

Leishmania

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Introduction

Leishmaniosis (leishmaniasis) is a vector-borne disease caused by a protozoan parasite that is spread by phlebotomine sand-flies. In Europe, canine leishmaniosis is predominantly caused by *Leishmania infantum*, although other species (*L. tropica*, *L. major*) have occasionally been reported. The dog is considered the main reservoir of *L. infantum* infection and the preferred source of food for phlebotomine sand-flies. Domestic cats can be infected with *Leishmania* spp. but clinical signs are rare. Transmission of *Leishmania* from cats to sand-flies has been demonstrated, which means that they can act as a secondary reservoir of infection

Clinical signs

The incubation period can vary from 3 months to several years and is dependent on the immune response of the individual infected dog. Dogs may present with a wide spectrum of clinical signs and clinicopathological abnormalities, ranging in severity from mild and self-limiting to fatal disease

- Local cutaneous lesions at the site of the sand-fly bite are self-limiting and often go unnoticed
- Affected dogs may develop enlargement of a single or multiple lymph nodes, reduced appetite and weight loss
- Cutaneous forms of the disease most commonly present as non-pruritic, symmetrical and seborrheic lesions, but papules, ulcers and other skin lesions may be seen
- Other clinical signs may include gastrointestinal disorders (vomiting, diarrhoea, chronic colitis), polyarthritis, glomerulonephritis (polyuria, polydipsia), ocular lesions (blepharitis, conjunctivitis, keratoconjunctivitis, anterior uveitis) and neurological disorders

However, it should be noted that clinical signs are only observed in a proportion of infected dogs

Diagnosis

A tentative diagnosis can be made based on the clinical signs. However, an accurate diagnosis of canine leishmaniosis requires an integrated approach based on the physical examination, clinicopathological tests and specific assays

- Direct diagnosis is possible by detecting the parasite in Giemsa or Diff-Quik stained smears obtained from the superficial lymph nodes, spleen, liver, bone marrow, other internal organs and, occasionally, body fluids. However, there may be a lot of false-negative results, especially in dogs with a low parasitic load
- Serology is the most commonly used first step, allowing the detection of a specific antibody response in dogs approximately 8-12 weeks after the initial infection. The sensitivity and specificity of serological tests (IFAT and ELISA) is generally good; however, the sensitivity of rapid (qualitative) serological test kits can be variable. High antibody levels are usually associated with clinical disease and high parasite burdens. Serological testing can be useful for monitoring infected dogs for changes in disease severity and response to treatment
- Polymerase chain reaction (PCR) assay is both sensitive and specific, and can detect infection earlier than serology. Aspirates from the bone marrow and lymph nodes are most likely to yield positive results in affected dogs, but blood (buffy coat) samples and specimens from other tissues can be used, especially in dogs with a high parasitic burden
- In dogs with positive serology or PCR assay results for *Leishmania*, blood samples for renal/liver parameters and urinalysis (urine protein:creatinine ratio) are recommended

An in-house test kit is now available for the detection of anti-*Leishmania infantum* kinesin antibodies. However, whilst this test has a reported 98% sensitivity and 100% specificity, the author recommends that until further information is available on the test that infection is confirmed by an external laboratory prior to beginning treatment

Treatment and prognosis

Drug therapy appears mainly to slow the progression of the infection, decrease infectiveness and improve the clinical signs by reducing the parasitic load. However, even if there is a clinical cure the dog may remain a carrier and therefore a reservoir of infection. No medication is 100% effective in eliminating the parasite and no treatment can guarantee to prevent future transmission.

There are three drugs commonly used for the treatment of leishmaniasis:

- Allopurinol (10 mg/kg orally q12h for 6-12 months with meglumine antimonite for 1-2 months or miltefosine for 1 month)
- Meglumine antimonite (100 mg/kg s.c., i.m., slow i.v. q24h (or divided doses q12h) until clinical remission achieved. Treat for at least 28 days)
- Miltefosine (2 mg/kg orally q24h for 28 days. It is important that the course is completed and given with allopurinol)

While in non-endemic areas single drug treatments have been used successfully, the most common treatment regimens use a combination of drugs for the first month and then allopurinol, which may need to be continued for life

Symptomatic treatment appropriate to the clinical signs can also be important in managing the disease

Note: The Leishvet Group has proposed a system that divides the disease into four stages in order to assist the clinician in determining the appropriate therapy and forecasting prognosis. Further information can be found on their website (www.leishvet.org)

Prevention

Prevention of phlebotomine sand-fly bites by applying repellents/insecticides to dogs in the form of impregnated collars or spot-on and spray formulations can be useful. Topical insecticides have been shown to be effective in reducing infection in experimental studies, but there is no reliable data on the effectiveness of owner treatment for individual dogs

- Topical pyrethroids (± neonicotinoids), which are a component of various sprays and impregnated collars, act as repellents and reduce the number of sand-fly bites. Studies indicate that pyrethroids provide protection and reduce the proportion of dogs which become infected, but they are not 100% effective
- Deltamethrin impregnated collars can be used. These should be applied at least 1 week before likely exposure to enable protective levels to be achieved

Vaccination can be provided to dogs over 6 months of age and is based on an initial course of three doses at 3-weekly intervals followed by annual revaccination. However, it should be noted that there is no currently authorized vaccine that is able to confer full protection against infection or disease

To help prevent disease, dogs should be housed, especially at dawn and dusk, between April and November, when the sand-flies are most likely to bite. For kennelled dogs in endemic areas, strict measures to control vectors and vector-borne diseases should be maintained

To avoid an extension of endemic areas, *Leishmania*-infected dogs should not be translocated to non-endemic areas where phlebotomine sand-flies (or other vectors) may be present

Public health implications

Leishmania can be transmitted to humans and is an important disease, especially in poorer parts of South America, East Africa and Southeast Asia. In Europe, the majority of human cases are associated with immunosuppressive diseases such as human immunodeficiency virus (HIV). The major route of transmission is via sand-fly bite; transmission from infected dogs is thought to be extremely uncommon. A high proportion of human infections are asymptomatic; however, the World Health Organization (WHO) estimates that 20,000-30,000 people die annually from this disease

Additional information

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