

Borreliosis (Lyme Disease)

Lynn F. Guptill, DVM, PhD, DACVIM (Small Animal)

BASIC INFORMATION

Description

Borreliosis (Lyme disease) is a tick-borne disease that affects animals and people worldwide.

Causes

Borreliosis is one of a large group of tick-transmitted diseases caused by spirochete bacteria. This handout focuses on Lyme disease. The causative agent of Lyme disease in the United States is *Borrelia burgdorferi*, which is transmitted most commonly by deer ticks. Most cases of Lyme disease in the United States occur in the eastern coastal states and upper midwestern states. Lyme disease primarily affects dogs; cats are much more resistant to the disease.

Clinical Signs

Approximately 5-10% of dogs exposed to *B. burgdorferi* develop signs of Lyme disease, which is a low number. Initially, fever, lethargy, decreased appetite, and lameness are the most common signs. Lameness tends to shift from one leg to another over several weeks. Joint swelling and enlarged lymph nodes may occur. Multiple joints may be affected. Inflammation of the eyes (uveitis) may develop.

Rarely, and possibly more frequently in Labrador and golden retrievers, severe kidney disease occurs. Dogs with kidney disease often have sudden onset of lethargy, decreased appetite, vomiting, and weight loss. This manifestation of Lyme disease may progress rapidly to kidney failure.

Diagnostic Tests

Routine laboratory (blood and urine) tests, abdominal and joint x-rays, and an abdominal ultrasound may initially be recommended to investigate the source of the clinical signs. Biochemistry panels may show low blood protein levels and evidence of kidney malfunction or failure. Urine analysis may show increased protein in the urine, poor ability of the kidneys to concentrate the urine, or both. A joint tap and analysis of joint fluid may also be recommended.

Tests for antibodies to *B. burgdorferi* may be done on blood samples. Two tests may be run 2-3 weeks apart to determine whether the antibody levels are increasing. In dogs that have been vaccinated for Lyme disease, special tests may be needed to differentiate whether the antibodies are from the vaccination or from natural exposure to the bacteria. Dogs with positive antibody tests may not have clinical disease; they may only have been exposed to the bacteria.

Bacterial culture is not often practical but may be attempted. Skin biopsies from near the site of attachment of a tick may provide the best tissue to culture. Polymerase chain reaction (PCR)

tests for bacterial DNA may be done in some cases (when available) on biopsies of skin or joint tissue.

TREATMENT AND FOLLOW-UP

Treatment Options

Treatment is recommended when the history, clinical signs, and laboratory test results are consistent with possible Lyme disease. Doxycycline is the most commonly recommended antibiotic and is usually administered for 3-6 weeks. Doxycycline has anti-inflammatory properties that may also be helpful. Amoxicillin, given for 1 month, is also considered an effective treatment. Side effects of doxycycline and amoxicillin in dogs are usually limited to mild vomiting or diarrhea. These drugs are often given with food to decrease these side effects.

Nonsteroidal antiinflammatory drugs (NSAIDs) may be recommended to relieve joint pain. (See also the handout on **Immune-Mediated Arthritis**.) Side effects of NSAIDs include vomiting, diarrhea, and sometimes stomach or intestinal ulceration. Stop the medication and notify your veterinarian immediately if any of these problems occur.

Antibiotic treatment of dogs that are clinically healthy but have a positive screening test for *B. burgdorferi* is considered controversial. Dogs with kidney disease require specific treatment for that disorder in addition to antibiotic treatment. (See also the handouts on **Protein-Losing Nephropathy in Dogs** and **Acute Kidney Failure**.) NSAIDs must be used with caution in animals with kidney disease.

Follow-up Care

B. burgdorferi may be difficult to completely clear from an infected dog, and clinical signs may recur weeks to months after treatment. Treatment also does not protect the animal against reinfection. Vaccination may be recommended in some areas where Lyme disease is common.

Ticks should be removed from dogs each day during the tick season. Strict tick control is an important means of preventing exposure to Lyme disease. Sometimes it is recommended that dogs exposed to *B. burgdorferi* be periodically tested for protein in their urine.

Prognosis

Most dogs treated for Lyme disease have a good prognosis, although relapse, re-exposure, and reinfection are possible. Dogs with severe kidney disease attributed to Lyme disease have a poor prognosis.