Lyme Disease in Dogs - Testing

What is Lyme disease? How could my dog be infected?

Lyme disease is a systemic infection caused by a corkscrew-shaped bacterium called a spirochete. The bacterium is carried by several species of ticks, most commonly the Deer tick or blacklegged tick, and dogs become infected when they are bitten by an infected tick. The tick needs to feed on the dog for more than two days before infection occurs. The tick itself becomes infected by feeding on infected mice, birds, deer and other animals.

Where is Lyme disease found?

In the United States, Lyme disease has been reported in every state, but more than 95% of cases are from the Northeastern, Mid-Atlantic, and upper Midwestern states (Massachusetts to Virginia, Wisconsin and Minnesota), with smaller numbers of cases reported along the West Coast, especially Northern California. In Canada, Lyme-positive dogs are found mostly in southern Ontario and southern Manitoba, with smaller numbers of cases in southern Quebec and the Maritime provinces.

Does being outdoors put my dog at greater risk for catching Lyme Disease?

Yes. Dogs are more likely to be infected if they spend a lot of time outdoors in wooded areas where deer ticks are abundant, especially in deciduous (hardwood) forests that have moist sandy or loamy soil. This includes forested woodlands in the country as well as wooded areas in city parks.

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The risk of infection is greatest in the warmer months of the year from spring through autumn, when ticks are most active.

What should I do if I find a tick on my dog?

The tick should be removed quickly but carefully so that none of the tick's mouthparts is left in the dog's skin. If you have not done this before, or are not sure how to do this, then take your dog to a veterinarian to have the tick removed safely. The tick can be sent to the laboratory for identification; it can also be sent for further testing to see if it is infected with Lyme disease; this is done by DNA-PCR (see handout 'DNA-PCR Testing'). If the tick is an infected deer tick, then your veterinarian will suggest monitoring your dog for signs of infection or may recommend antibiotic treatment. Your veterinarian will also advise you about steps you can take to protect your dog against further tick bites using tick control products.
Can infection be spread directly from one dog to another dog or from my dog to my family?

Direct transmission of Lyme disease from one dog to another dog has not been reported, even when infected and uninfected dogs have lived together for long periods.

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What are the clinical signs of Lyme disease?

Some dogs do not show any signs of illness. In dogs that get sick, the signs may be vague and may not appear for several months after an infected tick bite. Younger dogs are more likely to show clear signs of illness than mature dogs. The most common clinical sign is lameness, but a small percentage of dogs develop severe, life-threatening kidney disease.

Lameness: Infected dogs may show sudden lameness involving one or more joints. Affected joints are swollen and painful, and the lameness may shift from one leg to another. Joint fluid collected from sore joints shows large numbers of infection-fighting cells called neutrophils. Other signs of infection include fever, lethargy and lack of appetite; some dogs develop enlarged lymph nodes. Routine blood work (see handouts on CBC and Biochemistry Profile) is usually not helpful in diagnosing the disease.

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The lameness often passes quickly by itself and, as a result, a dog may not get proper treatment. Although the lameness resolves, the dog remains infected and will continue to experience episodes of lameness, which may shift to different joints. This long-term infection may lead to progressive and permanent injury to the joints.

Kidney failure: A less common but more serious consequence of Lyme disease is sudden kidney failure, with protein loss in the urine. (See handout on Proteinuria). In some dogs, kidney involvement appears at the same time as lameness but in other dogs, it appears 3–6 weeks after an episode of lameness. Dogs with kidney involvement suddenly stop eating and become lethargic; they often vomit and lose weight. Routine laboratory tests on these dogs show abnormalities typical of kidney failure, including protein loss in the urine.
How is Lyme disease diagnosed?

The traditional blood tests for diagnosing Lyme disease have largely been replaced by two new tests called the C6 Test and Quant C6 test.

The C6 test is a preliminary blood test that detects antibodies against a very specific protein called C6; the presence of antibodies signals the presence of the bacterium that causes Lyme disease. These antibodies become detectable three to five weeks after an infected tick bite, and may be present before the dog shows signs of illness. The C6 test is combined with a group of tests that looks for other diseases that can also be transmitted by ticks or that can mimic Lyme disease. This group of tests, including the C6 test, comes in a kit called SNAP-3DX© or SNAP-4DX©; testing can be done by your veterinarian in-clinic or the blood sample can be sent to an outside laboratory for testing.

If the C6 Test is positive, what is the next step?

A positive C6 Test means antibody is present. The next step is the Quant C6 test, which determines if the level of antibody is high enough to require treatment. If treatment is needed, this initial Quant C6 value is used as the starting point for monitoring the dog's response to treatment.

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If the C6 test is positive, the veterinarian may also want to run a urine test to look for abnormally high levels of protein in the urine. A positive test for urine protein may signal the presence of the serious underlying kidney disease that can be found in some dogs with Lyme disease.

What is the treatment for Lyme disease?

The decision to start treatment can be influenced by a number of factors including:

- the amount of C6 antibody present (as measured by the Quant C6 test);
- signs of illness compatible with Lyme disease at the time of testing;
- a history of illness compatible with Lyme disease in the recent past;
- the presence of abnormal levels of protein in the urine.

Lyme disease can be treated with a variety of antibiotics, and most dogs show improvement within 24 to 48 hours of starting treatment. The duration of antibiotic treatment can vary, but usually the dog will receive antibiotics for up to 30 days.
How can I tell if treatment is working?

The dog's response to therapy can be assessed by repeating the Quant C6 test. If the level of antibody has dropped by 50% from the starting value, then treatment is considered to have been effective. If the value of the repeat Quant C6 has not dropped by 50%, then treatment is incomplete and may need to be continued; it may also mean the dog has become re-infected by a second tick bite.

Dogs that develop kidney failure and/or urinary protein loss will require additional supportive treatment for the kidney problem, in addition to the antibiotic treatment. The amount of treatment needed will be determined by the severity of illness, and may include hospitalization with intravenous fluid therapy and medications to reduce protein loss and high blood pressure.

Is treatment 100% effective?

Scientists are divided on this topic. Some studies suggest that that even long-term antibiotics may not completely clear infection; dogs may get sick again at some point after antibiotic treatment is stopped. Other studies suggest that complete clearance of infection is possible with antibiotic treatment. Further research is required to answer this question.

Is there a vaccine against Lyme disease?

There are several vaccines available. Not all dogs need to be vaccinated, and the decision to vaccinate would be influenced by the level of Lyme disease in your community, the amount of time your dog spends outside, and the potential for side affects from the vaccine itself. Your veterinarian is the best person to advise you about vaccinating your dog for Lyme disease. Previous vaccination does not interfere with the C6 or Quant C6 tests.

How can I prevent Lyme disease in my dog?

"After outdoor exercise, carefully inspect your dog's skin and hair coat to look for ticks."

The easiest preventive measure is a comprehensive tick control program. The use of commercial products to prevent tick bites can greatly reduce the risk of your dog catching Lyme disease. There are a number of effective products available, and your veterinarian can advise you which ones are best for your dog. In addition, after outdoor exercise, carefully inspect your dog's skin and hair coat to look for ticks. Prompt removal of ticks, before they are finished feeding, reduces the chances that Lyme disease will be transmitted to your dog.

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