Q Fever: a guide to diagnostic testing

Background-

Q fever is caused by a type of bacteria (Coxiella burnetii), found in domesticated and wild animals throughout the world. This can cause acute or chronic disease and should be considered in a specific group of patients with clear epidemiology.

Epidemiology-

Incidence and transmission-

There are approximately 50-100 reported cases of Q fever each year in the UK. This is thought to be an underestimate of the true incidence as diagnosis may be missed due to ~60% of cases being asymptomatic. The average incubation period is 20 days (14-39 days). [1]

Although *C. burnetii* is endemic in the UK, the prevalence in UK sheep and cattle herds is not accurately known but is estimated in England, to range from ~20% in dairy herds and between 1.6%-6.3% in sheep. [2]

Infection usually results from inhaling the resistant spores in dust particles contaminated with animal birth products (such as afterbirths), dung or urine. Animal hides, wool or fur are other potential sources and abattoir workers are at particular risk. Very occasionally, outbreaks occur in urban areas, probably caused by windborne spread from nearby livestock premises. Infection can also be acquired via contact with infected materials through skin abrasions or, very rarely, from tick bites.

Risk factors-

- Contact with farm animals (sheep, cattle and goats)
- Contact with a known outbreak, contaminated straw/hides or fleeces
- Occupational exposure (Vets, abattoir workers, laboratory workers)

Clinical presentation-

The acute presentation includes:

Fever or Pyrexia of unknown origin

Pneumonia (classically older patients and immunocompromised)

Hepatitis (younger patients)

Flu like symptoms

<10% may have rare complications including rash, myocarditis and aseptic meningitis

Chronic features

Chronic Q fever can occur rarely and consists in the persistence of infection for more than 6 months. People with certain conditions, including pregnancy, immunosuppression, heart valve lesions, and vascular abnormalities, are more susceptible to developing chronic Q fever.

Most commonly, endocarditis (blood culture negative) is observed in 60–70% of cases of chronic infections , but chronic hepatitis, osteomyelitis, septic arthritis, interstitial lung disease, chronic fatigue syndrome , or infection of aneurysm and vascular grafts and recurrent miscarriages can also occur.

Diagnosis

Tests for diagnosis of Q fever include serology and PCR tests which is offered at Specialist reference laboratory. Q fever has two antibody-producing (antigenic) phases called phase I and phase II. These phases can help confirm a diagnosis and can help distinguish acute Q fever infection from chronic Q fever infection. Infected individuals develop specific antibodies against Q fever including immunoglobulin G (IgG), immunoglobulin A (IgA) and immunoglobulin M (IgM). Measuring the levels of these classes of antibodies can help confirm a diagnosis of Q fever. During the acute phase of Q fever, IgG and IgM antibodies may be detected. In chronic Q fever, IgG or IgA levels may be detected.

In acute Q fever, the levels of antibodies to phase II antigen of *C. burnetii* are higher than those to the phase I antigen and are first detected during the second week of the illness.

In chronic Q fever, a high level of phase I antibodies with a constant or falling level of phase II antibodies together with other signs of inflammatory disease are common.

Antibody levels reach peak 4-8 weeks after the onset of acute Q fever and then decrease gradually over the following 12 months.

Diagnosis can also be made on paired samples (acute and convalescent) 4 weeks apart by the demonstration of a 4 fold rise in anti-phase II antibodies. Whole blood, serum or tissue biopsies may be tested by PCR for *C. burnetii*.

References

1.Q fever Factsheet (publishing.service.gov.uk)

2.Q fever Disease name (hse.gov.uk)

3. Q fever - NORD (National Organization for Rare Disorders) (rarediseases.org)