

## Canine leishmaniasis | mosquito disease

Canine Leishmaniasis is a serious, even fatal for your dog. Discover how to protect it.

Canine leishmaniasis is a serious parasitic disease in dogs caused by a parasite (microscopic protozoan) called Leishmania, common throughout the Mediterranean area.

It can cause death to most dogs affected by it and who receive no further treatment and monitoring.

If your dog does not receive any protection, the risk of infection varies from 3% to 18% depending on the area. The risk increases if your dog always stays in rural and peri-urban areas, in warmer regions of the country, if outside at dusk.

### Epidemiology

Among other geographic locations, canine leishmaniasis occurs mainly in many Latin American countries and in all Mediterranean countries, including Portugal, Spain, France, Italy, Malta, Greece, Turkey, Israel, Egypt, Libya, Tunisia, Algeria and Morocco.

In Spain the most affected regions are those of Aragon, Catalonia, Madrid, Balears, Valencia, Murcia, Andalusia, Castilla-La Mancha, Extremadura, Castilla y León. Observed in other regions but with less intensity.

The origins of Leishmania are not clear. One possible theory proposes an origin in Africa, migration to the Americas from the Old World some 15 million years ago through the Bering Strait. Another theory proposes a Palearctic origin. These include migration or migration of vectors of successive adaptations. A more recent migration is that of *L. infantum* from the Mediterranean to Latin American countries, called since then *L. chagasi*, since European settlement of the New World, where the new vector parasites collected in their respective ecologies.

### Who produces leishmaniasis in dogs?

The causative agent of leishmaniasis is a single-celled parasite called Leishmania infantum, which lives inside the blood cells.

The disease spreads among dogs through mosquito bites, particularly Phlebotomus, living in the Mediterranean. The infection takes place when the female mosquito bites a dog infested with Leishmania, it remains in your digestive tract, and the parasite undergoes a series of changes there, that delay of 4 to 20 days, so that another mosquito when bites another dog becomes sick.

The incubation period can vary between 3 months and 18 months. Exceptionally, the disease can remain dormant for several years. Some dogs are tough and, even after receiving bites from sand flies, never show symptoms of the disease if they are properly fed and not under stress. This resistance probably is genetically determined.

Hazard season begin when the heat arrives, usually in May and ends in September or October if the summer prolongs. During the winter, mosquito larvae remain in a state of Quaternary and are harmless. In the warmer areas of Spain there are mosquitoes the whole year and therefore the danger exists throughout the year.

## Pathogenesis of canine leishmaniasis.

Under natural conditions, the sand flies transmit a low number of promastigotes that are capable of inducing the disease. The course of the disease is dependent on the type of dog's own immune response. Most parasites are destroyed by complement factors, the surviving promastigotes attach to cells of macrophage / monocyte adhesion by specific receptors. Then, the promastigotes are phagocytized and contained within the phagolysosome and there is then transformed into nonmotile amastigotes. The parasite is protected from degradation in the phagolysosome. After inoculation into the skin, initiates a local inflammatory response. In animals susceptible to the infection spreads in a few hours to the lymph nodes, bone marrow and spleen. In resistant animals, the parasites remain localized in the skin.

Dogs that develop a severe case of leishmaniasis, have developed a humoral response (Th2 type) against the parasite. During the Th2 response, T cells release cytokines, interleukin-4, interleukin-5, interleukin-10 and transforming growth factor B, which prevents the macrophages to destroy the leishmania. In these animals there is an increase in the number of B cells and a decrease in the number of T lymphocytes the increase in B cells produce excessive amounts of protective immunoglobulin. Form antigen-antibody (immune) than in the circulation produces the typical symptoms of immune complex disease.

Resistance to disease is associated with the development of a strong response immunospecific parasite-cell (Th1 response). In this type of response, T cells activate macrophages through the release of cytokines, interferon gamma and interleukin-2. These dogs often have skin nodules, "inoculation chancre, at the site of infection.

In general, clinical canine leishmaniasis is a slow, progressive disease. The resulting immunosuppression can lead to concurrent infections.

## Clinical signs of leishmaniasis

Clinical signs of leishmaniasis vary widely. The main ones are:

- Skin lesions: areas with no hair and dandruff intense, especially in the face and limbs, recurrent skin ulcers.
- Weight loss or loss of appetite
- Local or generalized lymphadenopathy
- Eye Injuries
- Epistaxis
- Lameness
- Anemia
- Renal failure
- Diarrhea
- Anorexia, weight loss, depression.

The signs show a slow but progressive, with little or very slight response to antibiotics or glucocorticoids.

The skin injuries are most commonly observed in clinical cases. These injuries are usually symmetrical, chronic and non-pruritic. They begin with the head and then spread to the rest of

the body. Chronic ulceration can develop in the head and limbs. Loss of appetite and weight being observed as leishmaniasis progresses. There is often atrophy of facial muscles. Eye injuries are variable. Blepharitis is associated with facial dermatitis in many cases. Renal failure occurs as a result of glomerulonephritis associated with immune complexes. Epistaxis is associated with inflammation and ulceration of the nasal mucosa. A small percentage of large bowel diarrheas are caused by ulcerative colitis. In more advanced cases, the decline in physical activity is evident.

### **My dog is apparently healthy, can have leishmaniasis?**

If, as the incubation period of the disease from mosquito bites until the onset of symptoms may be several months, so that a clinically healthy dog may be incubating the disease. These dogs with no symptoms can be detected by techniques of early diagnosis, dogs being detected at this stage with better prospects, since it's beginning to be addressed when the parasite has not yet hurt any tissue severely. We recommend checking using blood test once a year, if possible every six months.

### **What dogs are at risk of infection?**

Dogs most at risk of contracting the disease are those who live all the time in the garden, and especially those who sleep out all night, as the habit of the mosquito is biting at dusk and dawn.

### **How is it diagnosed?**

We performed a blood test that detects the presence of antibodies for Leishmania Infantun, or demonstrates that the dog has been bitten by a mosquito carrier, among them we can get the sampling of bone marrow or lymph nodes to visualize the parasite, serological tests (IFI and ELISA) for monitoring the level of immune response that the animal shows and proteinogram. In areas endemic for canine leishmaniasis, dogs, routinely are monitored annually by using a rapid blood kits for early detection of possible contamination

### **Can we cure leishmaniasis?**

The treatment of canine leishmaniasis is expensive, lifelong  
It can be controlled but should emphasize that the effectiveness of treatment will always be subject to the stage where the disease is taken, the status of the dog before and during the process, the injuries, the degree of infestation, etc. . . .  
But it is important to know that dogs do not always come to complete cure. Sick dogs should be monitored regularly with blood tests and treated again the signs of relapse. The goal of treatment is that dogs show no symptoms and remain clinically healthy.  
Dogs that at the time of diagnosis have kidney failure are those with a less favorable prognosis and will require more care and effort to succeed.  
A treatment can last several weeks, but the parasite always remains in the dog. Until the end of the dog's life, symptoms may periodically reappear and have to repeat the treatment.

The drugs used for treatment are antimonial. Applied by injection and treatment can last several weeks.

#### **The drugs used for treatment of leishmaniasis are:**

Pentavalent antimonials, amphotericin B, pentamidine, aminosidine, miltefosine, allopurinol, Pirazolpirimidina that inhibits xanthine oxidase.

#### **What is the possibility of relapse?**

Highly variable and difficult to quantify. Depend on the quality of life of the dog; possible reinfection from other sand flies of veterinary control etc. is practiced.

But keep one thing in mind ... The earlier the disease is diagnosed the better you can control.

"The only protection for your dog is prevention,"

#### **Prophylaxis**

There are various methods of control of leishmaniasis, some of them very controversial because of its high environmental cost:

- ✓ The complete destruction of the habitat of the sand-fly. It is the only permanent way to control vector. This has been used successfully but at great cost in certain endemic areas in the Soviet Union.
- ✓ Spraying or fogging with insecticides in the affected houses. This is costly and should be made for indefinite periods. Use mosquito nets or curtains impregnated with insecticide.
- ✓ In areas where dogs are the reservoir of the disease, the elimination of all dogs or hunting dogs selective seropositive may reduce the incidence of the disease but are unacceptable methods to control from an ethical point of view and does not solve the problem.
- ✓ A cheap and effective way to control where the dogs are known reservoirs, is to prevent the bite of sandflies, and thus the transmission of the disease, placing the dog collars impregnated with deltamethrin (Scalibor<sup>®</sup>, Intervet Schering-Plough Animal Health) Scalibor<sup>®</sup> works so long as a store releases deltamethrin in the lipid layer of the skin for 6 months. This method does not require expensive equipment or trained personnel to use. When combined with good public health program, the results are very good.

#### **Can we do something to prevent the disease?**

At the moment there is no effective vaccine available against Leishmaniosis.

The best preventive efforts are to prevent the spread of disease and development. For this we recommend the following measures:

- Do not let the dogs sleep outside.

- Treat them monthly with ectoparasiticides, via parenteral or spot rate on such as Frontline, Exspot, Scalibur, etc.
- Perform semi-annual blood tests, in the case of contagion, act early.

### **People can suffer from the disease? What about other animals?**

If people and many mammals, including cats, are susceptible to the disease. But unlike these, the canine has a particular susceptibility to the disease because their immune system is unable to successfully combat the parasite as the other species.

In the Mediterranean area of human leishmaniasis is very low incidence, and usually happens to people with impaired immune function (AIDS patients, people undergoing immunosuppressive therapy, transplant, chemotherapy, etc.).

### **My dog has leishmaniasis, can you breed?**

The disease is not transmitted through the uterus, or from the milk, so the puppies will be born healthy, but we do not recommend breeding in sick animals, as the organic expense and stress of gestation and lactation normally lead to a worse state of the dog and the appearance of new lesions and symptoms. For the same reason we discourage the use of sick animals for hunting or competitions.