii is a small gram-negative bacterium. It is not in the Rickettsial genus, but is closely related and is an obligate intracellular organism that requires CoA and NAD for survival. However, unlike the other Rickettsial infections, Coxiella is not transmitted by an arthropod vector, does not cause a rash, and has a negative Weil-Felix reaction. Instead, Coxiella burnetii is commonly acquired via inhalation of spores from cattle placenta and is the cause of Q fever. Symptoms include pneumonia and flu like symptoms. Treatment with tetracycline or doxycycline can reduce the symptomatic duration of illness.

PLAY PICMONIC

Characteristics

Gram Negative Bacteria
Graham-cracker Negative-devil
Coxiella burnetii is a small gram-negative bacterium. This bacterium is intracellular, however, and thus may be difficult to visualize on a gram stain.

Intracellular
In-a-cell
Coxiella burnetii is an intracellular organism. It is an obligate intracellular organism that requires CoA and NAD to survive, similarly to organisms in the Rickettsia genus.

Aerosol Transmission
Aerosol-can
Transmission of Coxiella burnetii occurs when aerosolized bacteria are inhaled. The typical hosts of coxiella are farm animals, and thus infectious particles may be inhaled during the handling of animals, their waste, or their products.

Affects Animal Handlers
Farmer
This organism typically affects those who work in close contact with farm animals such as cows, sheep, and goats. High risk individuals include farmers, slaughterhouse workers, and veterinarians. It may be transmitted through handling of the animals themselves, their feces, or their products. It may also be transmitted by domestic animals such as cats and dogs.

Presentation

Q Fever
(Q) Queen Fever-beaver
The disease caused by Coxiella burnetii infection is known as Q fever. In acute disease, Q fever typically manifests with flu-like symptoms, atypical pneumonia, and hepatitis. If it becomes chronic, patients may develop endocarditis as well.

Flu-like Symptoms
Thermometer and Ice-bag
The typical constellation of symptoms caused by coxiella infection resemble those of the flu. Patients can present with fatigue, fever, myalgias, and chills.

Atypical Pneumonia
A-tipi Nude-Mona
Patients with Q fever may also present with signs and symptoms of atypical pneumonia. The most typical of these symptoms is a nonproductive cough, which may or may not be associated with fatigue. These symptoms can persist for weeks.

Hepatitis

Happy-tie-liver

Q fever may also result in acute hepatitis. Labs will reveal elevated LFTs, and patients may be icteric. Bilirubin levels are often within normal range.

Endocarditis

Donut-heart-card

Chronic Q fever is an uncommon sequela of Coxiella infection. Endocarditis is the most common complication. Patients with prosthetic or previously damaged valves are at increased risk of this complication.

Diagnosis

Serology

Syrup

The diagnosis of Q fever can be confirmed via serology. Patients are screened for antibodies specific to the acute and chronic phase of Coxiella infection, namely anti-Phase I antibodies and anti-Phase II antibodies. Increased titers of anti-Phase II antibodies indicate acute disease, whereas a large quantity of anti-Phase I antibodies indicate chronic infection. Other markers of infection include elevated LFTs, thrombocytopenia, and bilateral, nodular opacities with hilar lymphadenopathy on chest radiograph.

Treatment

Doxycycline

Dachshund-cycling

As Coxiella is an obligate intracellular organism, antibiotics that concentrate inside of cells are most effective in treating this disease. Doxycycline is first line, but macrolides may also be used if treatment fails.

