

Leptospirosis

by: Liza Holland

Don't overlook this "bug" that can cause abortion and uveitis (moon blindness).

Many horse people don't know that much about leptospirosis. If you have heard of it, it is probably in reference to cattle, other livestock, or maybe dogs. However, leptospirosis does affect horses, and it can be the cause of some serious health problems, including abortion in pregnant mares and chronic uveitis (moon blindness). It is a disease that has not been studied much in the horse, but several scientists have been calling for further research and for the development of an effective equine vaccine.

What is it?

Leptospirosis is a zoonotic (transmitted between animals and man) bacterial disease found worldwide that can affect any mammalian species, including humans, wildlife, rodents, livestock, and, yes, horses. The disease is caused by leptospire, which are motile (capable of moving) bacteria called spirochetes. Leptospire are subdivided into serovars and serogroups (subgroups). Those of importance to the horse include *pomona*, *grippityphosa*, *hardjo*, *bratislava*, *canicola*, and *icterohaemorrhagiae*. They are very common in both domestic and wild animals.

Craig Carter, DVM, PhD, director of the University of Kentucky's Livestock Disease Diagnostic Center (LDDC) and professor of epidemiology, College of Agriculture, tells us horses become infected through mucous membranes of the eyes or mouth and sometimes through broken skin by contact with infected urine, blood, or tissues. Horses can become infected by eating hay or grain that has been contaminated by infected urine, or they can contract it by drinking from standing water that has been similarly affected. In some cases horses are affected by the direct splashing of infected animals' urine into the eyes or mouth.

The incubation period for leptospirosis in horses is one to three weeks. Horses might experience a variety of clinical signs, including fever, loss of appetite, swelling of the eyes, light sensitivity, tearing, ocular discharge, eye cloudiness, and redness around the eye, as well as lethargy and mid- to late-term abortion. Adult horses have been known to develop jaundice and even die from kidney and/or liver failure. Diagnosis of leptospirosis can often be overlooked because the clinical signs of the disease are common to other diseases. Only laboratory tests of blood or urine can confirm if leptospirosis is present.

WAYS OF GETTING LEPTOSPIROSIS

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Another unique factor in this disease is that the bacteria seem to cluster in different parts of the body, such as the eye, kidney, liver, or reproductive tract. An article on leptospirosis-induced uveitis in Cornell University's newsletter recommends "prompt treatment, which may include steroids, antibiotics, and medications to dilate the eye."

Drugs of choice, according to Carter, are oxytetracycline, streptomycin, or penicillin. Although leptospirosis vaccines are available for dogs, cattle, and pigs, there are no approved vaccines for horses. Cattle vaccines have been tried in horses, but they are not proven to be effective and might produce negative side effects.

The primary conditions associated with leptospirosis in horses are chronic uveitis (moon blindness) and abortion. Chronic uveitis occurs when the leptospira bacteria enter the eye, creating an immune reaction. The clinical signs, as touched on above, are ocular inflammation, redness, cloudiness, tearing, light sensitivity, and strong muscle spasms closing the eyes. In severe cases, it can cause a calcification of the cornea, permanent blindness, atrophy (wasting away) of the eye, and glaucoma (an increase in intraocular pressure that can cause blindness). Leptospirosis-

induced uveitis is often a painful condition for the horse, and veterinarians recommend that treatment begin as soon as possible.

An Ontario Ministry of Agriculture, Food and Rural Affairs Fact Sheet discusses a variety of treatments, including steroids given topically or systemically to reduce inflammation. Atropine is recommended to dilate the iris, which will help relieve the muscle spasms, photosensitivity, and tearing.

German researchers isolated leptospire from the eyes of infected horses and were able to identify them as belonging to the *grippityphosa* subgroup and a few from the *australis* subgroup.

Equine abortions occur when the bacteria migrate to the uterus or placenta, then to the fetus, resulting in fetal death. Abortion is most often associated with the *L. pomona* subgroup infections. Some research suggests that leptospirosis infection is a vastly underreported cause of abortions.

Precautions and Preventions

So what can we do about leptospirosis? Prevention is the best option available at this point. Good management techniques at the farm can help reduce the risk of infection. Keep wildlife away from feed sources and do not allow standing water to accumulate (or at least do not allow the horses to drink from stagnant water sources). Standing water might be contaminated with leptospirosis-tainted urine from wildlife or cattle.

Good disinfection programs will help reduce the risk of exposure to leptospirosis (and many other diseases).

So why don't we have a vaccine for horses? Several factors contribute to the lack of a vaccine, with two topping the list.

The first is a lack of data to support the need for a vaccine. There have only been limited studies on leptospirosis in horses, most of which have been epidemiologic studies on a limited scale. No one really knows how many horses are affected each year, so it has been difficult to generate interest and funds to research the disease. For this reason you might consider donating money for leptospirosis research.

Second, there are many subgroups of leptospirosis that can affect horses. Researchers in Northern Ireland, including Professor William A. Ellis, found that horses were susceptible to far more strains than animals such as cattle and dogs. In other species, one serogroup is overwhelmingly present. In horses there are seven serogroups, and there was no clear indication which one(s) was (were) predominant. This might explain why the cattle vaccine is not particularly effective in horses, as cattle are affected almost exclusively by the *sejroe* serogroup.

Yung-Fu Chang, DVM, MS, PhD, Dipl. ACVM (veterinary microbiology), a professor in the department of population medicine and diagnostic sciences at Cornell University, has been developing an equine leptospirosis vaccine. His group has experimented with a DNA vaccine for leptospirosis.

Several scientists are working to place a national focus on leptospirosis. Recent Kentucky research from Carter and his colleagues has been at the forefront because it showed a significant number abortions were caused by leptospirosis in 2006 and 2007. The scientists diagnosed 41 cases of leptospirosis at necropsy using fluorescent antibody testing on fetal kidney and placental tissue. The predominant serovars found through antibody testing on the aborting mares' serum were *L. pomona* and *L. grippotyphosa*.

Carter feels that the number of cases diagnosed at the laboratory might represent just the tip of the iceberg. As many as five to 10 times more abortion cases might have occurred around the area.

In 2007 there was a follow-up survey conducted on economic loss of the affected farms. Less than half of the farms responded, but those that did reported \$3.5 million in lost revenues as a result of the abortions caused by leptospirosis. This is an indication of the economic impact a disease like this can have on a region like Central Kentucky, where a single foal can potentially mean millions in profit. Another study by K.B. Poonacha et al. in 1993 in *Veterinary Pathology* identified 67 cases of leptospirosis in 51 fetuses and 16 stillborn foals in Kentucky.

Current and Future Work

Carter presented the 2006-2007 data to the American Association of Veterinary Laboratory Diagnosticians annual meeting in Reno, Nev., in October 2007. This group comprises the leadership in laboratory medicine for animals in the United States. Carter and others are now studying 14 years of equine leptospiral abortion cases received by his laboratory to better understand the conditions under which horses are at a high risk, such as high rainfall. He hopes this and other studies will underscore the need for more research on equine leptospirosis and provide the impetus for development of a vaccine.

To that end, the University of Kentucky recently developed a working group combining the resources of area practitioners, the Livestock Disease Diagnostic Center, scientists at the Gluck Equine Research Center, and the College of Public Health's statistics resources to conduct an epidemiological study and a nationwide impact study of equine leptospirosis.

Take-Home Message

Carter urges owners and veterinarians to recognize leptospirosis as a disease that is here to stay. He also urges horse breeders to keep in mind that an abortion could be caused by leptospirosis, especially in a year with high rainfall or when wildlife have been present. Prevention includes minimizing contact between horses and wildlife/rodents, and especially keeping these creatures out of feed areas.

Make an effort to reduce stagnant water and recognize the risk of commingling horses with cattle and sheep, as the latter two could introduce infected urine into ponds and other standing water. If you have an abortion or a case of uveitis on the farm, send in samples of the affected horse's blood or urine (or fetus and placenta, in the case of abortion) for testing. Talk to your veterinarian about leptospirosis and work with him or her on collecting samples if you think it is indicated. Until we fully understand the epidemiology of this disease--which might be increasing in prevalence--the industry won't be able to develop a vaccine.