

A DIAGNOSTIC LABORATORY UPDATE ON CANINE LEPTOSPIROSIS IN TEXAS

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OVERVIEW

At TVMDL we have been receiving numerous questions from Texas practitioners regarding canine leptospirosis. The purpose of this article is to present the epidemiology of this disease in dogs based on diagnostic laboratory submissions and test results in 2002. In addition, we have included an update on the tests that are available that aid in the diagnosis. Finally, the public health aspects of the disease are reviewed.

Until the mid-80s, leptospirosis in dogs was thought to be caused primarily by the serovars canicola or icterohaemorrhagiae. More recent studies have demonstrated that the serovars grippityphosa and pomona are becoming more common as causes of clinical leptospirosis than canicola or icterohaemorrhagiae. In another study, serovar bratislava was recognized as a cause of leptospirosis in dogs. TVMDL is seeing a similar profile of leptospirosis here in Texas.

Immunity to leptospirosis is known to be serovar specific. Because most bacterins on the market for dogs contain only the serovars icterohaemorrhagiae and canicola, many dogs may not be protected against the remaining serovars.

MATERIALS AND METHODS

In 2002, TVMDL received 405 clinical cases from clients requesting laboratory testing in which canine leptospirosis was one of the differentials. A total of 2014 tests were performed and reported. The analysis presented here is based on these cases and tests.

RESULTS

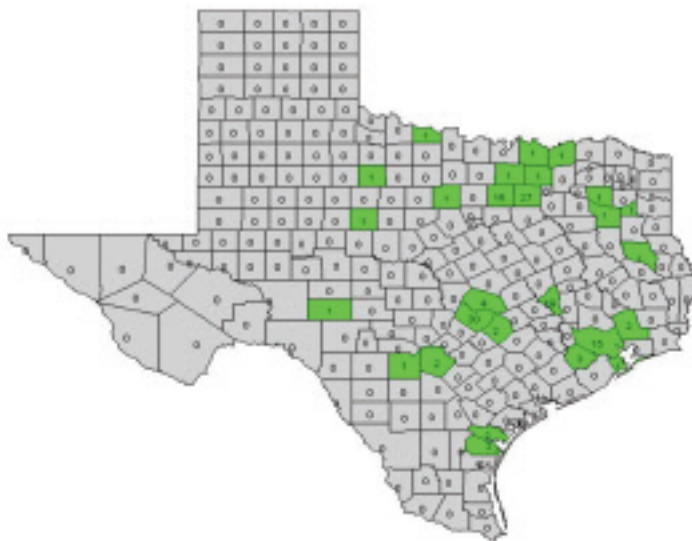
Demographics of animals with micro-agglutination titers (MAT) of 1:800 or greater

- Predominately large or hunting breeds but many miniature, small and medium breeds represented
- Median age 4.0 years (range 3 months to 11 years)
- 40% intact males, 19% intact females, 13% castrated males, 27% spayed females
- Six cases reported no vaccination for leptospirosis. The vaccination status of the rest of the animals was not reported.

Most common clinical signs and laboratory findings in animals with MAT titers of 1:200 or greater

PRESENTING SIGN	DOGS (N)	DOGS (%)
Elevated BUN, azotemia	26	25.5
Renal failure field diagnosis	22	21.2
Elevated serum creatinine	13	12.5
Anorexia	12	11.5
Vomiting	11	10.6
Elevated serum hepatic enzymes	10	9.6
Icterus	10	9.6
Lethargy	10	9.6
Not vaccinated for leptospirosis	6	5.8
Dehydration	5	4.8

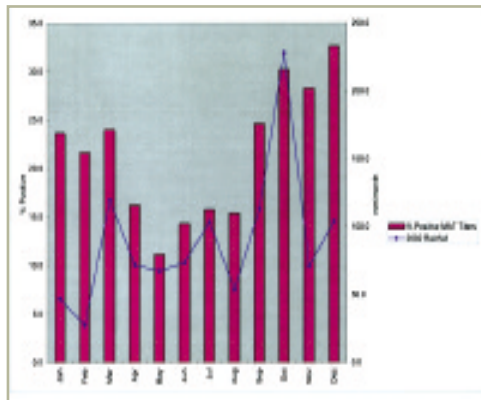
TVMDL Canine Leptospirosis MAT Titers 1:200 or greater
Calendar Year 2002



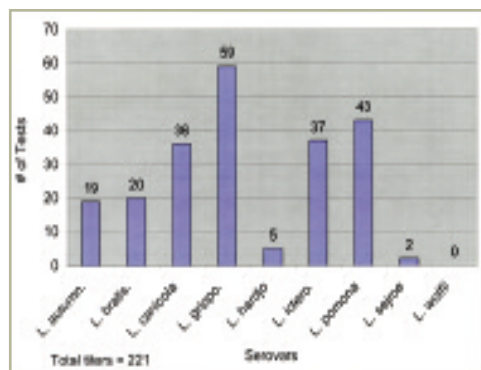
Geographic distribution and weather data for animals with MAT titers of 1:200 or greater

- 55% of cases submitted between September and December 2002
- Distribution is in central and east Texas.
- Over 60% of the rainfall in the geographic region where the positive titers were seen fell between September and December.
- The composite rainfall for this region in Texas was 16% above average for 2002. High MAT titers seems to correlate well with the increased rainfall.

Serological incidence of canine leptospirosis vs. composite regional rainfall, 2002

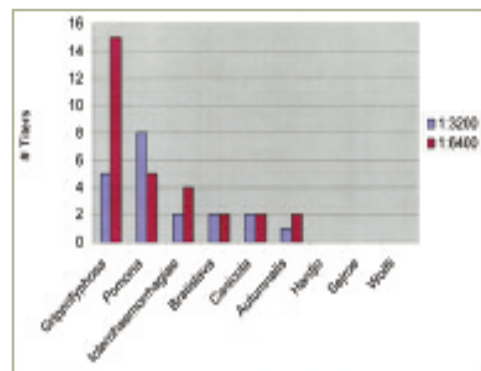


Leptospirosis serovars for all titers 1:200 or greater



Twenty-eight dogs had one or more MAT titers of 1:3200 or greater. The histories of 16 (57%) of this sub-group reported clinical signs of renal failure. Of these 16 cases, 9 (56%) had titers of 1:3200 or greater to serovar grippityphosa, 6 (38%) to serovar icterohaemorrhagiae, 2 (13%) to serovars bratislava and autumnalis, and 1 (6%) to serovars canicola and autumnalis. The chart below summarizes the MAT titers of 1:3200 or greater by serovar. Cross reactions among serovars is common.

Leptospirosis MAT titers 1:3200 or greater



PCR for *Leptospira* was run on 24 of the cases. There were three positives, one on a urine specimen and two on kidney specimens. The histories of two of the three cases referred to a clinical presentation of renal failure. Two IFA tests for *Leptospira* were run, and both were negative.

DISCUSSION

- Forty-four percent of the dogs (discounting non-reported breeds) were in the class of large or hunting breed.
- There appears to be adequate exposure potential to cause high MAT titers for the full range of breeds (miniature to large).
- The wide age range from very young to very old suggests that vaccination is indicated throughout the life of the animal.
- Fifty-nine percent of the dogs were represented by intact males and females and therefore more likely to roam and become exposed.
- Clinical signs and findings are typical of those seen in other studies.
- Over 5% of the animals were reported to have not been vaccinated for leptospirosis. It would be interesting to know how high this statistic really is in light of the expected under-reporting of history in diagnostic laboratory cases.
- The geographic distribution of positive titers in Texas is in the central and eastern portions of the state where the highest rainfall is expected.
- Most of the cases with titers were submitted during the highest rainfall periods in 2002.
- The two serovars with the highest incidence of titers of 1:200 or greater in this study are grippityphosa and pomona. Use of a four-way bacterin might be indicated based on this serological evidence.
- Titers of 1:3200 or greater correlated well with field diagnoses of renal failure by clinicians (57%).
- Fifty-four percent (15/28) of sera with titers of 1:3200 or greater to grippityphosa and pomona titers had no significant titers to other serovars.

PUBLIC HEALTH CONCERNS

Leptospirosis is a zoonotic disease that is found worldwide in people and animals. It is transmitted primarily by contact with leptospires on the abraded skin or mucous membranes. The organism is commonly found in bodies of water, moist soil or vegetation contaminated by the urine or tissues of infected animals. Swimmers can contract the disease in infected waters. Ingestion of food contaminated with the urine of an infected animal and inhalation

of contaminated aerosols of fluids are other possible routes of infection but are less common.

Vaccinated dogs can be asymptomatic and may still be shedding leptospires into the environment, thereby increasing the likelihood of exposure to humans and other animals. Leptospirosis screening of pets from animal shelters and other sources where the history of the animal is unknown might help to prevent the introduction of an infected and/or shedding animal into a household.

In July 1998, athletes from 44 states and seven countries participated in triathlons in Springfield, Ill. The Illinois Department of Health, the U.S. Department of Agriculture, and the Centers for Disease Control investigated an outbreak of acute febrile illness in which 110 of 1194 (9.2%) participants experienced chills, headache, myalgia, diarrhea, eye pain or conjunctivitis. The investigation indicated that *Leptospira* bacteria caused illness in some of the athletes exposed to Lake Springfield, where the Illinois triathlon was held.

In 1988, a 45-year-old San Antonio man experienced a throbbing frontal headache, diarrhea and fever for four days. He was employed as a meat-packing plant worker, and it was first thought that he might have contracted an infection at work. However, during an epidemiological investigation it was found that his two dogs at home had high MAT titers for three *Leptospira* serovars. The patient also had high titers to the same serovars, and it was concluded that his exposure was from the dogs at home. *Leptospira* had been cultured from the patient's urine specimens to further confirm the diagnosis.

In December 2002, a Beagle and a crossbred dog in Dallas tested by TVMDL had high MAT titers for leptospirosis. The wife of the owner of the dogs was later diagnosed by her physician as having leptospirosis. Close contact with infected pets is enough to transmit leptospires from pets to humans.

DIAGNOSTIC TESTING SUPPORT AVAILABLE AT TVMDL

MAT (Micro-Agglutination) Titers

This tests for serovars autumnalis, bratislava, canicola, grippityphosa, hardjo, icterohaemorrhagiae, pomona, sejiro and wolffii.

Specimen: 1 cc serum

Cost: \$1.00 per serovar in-state, \$1.20 out-of-state. Lepto 5 panel available for pomona,

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icterohaemorrhagiae, canicola, grippotyphosa and hardjo.

Turn-around and interpretation: In College Station, test is run Monday through Friday with results in two working days. In Amarillo, test is run Monday, Wednesday and Friday with results available the same day. Vaccination titers will likely be < 1:400; results of 1:1600 or > suggests a recent or current infection if not recently vaccinated; and results of 1:3200 or > along with clinical signs of leptospirosis likely signifies an infection.

PCR for Leptospirosis

This can detect the presence of the leptospira antigen but cannot identify a serovar.

Specimen: Fresh urine or kidney tissue

Cost: \$15.00 per specimen in-state, \$20.00 out-of-state

Turn-around and interpretation: Test is run Monday through Friday with results in five working days. A positive test indicates the presence of leptospire. PCR is more sensitive than the IFA test in detecting leptospire in urine.

IFA for Leptospirosis

Specimen: Impression smear of kidney or fresh kidney

Cost: \$6.00 per test in-state, \$8.00 out-of-state

Turn-around time and interpretation: In College Station, test is run Monday through Friday with results in two working days. In Amarillo, test is run Monday, Wednesday and Friday with results available the same day. This test is as good as PCR for detecting the presence of leptospire in tissues.

SUMMARY

Canine leptospirosis still appears to be endemic in Texas. Furthermore, the so-called "non-vaccinal" serovars of grippotyphosa and pomona appear to be important etiological factors in the disease. A bacterin is now available that immunizes against serovars icterohaemorrhagiae, canicola, pomona and grippotyphosa. Based on the age range of animals with high titers, vaccination with four-way bacterins by Texas practitioners for the life of the animal might be indicated. Finally, further studies should be done to ascertain if other serovars such as bratislava, hardjo and autumnalis might be of importance in canine leptospirosis.

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