Leptospirosis: an old dog with new tricks

Robert Shiel

In dogs, leptospirosis is classically associated with kidney and liver disease. However, acute leptospirosis can be associated with myriad signs including fever, vomiting, recumbency, cardiac arrhythmias, tachypnoea, bleeding tendencies, jaundice and oliguria or anuria. Polyuria, polydipsia, anorexia, meningitis, uveitis, rhinitis, tonsillitis, peripheral oedema, intussusception, pancreatitis, mild pleural or peritoneal effusion, abortion and signs associated with disseminated intravascular coagulation may also occur. Recent evidence suggests that *Leptospira* could be associated with chronic hepatitis in dogs. Acute, severe pulmonary disease has been described, due to interstitial pneumonia and pulmonary haemorrhage. Canine leptospirosis may cause polyuria and polydipsia with no other clinical signs and without the development of azotaemia, but this is likely rare.

There are no clinicopathological features that are pathognomic for leptospirosis, and changes are dependent upon the form of disease identified. The most appropriate confirmatory test is dependent upon the stage.

Tests may either detect the microorganism or the antibody response. Dark-field examination of wet-mount urine preparations can be performed. However, adequate numbers of organisms must be present, and experience is necessary to distinguish between leptospires and other urine components. Culture of leptospiral organisms is extremely slow, and this precludes the application of this test in most clinical settings.

Polymerase chain reaction (PCR) may be used to identify nucleic acid from pathogenic *Leptospira* serovars, but it will usually not identify the infecting serovar. Organisms will be identifiable in the early stages of illness, prior to development of an antibody reaction. During this phase, organism numbers are usually higher in blood. Later in infection, numbers are higher in urine. Administration of antimicrobial drugs may result in false-negative reactions.

Traditionally, the microscopic agglutination test (MAT) has been used to demonstrate an antibody response. Interpreting results can be challenging. Extensive cross-reactivity is common between serovars from the same serogroup; therefore, multiple positive reactions are commonly seen, and it is not possible definitively to identify the infecting serovar. With all antibody-based tests, vaccination may cause a positive reaction. As the MAT is dependent upon antibody generation, the test often remains negative for at least the first week of clinical illness. For that reason, measurement

of acute and convalescent phase titres is recommended. The classical response is a four-fold rise in paired samples taken 2–4 weeks apart. False-negative results may also be observed if the infecting serovar is not included in the laboratory's panel.

In more recent years, patient-side antibody-based tests have become available. In general, these may detect an antibody response earlier than MAT, but can be negative in acute infection, and false-positive results can occur (e.g. with vaccination).

Treatment involves supportive care and appropriate antibiotic therapy. Zoonotic potential should be considered, which usually results in barrier nursing and placement of an in-dwelling urinary catheter. In some cases, prolonged carriage can occur despite treatment.

KEY LEARNING OBJECTIVES

- Be familiar with the different presentations of canine leptospirosis
- Be able to select and interpret appropriate tests for the diagnosis of this disease
- Be aware of options for treatment and prevention

MULTIPLE CHOICE QUESTIONS

1. A dog presents with peracute onset of clinical signs compatible with leptospirosis. What single test is most likely to confirm the diagnosis?
(A) MAT
(B) PCR of blood
(C) PCR of urine
(D) Patient-side leptospiral antibody test
2. What is the most likely radiographic lung pattern in a dog with severe pulmonary changes associated with leptospirosis?
(A) Caudal or generalized reticulonodular interstitial pattern with patchy alveolar consolidation
(B) Perihilar or cranioventral alveolar pattern
(C) Vascular pattern with prominent pulmonary arteries
(D) Generalized bronchial pattern with possible bronchiectasis
3. A recently vaccinated dog presents with clinical signs compatible with leptospirosis. Amoxycillin clavulanate was prescribed 3–4 days earlier. What single test is most likely to confirm the diagnosis?
(A) MAT
(B) PCR of blood
(C) PCR of urine
(D) Patient-side leptospiral antibody test