

Update on Canine Leptospirosis

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I recently had the pleasure of attending veterinary continuing education and seeing Dr. Richard Goldstein DVM DACVIM DECVIM-CA speak on canine Leptospirosis. He is a leading researcher on this emerging disease, and he presented some intriguing and useful information. For this article, I'll summarize his presentation on Lepto, and present some recommendations for disease prevention and treatment of infected dogs.

Leptospirosis is the number one zoonosis in the world! (A zoonosis is a disease that is transmitted from animals to people.) Most human cases are from contact with rat urine, and cattle and raccoons are also reservoirs of infection. Transmission occurs via contact with contaminated soil or water, or by direct contact with infected urine. The bacteria survive in the environment outside the host animal, but do not replicate outside the host. Warm, wet environments are ideal conditions for survival, and the highest numbers of cases occur in the late summer and fall. The amount of rainfall in the previous spring also correlates to the number of cases in a year. However, we don't have a good test for Lepto, and may miss cases. There are a number of different *Leptospira* serovars that cause clinical disease, but the treatment is that same for all.

Infection with Leptospirosis in dogs causes thrombocytopenia (low platelet count), vasculitis (inflammation of the arteries and veins), coagulopathy (difficulty with blood clotting), liver and kidney damage, and uveitis (inflammation in the eye). "Moon blindness" in horses is also caused by Lepto infection, but the disease is very rare in cats. Infected dogs may also vomit, drink and urinate excessively, and have glucose and protein in their urine, which indicates kidney damage. Most infected dogs do not have a fever.

Diagnosing Leptospirosis is often difficult. Urine and/or blood cultures are not practical methods of diagnosis, because the organism is very difficult to culture and requires a special medium. Additionally, a dose or two of antibiotics will cause a negative culture, even though the dog is still infected and sick. PCR (polymerase chain reaction) on blood and urine is the best way to diagnosis Lepto, as a positive test is a strong indicator of infection, but this test also must be done prior to giving the dog antibiotics. The most commonly used test is the MAT (microscopic agglutination test). A definitive diagnosis can be made with paired rising titers taken seven to ten days apart. A negative titer on the first test is just a baseline (it does not mean no infection), and a four-fold or greater increase distinguishes active infection from a vaccine titer. Titers drop quickly in dogs receiving antibiotic treatment. Many dogs do not receive a definitive diagnosis, and are simply treated for acute kidney or liver failure and a presumptive diagnosis of Lepto.

Treatment consists of intravenous fluids, antibiotic therapy, and supportive care for the kidney and/or liver damage and other manifestations of the disease. Antibiotic therapy is especially important to minimize organ damage, and to sterilize the urine to prevent spread of infection to other dogs or their human caretakers. Either injectable penicillin or ampicillin along with injectable Baytril, or oral

doxycycline (if the dog can stomach oral medication) for three weeks is considered the best course of treatment, but controlled studies are lacking. The concern is a carrier state in recovered dogs, who will continue to shed bacteria in their urine and spread the disease. Carriers can be diagnosed by urine PCR, and should be treated with a course of doxycycline. Environmental drying and iodine-based disinfectants are effective against the highly-infectious urine. The survival rate of dogs with acute kidney failure caused by Lepto that receive prompt treatment is approximately 80%.

Leptospirosis can be prevented by inoculation with a four-strain bacterin-based vaccine, but there are more than four serovars, and the currently available vaccines don't prevent infection from all of them. Puppies and dogs receiving their first Lepto vaccine need a booster two to six weeks after the first vaccine for it to be effective. Boosters are also recommended yearly because the vaccine **does not** have a good duration of immunity. Lepto is considered to be a "reactive" vaccine, although only about 1% of dogs suffer side effects. Small breeds of dogs are more likely in general to react to vaccination, and the four-strain Lepto vaccine is no exception. **However**, the two groups of dogs that have the highest prevalence of Leptospirosis are hunting dogs (due to exposure in the field) and toy dogs (because owners often skip vaccination due to concerns about reactions). Another concern is that the vaccine may promote the carrier state of the disease, but it has been demonstrated that this is not the case. While vaccination causes a low positive MAP titer, it does not cause a positive PCR test, and will not hamper diagnosis. Since dogs do not practice good hygiene, and often sniff and/or lick urine from other dogs or wild animals, annual vaccination with the four-strain Lepto vaccine is recommended to prevent this highly infectious disease.