Diagnosis and Prevention of Lyme Disease in Horses

Incidence

According to the Centers for Disease Control, Lyme disease is the most important, and most reported vector-borne disease in the United States today. Lyme disease affects horses, people, dogs and cats. Lyme disease is heavily concentrated in the Northeast and upper Midwest regions of the United States. The numbers of confirmed Lyme disease cases in humans and the numbers of ticks (*Ixodes* species) found to be infected with the bacteria responsible for causing Lyme disease, *Borrelia burgdorferi*, have risen steadily over the past 12 years in both New York State and in Pennsylvania and has spread geographically over both states. Our clinic has diagnosed and treated more Lyme disease and anaplasmosis (another disease transmitted to the horse by infected ticks, sometimes concurrently with Lyme disease) over the past 10 years as compared with any prior decade. Lyme disease in horses can be easily overlooked, treatment is prolonged and costly and treatment is not always 100% effective.

Signs of Lyme Disease in Horses

Not all horses infected with *Borrelia burgdorferi* develop any signs of the disease. A large number of horses with antibodies to this organism are apparently normal. Horses that develop Lyme disease show varying clinical signs such as low grade fever, stiffness, lameness in more than one limb, skin and muscle tenderness, poor performance, chronic weight loss, behavioral changes, and less commonly swollen joints, depression, difficulty swallowing, head tilt, encephalitis and uveitis (moon blindness). Poor performance may be the only clinical sign.

New Diagnostic Test

If your horse has any of the problems that are associated with Lyme disease, and other diseases and other causes of lameness and behavioral or training problems have been ruled out, then a blood test, the Equine Lyme Multiplex Assay is available only at Cornell University since 2012, and should be done.

This relatively new test for Lyme disease is able to detect infection 3 to 5 weeks after infection, earlier than any of the previously available tests with a higher accuracy. The Equine Lyme Multiplex Assay also aids in distinguishing between early and chronic stages of infection, and in distinguishing between antibody responses to vaccination as opposed to infection. This quantitative assay is also very helpful in evaluating success of treatment and success of vaccination.

Vaccination News

As you probably know, there is no vaccine currently licensed by the U.S.D.A. for use in horses for the prevention of Lyme disease. However, studies by Dr. Thomas J. Divers, et al., entitled Equine Lyme Disease: A Review of Experimental Disease Production,
Treatment Efficacy, and Vaccine protection published in 2003 and studies currently in process by Dr. Joseph Bertone, Professor of Equine Medicine, Western University College of Veterinary Medicine, have demonstrated safety and good antibody responses to one of the commercially available Lyme vaccines for dogs. According to Dr. Bertone’s survey of veterinarians who administered an unapproved canine vaccine with clients’ knowledge and consent, thousands of horses have been vaccinated safely.

At the 2014 Hambletonian Continuing Education Seminar last month, Dr. Bertone presented promising news from his ongoing study of 41 horses using the USDA approved canine *Borrelia burgdorferi* outer surface protein A (OspA only) vaccine. Thirteen horses were vaccinated with a double dose of canine vaccine under the skin of the neck. Thirteen horses were vaccinated with a single dose administered transdermally (within the skin), (1/2 ml per site) over the pectoral (chest) region. Three horses were not vaccinated at all. All horses in both groups tolerated vaccination well with no adverse reactions. All horses in both groups developed specific antibody production, a 3.2 to 176 fold increase in measurable OspA antibodies on the Equine Lyme Multiplex Assay. Antibodies to Osp A are generally undetectable in natural infection so that measurement is an excellent indicator of a good response to the vaccine. There were no differences in Osp A antibody protection between breed, sex, age or route of administration. The lack of difference between the routes of administrations suggests that the single dose given transdermally over the pectoral region elicits the same response as the double dose given under the skin of the neck.

Dr. Bertone’s study will continue testing his vaccinated horses every 90 days to identify the duration of the vaccine effect. So far at 132 days, the vaccine antibody levels are holding well. The next update will be presented at the American Association of Equine Practitioners Convention this December. Following the completion of this study, it is anticipated that the manufacturer of the vaccine will fund a challenge study, to show just how effective the vaccine is in preventing Lyme Disease in horses and what Osp A antibody titers are considered protective. In dogs, the vaccine given as directed is 100% protective against Lyme disease and in Dr. Diver’s study, not one of the ponies vaccinated at days 1, 20 and 82 became infected with Lyme disease when challenged with infected ticks one month after vaccination whereas all the ponies not vaccinated and similarly exposed to infected ticks became infected with Lyme disease.

**NPEC Recommendations**

Blood testing horses using the **Equine Lyme Multiplex Assay before vaccination** gives horses and horse owners’ multiple advantages. Doing so would 1.) identify horses with very subtle clinical signs of the disease that have gone previously diagnosed so that they could be appropriately treated, 2.) demonstrate exposure to *Borrelia* in your horses’ environment, and 3.) enable precise assessment of the effectiveness of (before and after) the vaccine in individual horses.

Blood testing prior to vaccination, although encouraged, will not be required. Testing after vaccination will be strongly recommended in order for clients to find out 1.) how
well their individual horses responded to the new vaccine protocol and 2.) how to
determine what booster interval is needed in individual horses. This data will be
confidentially shared (numbers only) with other horse owners and other researchers so as
to benefit many other horses.

A recent visitor to the NPEC website, Dr. Robert A. Ollar, PhD., has been in contact with
Dr. Johnson regarding her findings on the efficacy of the Lyme disease vaccination of
horses. Dr. Ollar serves on the Advisory Board of the Commonwealth of Pennsylvania,
Department of Health, Tick and Lyme Disease Task Force. We are honored that Dr. Ollar
is interested in our research and has asked Dr. Johnson’s input in preparation of a
presentation to the Task Force at a state-wide Medical Conference in Pittsburgh,
Pennsylvania. We will be pleased to supply Dr. Ollar with data and blood samples (at no
charge to clients) for a promising new genetic test for detection of Lyme disease in
humans and in animals that Dr. Ollar is working on.

Our clinic will do our part in facilitating this good cause by investing in a transdermal
injection device so that a single dose of the Osp A canine vaccine may be given at your
vaccination appointments rather than a double dose, thereby making the cost of the
vaccine available for half the cost. This savings over the cost of the initial vaccine plus
two boosters (one three to four weeks after the initial dose and the second booster three to
six months after the initial dose) will make the vaccine protocol affordable for many
more horse owners! In addition NPEC will provide all pre- and post- vaccination blood
testing with the Equine Lyme Multiplex Assay at discounted pricing.

Starting vaccination this fall will afford your horse(s) protection for the remainder of this
year’s tick season and maximal protection prior to the 2015 tick season!

Please email us ejohnson@nep.net if you are interested in the use of the OspA canine
Lyme vaccine in your horse and would like to get started or if you have any additional
questions.