EastHill Veterinary Clinic

Tick Diseases:

—*lyme disease*

Lyme disease (borreliosis) is an infectious, tick-borne disease first recognized in dogs in 1985. It is caused by Borrelia burgdorferi, a type of bacteria called a 'spirochete.' The common deer tick Ixodes scapularis (formerly called Ixodes dammini) is the primary carrier of B. burgdorferi in the Northeast and upper Midwest. The tick Ixodes pacificus is the primary carrier in the western United States.

Although Lyme disease was first diagnosed in Connecticut in 1975, there is evidence that it has existed in wildlife for many years. Tissue samples taken from a white-footed mouse in Massachusetts in 1894 have now undergone DNA testing that show the mouse was infected with Lyme disease. Certain environmental factors have caused Lyme disease to be more prevalent in people in the twentieth century. Before 1900, the habitat in the East and upper Midwest was heavily deforested by early settlers. Deer and their associated ticks were greatly reduced. The reforestation of these areas and the resulting booming white-tailed deer population in these areas are probably a big factor in the increase in the incidence of Lyme disease. This coupled with increased awareness and testing capabilities has led to the greatly increased reporting of the disease.

Prevalence of Lyme Disease in the U.S. Where is Lyme disease found?

Despite the fact Lyme disease has been diagnosed in people from all 50 states, it is felt that they acquired the disease by traveling to endemic areas (areas where the disease is consistently present). Only a relatively small portion of the United States is endemic for the disease. However, all of the areas where Lyme disease is present are areas with high human and pet populations bringing the total number of people and animals that can be potentially exposed to a high number. In humans, 85% of cases have occurred in the eastern coastal states from Massachusetts to Virginia. 10% of the cases come from Wisconsin and Minnesota and 4% from California. All of the other states account for less than 1% of the disease.

Life cycle of the deer tick

The deer tick (I. scapularis) goes through several stages in its life cycle. In the spring, the eggs hatch into larvae. During the summer, a larva will feed on a small mammal such as a white-footed mouse. If the mouse is infected with B. burgdorferi, the larva can become infected. This infected larva will then winter over until the following spring when it becomes a nymph (and is still infected) and feeds on another small mammal or a deer, dog, or human. In situations where the nymph was not infected as a larva, it could become infected by biting an infected animal. The nymph then molts into an adult. The infected adult then feeds on a larger mammal such as a deer, dog, or human, and lays its eggs, which will hatch the following spring. In summary, a dog or person usually acquires Lyme disease through the bite of an infected nymph or adult tick.

How is Lyme disease transmitted?

For a nymph to transmit B. burgdorferi, it must be attached to the host for about 48 hours. If a tick dies or is removed before 48 hours, transmission of the bacteria will not occur. Even if a tick is a carrier of B. burgdorferi and it attaches to a dog for more than 48 hours, the dog may not contract the disease. In fact, studies show that only around 10% of dogs that are exposed to B. burgdorferi will contract the disease. There is no evidence to suggest that infected dogs pose a risk to other members of the household except as a reservoir of infected ticks. Once a tick has had a full meal, it will detach and not bite another mammal. The risk comes from ticks that have not gotten a complete meal and are detached. They could possibly seek out a human and bite them causing infection.

What are the symptoms of Lyme disease in dogs?

The symptoms of Lyme disease in dogs differ from those in people, and usually occur much later after the tick bite. Clinical illness in dogs usually occurs 2 to 5 months after a bite from an infected tick. Cats can develop Lyme disease, but it occurs rarely in them, even in endemic areas. Other domestic animals such as horses have contracted Lyme disease, but it does not appear to be a significant problem. Dogs show several different forms of the disease, but by far, the most common symptoms are a fever of between 103 and 105°, lameness, swelling in the joints, swollen lymph nodes, lethargy, and loss of appetite.

Although not common, some dogs have developed severe progressive kidney disease as sequelae to Lyme disease. This severe kidney failure is difficult to treat and may result in death of the dog. It is recommended that a dog with a positive Lyme antibody test have additional blood tests and a urinalysis to assess kidney function. Some dogs may also develop heart problems or nervous system disease after being infected with B. burgdorferi. Dogs do not develop the typical rash or the circular area of redness around the bite (erythema migrans) which is seen in people.

How is Lyme disease in dogs diagnosed? Four Criteria For Diagnosing Canine Lyme Disease

- History of tick exposure
- Typical signs and symptoms
- Antibodies against B. burgdorferi
- Prompt response to antibiotics

Blood tests are available to assist in the diagnosis of Lyme disease. The standard blood test detects antibodies made by the dog in response to infection with B. burgdorferi. Many dogs show positive test results, but are not actually infected with the disease. These animals have been exposed to the organism, but fought off the infection on their own. These animals will have antibodies to B. burgdorferi but not have the disease. Thus a single positive result means only that the dog was exposed. As mentioned earlier, only around 10% of the exposed dogs actually contract the infection.

The 'C6 antibody test' can distinguish between antibodies made as a result of exposure and those produced as a result of vaccination against Lyme disease. This simple test can be run in a veterinarian's office. As with the other antibody tests, however, the C6 test will not distinguish between exposure to Borrelia and actual infection.

Tests results must always be interpreted in combination with other information to obtain the correct diagnosis. Suspected animals should have a history of tick exposure, compatible clinical signs, and have a rapid response to antibiotic therapy. If an animal that is suspected of having Lyme disease does not clinically improve within 48 hours of starting antibiotic therapy, it is best to assume that it is not Lyme disease and other diagnostic tests would need to be done to find the source of the problem.

How is Lyme disease in dogs treated?

Treatment for Lyme disease is very straightforward and consists of using either a tetracycline or penicillin-based antibiotic. The two most commonly used are oral doxycycline or amoxicillin. A recent study showed that both antibiotics worked equally well. The antibiotics must be given a minimum of 14 days, but 30 days is recommended. However, some preliminary studies show that some animals may not even clear the organism after 30 days and will relapse once the antibiotic is discontinued. In these cases, the animal may have to be on the antibiotic for much longer. It appears that many animals may never completely rid themselves of B. burgdorferi despite antibiotic treatment. These animals may never show any further signs of the disease. Despite the fact that some animals may develop chronic infections, the vast majority of infected dogs respond rapidly and satisfactorily to doxycycline treatment. In some animals with severe arthritis, pain relievers may also be used in addition to antibiotics. The use of steroids in this disease is definitely contraindicated.

How is Lyme disease prevented in dogs?

Lyme disease is best prevented through tick control and vaccination. Prevention of Lyme disease involves the use of vaccination and tick control programs. Dogs who were infected once with B. burgdorferi can become reinfected, so they too need protection.

Vaccination: There are whole-cell killed vaccines on the market including Lymevax® by Fort Dodge and Galaxy® Lyme by Schering-Plough. Recombinant vaccines, such as Recombitek® Lyme by Merial and Pro-Lyme® and ContinuumTM Lyme by Intervet, are also available.
Some veterinarians have criticized the ineffectiveness of the Lyme vaccines and do not recommend their use. Although many dogs have been vaccinated and treated for Lyme disease, some vaccinated animals contract the disease, but it appears that vaccinated animals are less likely to contract the disease than unvaccinated animals. Vaccinations can be started after 12 weeks of age and it is recommended that two doses be given three weeks apart, then boostered yearly after that. Because of the inherent problems of over-vaccination, it is recommended that only dogs that are exposed to ticks in areas where Lyme disease is a problem be vaccinated.

Tick Control: Tick control is probably the most important thing an owner can do to prevent Lyme disease in their pet. Ticks carry many other diseases besides Lyme disease and by preventing them from attaching to your pet, we can prevent all of these diseases. Avoiding areas of high tick infestation during periods when ticks are active is one of the best ways to avoid contact.

Using insecticides on the dog that repel ticks is another method. With the advent of once-a-month topical insecticides, tick control has become a lot easier and more effective. Permethrin, which is an ingredient in Bio Spot® Spot On® for Dogs and K-9 Advantix®, is a very good repellent, and if the tick attaches itself to the animal it will die within 12 hours preventing the passage of the B. burgdorferi. (Permethrins should NOT be used on cats.) Frontline®, containing fipronil, also control ticks. Very few tick collars are effective with the exception of a collar that contains amitraz. Amitraz is an organophosphate that is very effective at repelling and killing ticks, but has little effect on fleas. Often using a once-a-month topical product along with a Preventic® Collar provides the best protection.

Removing a Tick: If you find a tick on your dog, do not panic. Check out our article How do I Safely Remove a Tick? Ticks carrying Lyme disease are very small and most people never see them.

Summary

The tick-borne spirochete Borrelia burgdorferi causes Lyme disease. It

often causes symptoms of lameness and fever. It is very treatable with antibiotics. There are vaccines available for dogs. The human Lyme disease vaccine has been discontinued. Preventing tick attachment is one of the best ways to control the disease.

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Desire any more information, please don't hesitate to give us a call or jot us an email. We will be glad to help you and your pet in the best possible manner.

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