

Imperial County Public Health Department



935 Broadway
El Centro, California 92243

Date: June 25, 2014

Subject: Rocky Mountain spotted fever detected in Imperial County

INFORMATION FOR VETERNARIANS

A local woman passed away last week due to Rocky Mountain spotted fever (RMSF). This is the first case of RMSF reported in Imperial County.

Rocky Mountain spotted fever is an important zoonotic disease that causes clinical illness in both dogs and humans. It is caused by the organism *Rickettsia rickettsii*, a small gram-negative obligate intracellular parasite. It is the most severe tick-borne rickettsial illness in the United States. But contrary to its name, RMSF is rare in the West; most cases occur in the Midwest and southeastern United States. Only 1 to 2 cases of RMSF are reported annually in California.

Preliminary laboratory testing has identified evidence of *R. rickettsii* in ticks and dogs associated with this case.

R. rickettsii is transmitted to the dog through the bite of an infected tick. Once inside the body, the organism undergoes a 2-14 day incubation period. The organism then invades endothelial cells of the venules and capillaries and begins replicating, causing a vasculitis. The replication of *R. rickettsii* and subsequent vasculitis may lead to edema, hemorrhage, shock, and vascular collapse. Endarterial organs (brain, skin, heart and kidneys) are affected most often. Vascular leakage also triggers activation of the animal's platelets and coagulation system.

Signs and Symptoms

Symptoms usually appear 4 or 5 days following a tick bite and almost always include:

- Fever (39.2°C [102.6°F] to 40.5°C [104.9°F]) and
- Severe lethargy

Other symptoms that may occur are:

- Petechiae and ecchymoses on oral, nasal, ocular, and genital mucous membranes
- Focal retinal hemorrhages
- Edema of the extremities and/or lips, pinna of ears, penile sheath, and scrotum.

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In late-stage disease or during recovery, symptoms may include:

- Necrosis (acryl gangrene) of the extremities
- Abdominal pain, vomiting, and/or anorexia
- Altered mental status (signs of depression, stupor)
- Myalgia and/or polyarthritis
- Vestibular deficits (circling, head tilt, or nystagmus)
- Dyspnea or cough

Such signs indicate more disseminated lesions, substantial organ edema, and a worse prognosis.

The most likely abnormal clinical laboratory findings are:

- Hypoalbuminemia,
- Moderate leukocytosis (minimal left shift)
- Thrombocytopenia

Platelet counts usually range from 25,000 to 250,000/ μ L. If hypoalbuminemia develops, it probably results from widespread damage to the vascular endothelium and subsequent intercellular leakage. In dogs that are examined primarily because of cough or dyspnea, thoracic radiography typically reveals diffuse interstitial densities (pneumonitis). Clinical RMSF may also resemble infection with *Ehrlichia canis*, which is also transmitted by the brown dog tick, although RMSF tends to be more severe.

Treatment

The antibiotic of choice for treating RMSF in dogs is doxycycline (10 to 20 mg/kg [4.5 to 9.1 mg/lb]). Mortality from RMSF is directly related to incorrect treatment, delayed diagnosis, or both. Appropriate antibiotic treatment promptly reduces the severity of illness only if they are given before tissue necrosis (thrombotic lesions) or coagulation disorders develop. Naturally acquired immunity most likely plays a role in limiting or protecting against clinical illness. Healthy dogs from endemic areas often possess anti-Spotted Fever Group (SFG) antibodies, possibly a result of prior *R. rickettsii* infection or exposure to nonpathogenic SFG rickettsiae.

Laboratory Confirmation

The gold standard serologic test for diagnosis of RMSF is the indirect immunofluorescence assay (IFA) with *R. rickettsii* antigen, performed on two paired serum samples to demonstrate a significant (four-fold) rise in antibody titers.

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The first sample should be taken as early in the disease as possible, preferably in the first week of symptoms, and the second sample should be taken 2 to 4 weeks later. Often the first IgG IFA titer is typically low or negative, and the second typically shows a significant (fourfold) increase in IgG antibody levels. IgM antibodies usually rise at the same time as IgG near the end of the first week of illness and remain elevated for months or even years. Also, IgM antibodies are less specific than IgG antibodies and more likely to result in a false positive. For these reasons, veterinarians requesting IgM serologic titers should also request a concurrent IgG titer.

Both IgM and IgG levels may remain elevated for months or longer after the disease has resolved, or may be detected in dogs that were previously exposed to antigenically related organisms. Because there is no widely available rapid laboratory assay to provide early confirmation of RMSF, specific antibiotic treatment decisions should be made on the basis of epidemiologic and clinical clues rather than awaiting laboratory confirmation.

Prevention

The best method to prevent RMSF in dogs is to prevent tick attachment. A topical or systemic tick-control treatment such as permethrin, fipronil, seasonal dips, or the use of impregnated collars containing amitraz or propoxur to prevent ticks is recommended. In areas with a high tick population and/or human cases of RMSF, regular applications of an acaricidal treatment to kennels and yards can reduce the number of ticks in a dog's environment. Brown dog ticks have also been found inside homes when dogs are permitted to come inside, and inside treatments from experienced pesticide technicians may be required to control infestations. Any ticks attached to dogs should be promptly and carefully removed using forceps or gloved hands. There are no anti-rickettsial vaccines available for use in either dogs or humans.

RMSF is one of the diseases in animals reportable to the Imperial County Public Health Department (ICPHD) as required by Title 17, section 2500, of the California Code of Regulations. This section requires routine reporting of the following suspected or confirmed animal diseases to the ICPHD: anthrax, brucellosis, tularemia, plague, rabies, and influenza (novel virus with pandemic potential), and if confirmed by laboratory diagnosis, leptospirosis, psittacosis, Rocky Mountain spotted fever, salmonellosis, tuberculosis, and arboviral encephalitis, or an outbreak of any disease or condition of unknown etiology which may be a danger to public health. The Confidential Morbidity Report Form for Animal Patients is available at: <http://www.cdph.ca.gov/pubsforms/forms/CtrldForms/cdph8572.pdf>

If you suspect a case, please contact the Epidemiology section of the Public Health Department at (760) 482-4723.

Reference

1. Arizona Department of Health Services: Rocky Mountain spotted fever – Information for Veterinarians. <http://www.azdhs.gov/phs/oids/vector/rmsf/veterinarians.htm>