

Borrelia spp.

***Borrelia burgdorferi* sensu lato infection (the cause of Lyme disease)**

Borrelia burgdorferi s.l. comprises a group of genospecies of spirochaete bacteria (primarily *Borrelia burgdorferi* sensu stricto, *Borrelia afzelii* and *Borrelia garinii*) that cause Lyme disease in a small percentage of infected dogs. They are found worldwide including the UK, and are transmitted by the tick *Ixodes ricinus*, also found in the UK. Recent surveys have found that 2.3% of ticks in the UK were infected with *B. burgdorferi* s.l.. Transmission from the tick to the host occurs about 36 to 48 hours after the tick starts feeding.

FAQs

What clinical signs are seen with *B. burgdorferi* s.l. infection?

Most infected dogs show no clinical signs. A rash may occur where the tick attached to the dog but, unlike humans, no 'bullseye' lesion is seen in the skin. In dogs which show clinical signs, these usually develop around 2-5 months after a tick bite and can include lethargy, fever, polyarthritis (pain and swelling in multiple joints; signs may shift from one leg to another), and lymphadenopathy. Any resultant lameness often resolves spontaneously with time, although repeat episodes can occur. Signs may be worse in young or immunocompromised dogs. Occasionally cardiac, neurological, or renal signs are reported.



What clinical pathology changes occur with *B. burgdorferi* s.l. infection?

There are no real characteristic haematology or serum biochemistry changes in *B. burgdorferi* s.l. infection. A mild thrombocytopenia may be present. In the USA Lyme nephritis is reported, particularly in Labrador retrievers, Golden retrievers, and Bernese mountain dogs, with associated azotaemia and proteinuria, but this is not recognised in the UK - possibly due to the bacteria species and strains present.

Is PCR useful for the diagnosis of *B. burgdorferi* s.l. infection?

Not often!

PCR is sensitive and specific, but the organism needs to be present in the submitted sample for PCR to be able to identify it. PCR of blood samples is often not useful as *B. burgdorferi* s.l. is not present consistently in the blood of infected dogs, including those with clinical illness - i.e. if the

Reception Hours

Mon-Fri 9am - 5pm

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blood is positive that is helpful, but a negative result does not rule out infection. PCR of synovial fluid (or synovial membrane biopsy) samples from dogs with joint changes will offer increased sensitivity for PCR analysis. If a tick bite has been identified, a skin biopsy taken adjacent to the tick bite can also be submitted for PCR.

Is serology useful to diagnose *B. burgdorferi* s.l. infection?

Yes. As outlined above, finding *B. burgdorferi* s.l. by PCR is difficult but infected dogs will usually seroconvert and mount an antibody response. However, this occurs in dogs infected with *B. burgdorferi* s.l. regardless of whether they are showing clinical signs or not; so seropositivity does not equate with disease. The IDEXX SNAP 4Dx test detects antibodies specific for *B. burgdorferi* s.l. (most genospecies are believed to be detected although it may not pick up all strains of *B. afzelii*) and thus can be used as a screening test for Lyme disease in dogs. A positive result may need to be followed up with a quantitative antibody test for *B. burgdorferi* s.l.

How do I treat *B. burgdorferi* s.l. infection?

Doxycycline (10 mg/kg orally once daily) is the treatment of choice for Lyme disease, with four weeks' worth of treatment usually recommended. A good response to treatment is usually seen, often starting within 48 hours. Intensive therapy is required for Lyme nephritis and protein-losing nephropathy, which carries a guarded prognosis.

How do I prevent *B. burgdorferi* s.l. infection?

Effective tick control!

Owners should be instructed to avoid tick exposure whenever possible, remove any ticks found on a dog promptly and use a topical ectoparasiticide that is effective against ticks. There is also an inactivated whole cell *B. burgdorferi* s.l. vaccine available in the UK, which can be considered for dogs living in areas known to have a high risk of Lyme disease.

Is *B. burgdorferi* s.l. zoonotic?

Infected dogs do not pose a direct zoonotic risk to humans, but humans can develop Lyme disease after being bitten by a tick infected with *B. burgdorferi* s.l.. A bullseye rash occurs within a month of the tick bite, moving outward from the bite site over time. Cardiac and neurological signs can develop as well as arthritis.

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What about *B. burgdorferi* infection in cats?

Lyme disease has not been reported as a clinical entity in cats, although evidence of infection with *B. burgdorferi* s.l. in cats has been reported worldwide, including in the UK. NB: the IDEXX SNAP 4Dx Plus test is optimised for dogs, not cats, so this test is not validated for use in cats. However, it is reported to be non-species-specific and some researchers have successfully used it to detect cat antibodies against *B. burgdorferi* (DOI: 10.1177/1040638715593598).



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