

Lyme Disease

Lyme disease is caused by the spirochete organism, *Borrelia burgdorferi*, which is transmitted to mammals (including horses, dogs, goats, and humans) via tick bites. The species of tick that transmits Lyme disease is the deer tick (*Ixodes spp.*),



whose lifecycle includes wildlife hosts such as deer and the white-footed mouse. In order to infect its host with Lyme disease, the deer tick has to be attached to the skin for at least 24 hours. Although horses do not display the characteristic red circle surrounding the bite that is seen in humans who are infected with the spirochete, they can frequently show noticeable swelling at the site of the tick bite.

The clinical signs attributed to Lyme disease in horses are generalized stiffness, lameness that shifts from leg to leg, low fever, changes in attitude or behavior, lethargy, swollen joints, muscle tenderness, uveitis, and hyperesthesia (being abnormally sensitive to normal stimuli). These signs range from quite subtle to very noticeable, depending on the horse, the severity of infection, and the level of work. Some horses may display no clinical signs when they are infected.

Lyme disease has become very common in New England, with as many as 75% of horses carrying antibodies that indicate that they have been exposed to *B. burgdorferi* at some point in their lives¹. For this reason, testing for Lyme disease involves two different tests: An antibody titer (ELISA/ KELA), which tells us how many antibodies the horse has to the disease at the moment of the test, and a Western Blot, which compares the antibodies to those of a horse with confirmed Lyme disease. This is based on the theory that a horse that was exposed to the disease many years ago and no longer has active disease should have a lower number of Lyme-specific antibodies in their system than a horse that was exposed more recently, and has an active infection. The complicated cases are those with antibody levels in the middle range, which could fall into either category. In these cases, we have to listen to the horse and let the horse's clinical signs guide us. If, for example, the horse has generalized stiffness and a history of lameness in multiple limbs which can not be explained by other causes (such as arthritis, back pain, etc), treating for Lyme disease often results in marked improvement during and after treatment.

One complicating factor in using this positive result to treatment to confirm that the horse was suffering from Lyme disease is the fact that doxycycline, the drug commonly used to treat Lyme disease, has recently been proven to have anti-inflammatory effects, similar to phenylbutazone (bute). Therefore, some horses who are suffering from conditions unrelated to Lyme disease may also improve while being treated with doxycycline. In most of these cases, this effect will stop when the drug is discontinued, whereas if the cause of the pain was Lyme disease, and treatment was

¹ Thomas Divers and Yung-Fu Chang, Lyme Disease. *Current Therapy in Equine Practice*. 6th Ed. Editors N. Edward Robinson and Kim A. Sprayberry, 2009.

successful, the positive effect of the drug will last even once the drug is discontinued. Unfortunately, getting Lyme disease is not like chicken pox in people – horses do not become immune to it, and with the high numbers of infected ticks in this area, many horses are re-infected by new ticks multiple times in their lifetimes.

There are two main treatments for Lyme disease currently in use. The most common treatment is oral doxycycline, which is an antibiotic. It is given twice a day for thirty days to months. Side effects to this drug are rare, but include diarrhea and depression. A large dose of the drug is necessary, because only a small amount of it is absorbed by the horse's intestines. Some horses do not respond to oral doxycycline, which may be due to their inability to absorb the drug. The more direct treatment method is to inject the affected horse with tetracycline through an intravenous catheter. This causes the drug to go directly into the bloodstream and eliminates the variability of absorption. After the 3-week course of IV medication, the horse is then treated with a full course of doxycycline.

There are several things horse owners can do to protect their horses against Lyme disease. Unfortunately, there is currently no vaccine for horses, so prevention strategies are based on preventing tick bites and removing ticks regularly to prevent transmission of Lyme disease from tick to horse. Strategies to prevent tick bites include spraying the horse's tail, hooves, and legs with tick-repellant sprays such as Frontline Spray (labeled for use on dogs, not horses, but widely used with no known side effects) or citronella oil, and tying rags soaked in citronella oil from the horse's halter when it is turned out. Ticks usually climb onto the horse from the grass, and if the parts of the horse offered to climb on are made unappealing, they may wait for a less protected host. It is also important to check the horse daily for tick bites, and remove any ticks as soon as they are discovered. The undersides of the jaw, throatlatch, tail and underside of the horse (elbows, flanks, etc) are the most common sites for tick bites. If Lyme disease is suspected, early testing and treatment are important and improve the chances for a full recovery. In this Lyme endemic area, it is advisable to have a baseline titer drawn when your horse is asymptomatic so if he or she comes up positive in the future, it gives us some sense of length of time of infection.