



**ANTECH**  
D I A G N O S T I C S

# News

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## EHRlichia UPDATE

### EHRlichiosis

#### • Species

*Ehrlichia canis* was the first species known to infect dogs, and infection results in a variety of acute and chronic clinical and subclinical syndromes. *Ehrlichiosis platys* also infects dogs and may cause cyclic thrombocytopenia but minimal clinical illness. Several other Ehrlichia spp. infect dogs, the most common being *E. ewingii*, *E. chaffeensis*, *E. risticii*, and *E. equi*. Most regions of the world have Ehrlichia spp. In cats, *E. canis* and *E. equi* can cause natural infections, although other species of Ehrlichia can experimentally infect cats.

#### • Vectors

Tick transmission vectors for Ehrlichia spp. are usually *Ixodes* ticks with the granulocytic forms of ehrlichiosis and *Rhipicephalus*, *Amblyomma* or *Dermacentor* ticks with the monocytic Ehrlichia spp. In horses, *E. risticii* can be transmitted by ingestion of the trematode stages found in intermediate hosts such as aquatic insects and snails.

#### • Clinical Manifestations

A multisystemic disorder, ehrlichiosis is characterized by depression, lethargy, mild weight loss, and anorexia, both with and without hemorrhagic signs. If present, bleeding usually manifests petechiae, ecchymoses, gastrointestinal bleeding and/or epistaxis. Other less common signs include uveitis, polymyositis, polyarthritis, and central nervous system signs such as seizures, ataxia, vestibular deficits, and cerebellar dysfunction. Adult respiratory distress syndrome and acute renal failure also may occur in dogs as seen in humans. Many dogs are apparently exposed and seroconvert but never show clinical signs of the disease. Some animals harbor the agent for months or even years without developing illness. German Shepherd dogs may be predisposed to clinical ehrlichiosis. Most clinical manifestations of canine ehrlichiosis also have been described in cats.

#### • Laboratory Findings

Most consistently, the CBC will reveal thrombocytopenia and mild nonregenerative anemia in dogs and cats. Some infected dogs have normal platelet counts. Pancytopenia occurs in severe chronic phase disease from bone marrow hypoplasia. Granular lymphocytosis can occur and mimic well-differentiated lymphocytic leukemia. In about 1/3 of affected dogs, hyperproteinemia is reported. A polyclonal gammopathy is most common, but monoclonal or biclonal gammopathies have been seen in both dogs and cats.

#### • Serologic Diagnosis

In the dog, diagnosis usually is made by detecting specific antibodies by indirect immunofluorescent antibody (IFA) test. Serum ehrlichial antibodies can be detected as early as 7 days after initial infection but some dogs become seropositive only after 28 days. Thus, clinical signs of disease can occur before the development of serum antibodies in acutely infected dogs. In such cases of strongly suspected infection, the IFA test should be repeated in 2-3 weeks.

Cross-reactivity among Ehrlichia spp. is variable, and so *E. canis*-based antibody tests often fail to detect other Ehrlichia spp. The *E. canis* IFA test detects only ~40% of dogs infected with *E. ewingii*, and does **not** detect any *E. risticii*- or *E. equi*-infected dogs. The Idexx Snap 3Dx test does **not** detect dogs infected with *E. ewingii*, *E. risticii*, or *E. equi*.

The IFA test results are usually reported as a quantitative antibody titer. However, titer levels do **not** correlate with duration of infection or severity of disease. Experts believe that titers >1:80 should be considered positive. It is important to remember that in endemic areas, many healthy dogs have positive IFA titers to *E. canis*.

# EHRlichIA UPDATE (CONT'D.)

In the cat, a definitive statement about the utility of diagnostic ehrlichial serology cannot be made. For cats with clinical findings supportive of ehrlichiosis and seropositivity with *E. canis* or *E. risticii* reagents, treatment with antiehrlichial drugs is advised. Some cats found positive for *E. canis* DNA are seronegative by IFA.

## • PCR Testing and Western Immunoblotting

Due to the limitations of serological testing, PCR testing may play a more important role in diagnosing canine and feline ehrlichiosis. The PCR method is very sensitive for detection of ehrlichial infections in dogs. It is recommended that PCR testing be used in conjunction with IFA serology, and not instead of it, for the diagnosis of ehrlichiosis. Treatment is recommended for PCR positive dogs, even those that are subclinically infected, as they can decompensate, and develop clinical disease.

## • Treatment

Drugs used most frequently today to treat all Ehrlichia spp. are doxycycline and minocycline, although tetracycline and oxytetracycline are still used. Experts currently recommend doxycycline at a dosage of 10 mg/kg P O q 24 hr for 28 days. Dramatic clinical improvement is usually seen within 24-48hrs.

Doxycycline and tetracycline have also been used successfully at the same dosage in cats with presumed ehrlichiosis. Another drug that can be used is imidocarb dispropionate at 2 doses of 5 mg/kg IM given 2-3 weeks apart for dogs or cats. Enrofloxacin, used effectively to treat Rocky Mountain Spotted Fever, is ineffective in *E. canis* infection. As thrombocytopenia occurs in about 82% of dogs infected with *E. canis*, normalization of the platelet count is usually indicative of good response to therapy. Platelet counts begin to increase after 24-48

hours of therapy and are usually normal within 14 days. If resolution is **not** seen within 7 days of therapy, consider a diagnosis of immune-mediated platelet destruction or coinfection with *Babesia spp.* or *Bartonella*. Hyperglobulinemia will resolve gradually in 6-9 months if the organism has been eliminated. Serologic antibody levels will gradually decline and typically become negative within 6-9 months of therapy, although dogs with high serum titers can maintain them for longer periods, even years. Thus, monitoring IFA titers is probably not a very effective way to assess response to treatment. The PCR test may be more useful in distinguishing successfully treated dogs with persistently high IFA titers from unsuccessfully treated dogs.

## • Prevention

In endemic areas, strict tick control programs should be implemented for dogs and premises. Routine serologic screening of healthy dogs is generally not recommended, nor is treatment advisable for healthy seropositive, PCR negative dogs because of the potential for adverse effects and development of antimicrobial resistance. For introducing new dogs to an Ehrlichia spp. negative kennel, screening them by IFA is advised so that any seropositive dog can be treated with doxycycline as a precaution, before joining the rest.

There is minimal zoonotic risk for direct transmission of Ehrlichia spp. from dogs or cats to people. Dogs carrying infected ticks in endemic regions, however, could act as a reservoir host for transmission to people.

[Excerpted from the ACVIM Consensus Statement from the Infectious Disease Study Group, Neer, et. al, J Vet Int Med 16:309-315, 2002; with permission]

## Summary of Commonly Used Ehrlichia Tests\*

Test	Test Code	Sample Requirements	Comments
Ehrlichia canis IFA	T570	Serum: ¼ mL minimum	Detects antibodies against <i>E. canis</i> . <1:20 is negative titer, >1:80 is positive titer, titers between 1:20 and 1:80 are considered suspect. Single positive titer indicates exposure, <b>not</b> necessarily current infection. Demonstrating 4-fold rising titers in serum collected 3-4 weeks apart indicates acute infection. The <i>E. canis</i> IFA test does <b>not</b> cross-react with <i>E. equi</i> or <i>E. risticii</i> , but some cross-reaction occurs with <i>E. ewingii</i> (~40% of <i>E. ewingii</i> -infected dogs will have positive <i>E. canis</i> IFA tests).
Ehrlichia risticii IFA	S16270	Serum: 1 mL minimum	Detects antibodies against <i>E. risticii</i> . Single positive titer indicates exposure, <b>not</b> necessarily current infection. Demonstrating 4-fold rising titer in serum collected 3-4 weeks apart indicates acute infection.
Ehrlichia equi IFA	S16872	Serum: 1 mL minimum	Detects antibodies against <i>E. equi</i> . Single positive titer indicates exposure, <b>not</b> necessarily current infection. Demonstrating 4-fold rising titer in serum collected 3-4 weeks apart indicates acute infection.
Ehrlichia spp. PCR	7002	Whole blood in LTT, synovial fluid or CSF in LTT or RTT, splenic aspirate in LTT; ½ mL minimum	This is a "pan" ehrlichia PCR test and will detect infection with a variety of ehrlichia species. If the test is positive, the organism will be speciated to <i>E. canis</i> , <i>E. ewingii</i> , <i>E. equi</i> , or <i>E. risticii</i> . A positive PCR test indicates current infection with ehrlichia and treatment is warranted.

LTT, Lavender top tube (EDTA); RTT, Red top tube (serum)

\* Other Ehrlichia spp. can also be measured (call Lab)

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