

# Leptospirosis

## Medical Summary

### Introduction

Leptospirosis is an acute zoonotic illness that is caused by spirochetes belonging to the genus *Leptospira*; the disease occurs throughout the world. A vast range of animals, including amphibians, reptiles, and mammals, can be infected and become reservoirs when the microorganisms settle in the renal tubular epithelium, from where they are excreted with the urine for prolonged periods of time. The tissues of parturition of infected animals also contain large numbers of organisms. Although *Leptospira* are relatively labile organisms that die quickly in dry environments, they can persist for months in freshwater bodies and moist vegetation or soil.

### Epidemiology

Leptospirosis is considered the most widespread zoonosis worldwide, with a peak incidence during or immediately after rainy seasons. Most temperate and tropical areas of the world report transmission of leptospirosis, although reliable incidence figures are not available for many regions. Outbreaks in urban areas are frequently associated with the presence of infected rodents and dogs in the community, which serve as permanent reservoirs. The overall incidence in the U.S. is about 100 to 200 new cases per year, more than half of which occur in Hawaii. Intense precipitation, flooding, and tropical storms have been the background for several epidemics in the Caribbean and Central America, where walking through bodies of water has been significantly associated with contracting leptospirosis. Epidemics involving travelers have occurred among white-water rafters in Costa Rica and participants in the Eco-Challenge 2000 race in Malaysia, and an outbreak was reported among triathletes exposed to the waters of Lake Springfield, Illinois. Reported cases of leptospirosis among European travelers most commonly have been acquired in Southeast Asia, and leptospirosis is the most common cause of life-threatening infection in travelers going to that region. Of importance when considering the diagnosis of leptospirosis in a febrile returned traveler, the majority of these cases could provide a clear history of exposure to freshwater bodies.

### Mode of Transmission

Humans become infected with *Leptospira* through contact with contaminated freshwater, soil, or tissues of infected animals. Leptospire gain access to the body through skin lesions or abrasions, intact mucous membranes, or waterlogged skin after prolonged immersion. A small proportion of cases are acquired through inhalation of contaminated aerosols or ingestion of infected tissues. The disease is considered a zoonosis because humans usually do not become chronic carriers as do other animals, and human-to-human transmission is rare, if it occurs at all. The incubation period of leptospirosis ranges from 2 to more than 30 days, but most cases present 5 to 14 days after exposure.

### Risk Factors

Travelers going to endemic areas who engage in water sports (including rafting and kayaking) in natural freshwater bodies (particularly in developing countries), hiking, biking, or camping are at high risk for acquiring leptospirosis, especially during or soon after seasons of high precipitation. Similarly, persons staying at facilities where rodents are present in or around human habitation can become inadvertently exposed. Individuals whose work or hobbies expose them to animals or heavily contaminated environments (such as hunters, veterinarians, dairy farmers, slaughterhouse workers, rice farmers, and military personnel) are also at risk.

### Clinical Presentation

#### Typical

The severity of the clinical manifestations of leptospirosis is highly variable, ranging from minimally symptomatic (90%) to severe and potentially fatal cases (5%–10%). Classically, the clinical course of leptospirosis is divided into 2 phases. The acute (septicemic) phase is characterized by the abrupt onset of high-grade, remittent fever, chills, headache, severe myalgia,

conjunctival edema, and a variety of gastrointestinal symptoms. Rarely, some patients may develop a pretibial maculopapular rash during this phase. Because IgM antibodies are produced around 1 week into the illness, a short-lived defervescence occurs that marks the end of the septicemic phase. Subsequently, the immune phase begins, during which up to 80% of patients develop an aseptic meningitis syndrome, with intense headache, photophobia, ocular pain, and variable mental status changes. Other prominent features of this phase include hepatosplenomegaly, conjunctival hemorrhage, pulmonary insufficiency, and palpable purpura. Early in the disease, symptoms may be indistinguishable from malaria, dengue, viral hepatitis, or typhoid fever.

### Atypical

About 10% of patients with leptospirosis develop Weil's disease, a severe clinical syndrome that occurs after the septicemic phase and is characterized by rapidly progressive renal and hepatic dysfunction, with marked conjugated hyperbilirubinemia. Other manifestations include hemorrhagic pneumonitis, shock, and various cardiac arrhythmias. Although death from "typical" acute leptospirosis is rare, mortality associated with Weil's disease has been reported to be as high as 50%.

### Need for Medical Assistance

Because severe forms of leptospirosis can occur even after a typical, initially benign clinical course, travelers suspected of having been exposed to or become infected with leptospirosis should seek medical assistance whenever possible. Ideally, severe cases should be treated in a center with experience in handling such patients because serious reactions to the destruction of leptospire by antibiotics have been reported.

### Prevention

The main prevention strategy is to avoid exposure to potentially contaminated water, soil, and mud, as well as to animal tissues or urine. Bodies of water that represent the highest risk are those that have extensive populations of animals such as rodents, possums, raccoons, skunks, and foxes, which are known to be frequently infected. Although a vaccine exists for animal use that can be useful in reducing transmission to other animals and humans (especially in epidemic situations), limited experience with vaccination of humans suggests that the limited number of serovars in the vaccine elicits only a partially protective response.

*Preexposure chemoprophylaxis* with doxycycline 200 mg, orally, taken weekly can drastically reduce the risk of acquiring leptospirosis in individuals at high risk due to unavoidable contact with contaminated water or soil. Start the 200 mg weekly regimen 1 to 2 days before exposure and continue for as long as exposure continues. Although the trials supporting the efficacy of this regimen were conducted among military personnel destined for training exercises in the Central American jungle, chemoprophylaxis is currently recommended for outdoor adventure travelers who plan to engage in high-risk activities such as prolonged hiking, biking, or water sports in endemic areas, as well as for persons in areas of recent flooding.

*Postexposure chemoprophylaxis* with doxycycline (for those not taking preexposure chemoprophylaxis and with high-risk exposure in an area with previously documented cases) may be taken as:

- ┆ 1 dose of 200 mg, orally, if asymptomatic
- ┆ 100 mg, orally, twice per day for 7 days as empiric treatment, if mild symptoms consistent with leptospirosis exist

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