**Introduction**

Lyme disease is a chronic, multi-systemic, inflammatory disorder of humans and animals associated with infection by the tick-borne spirochaete, *Borrelia burgdorferi*. There are a number of subspecies of *B. burgdorferi*, each adapted to a different type of wildlife species. The principle vector in the UK is the tick *Ixodes ricinus* and animals become infected following a bite from an infected nymph or adult (Simpson, 2008).

**Clinical signs**

In dogs, Lyme disease most often manifests as a non-erosive inflammatory arthropathy. The typical presenting signs are a migratory arthritis affecting up to five joints (true polyarthritis is rare). Episodes of lameness typically last only a few days, although repeat episodes may occur. There may be fever and lymphadenopathy. Lyme disease has also been associated with rapidly progressive renal failure and although a causal relationship with *B. burgdorferi* infection has not proven, an immune-mediated glomerulonephritis has been postulated. The risk of developing Lyme disease associated renal disease appears to be greater in Labrador and Golden Retrievers, as well as Bernese Mountain Dogs (Krupka and Straubinger, 2010). Although cats have been found to have similar rates of seroconversion as dogs, clinical signs of Lyme disease are generally absent.

**Diagnosis**

Diagnosis may be difficult and normally depends on evidence of exposure in conjunction with the clinical signs and results from diagnostic testing. Tests for *B. burgdorferi* can be divided into those that demonstrate the presence of the organisms and antibody tests. Detection of the organism by culture, cytology or polymerase chain reaction (PCR) assay can be difficult as the organism is rarely found in blood, urine, synovial fluid or cerebrospinal fluid (CSF) (Littman et al., 2006).

Serological testing is helpful, but subclinical infections can occur and antibodies to *B. burgdorferi* may cross-react with other spirochaetes. A positive serological test does not equate to a diagnosis of Lyme disease, but animals with clinical Lyme disease are unlikely to be negative for anti-*Borrelia* antibodies. The cytological changes in synovial fluid from dogs with Lyme disease are often more typical of low-grade immune-mediated joint disease than of a bacterial infection (Ramsey and Tennant, 2001).

**Treatment and prognosis**

A response to treatment with tetracyclines or penicillin derivatives is normally found within 7 days of starting therapy, but it is advisable to continue antibacterial treatment for at least 2 weeks after the resolution of clinical signs. The American College of Veterinary Internal Medicine (ACVIM) guidelines recommend that seropositive dogs with clinical abnormalities thought to arise from Lyme disease are treated with doxycycline (50 mg/kg orally q24h for 1 month). Proteinuric dogs may need a longer course of treatment, as well as therapy for the protein-losing nephropathy (Littman et al., 2006). Most cases have an excellent prognosis, particularly if diagnosed and treated promptly (Ramsey and Tennant, 2001).

**Prevention**

There is now at least one authorized vaccine available for Lyme disease in Europe; however, in the USA where a vaccine has been available for some time ACVIM Diplomates consider its use to be controversial. There is evidence to suggest that acaricides prevent the transmission of *Borrelia* as during the first 12–24 hours following a tick bite, *Borrelia* organisms residing in the mid-gut of the tick are not transmitted to the vertebrate host (Spencer et al., 2003; Jacobson et al., 2004; Krupka and Straubinger, 2010).

The latest WSAVA Vaccination Guidelines (Day et al., 2016), consider vaccination against *Borrelia burgdorferi* (Lyme disease) to be non-core and recommend that it should only be given to dogs with a known high risk
of exposure, living in or visiting regions where the risk of vector tick exposure is considered to be high, or
where the disease is known to be endemic

Public health implications
Lyme disease in humans can take many forms and may mimic a wide range of conditions. Clinical signs
include a characteristic circular red rash, erythema migrans, which spreads from the site of the tick bite,
followed by a flu-like condition. If untreated, the disease can progress to neurological problems and
arthritis

Additional information
For further information on leptospirosis, see the BSAVA website at www.bsava.com