

An Ongoing Series

Leptospirosis

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ABSTRACT

Leptospirosis is caused by an infection with bacteria of the *Leptospira* species. These spirochetes are carried by a variety of wild and domestic animals. Humans can become infected with these bacteria; leptospirosis most commonly occurs in the tropics and subtropics. Military personnel are at risk of infection through deployment in the field.

KEYWORDS: *leptospirosis; tropics; subtropics; bacteria*

Background

Leptospirosis is caused by an infection with a tightly coiled, gram-negative spirochete bacteria of the *Leptospira* species. These spirochetes are carried by a variety of wild and domestic animals, including dogs, livestock, and rodents, and are shed into the environment through their urine. These bacteria can live for months in damp soil or fresh water in warmer climates.¹ Humans can become infected with these bacteria when they come into contact with infected animals or contaminated soil or water. Leptospire get into the human body through the eyes or mouth or via broken skin. Approximately 1 million people worldwide are infected with leptospirosis annually, causing an estimated 60,000 deaths.² Leptospirosis most commonly occurs in the tropics and subtropics (Figure 1). The exposure risk is higher for people who frequently have contact with moist soil or fresh water and increases after heavy rainfall or natural disasters. Recreational activities, including freshwater swimming, adventure races, and water sports, have been associated with outbreaks of leptospirosis. Military personnel are at risk of infection through deployment in the field, and outbreaks have been associated with jungle operations training.

Clinical Presentation

The majority of those infected with leptospire will have a brief self-resolving febrile illness or no symptoms at all, whereas others will become severely ill. Symptoms may occur between a few days to a month after exposure. For symptomatic patients, the initial phase of leptospirosis usually lasts 1 week

with fever, chills, headaches, cough, muscle aches, nausea, and vomiting. Muscular aches most commonly occur in the calves and lower back. The presence of reddened conjunctiva, sometimes with associated hemorrhage, is a distinctive finding of leptospirosis.³ Other illnesses to consider in the differential diagnosis include malaria, dengue, zika, influenza, and murine typhus.

The secondary phase of leptospirosis is caused by the immune system's response to the illness. Continued fever and inflammation of the meninges or eyes are most common during this phase. In 5% to 10% of patients, severe illness occurs and can include yellowing of the skin and eyes, kidney failure, bleeding in the lungs, brain or intestines, and abnormal heart rhythms.³ Renal and liver failure in combination as a result of a leptospirosis infection is known as Weil disease. Some patients will go into shock. The death rate of severe illness is 5% to 15%.³

Diagnosis

Use of both serological testing and cultures is ideal to diagnose leptospirosis. However, seroconversion alone demonstrating an increase in antibodies against leptospirosis is diagnostic. The patient's blood should be sent for serological antibody testing, performed at least 10 days apart. Samples of blood, cerebrospinal fluid and urine can be cultured to look for *Leptospira* and should be obtained before treatment with antibiotics if possible, but treatment should never be delayed if the diagnosis has been made clinically and testing is not readily available. Cultures require use of media specific to *Leptospira* with regular dark field microscopy and incubation for up to 16 weeks. If isolated in culture, leptospire can be identified with molecular or serologic testing. Negative testing results do not rule out the diagnosis of leptospirosis, especially if appropriate antibiotics were initiated early in the course of the illness.

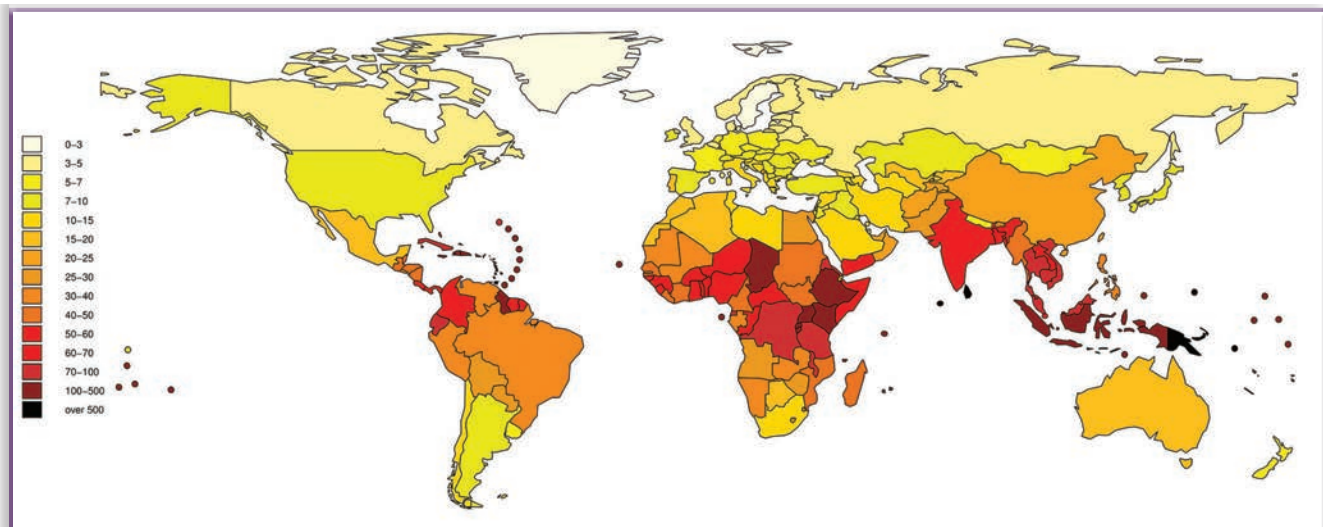
Treatment and Prevention

All patients with severe illness should be transferred to a higher level of care. Antibiotic therapy is sometimes effective

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FIGURE 1 The global burden of leptospirosis in disability-adjusted life-years.



Source: Wikimedia Commons. Torgerson et al. Global Burden of Leptospirosis. PLOS Neglected Tropical Diseases. <https://doi.org/10.1371/journal.pntd.0004122>

to improve symptoms in the initial phase but usually does not help with the secondary phase of illness. Mild illness can be treated with oral doxycycline (100mg twice daily) or amoxicillin. For patients with severe illness, IV penicillin, ceftriaxone, and doxycycline are equally effective and may decrease the duration of symptoms by 2 to 4 days.⁴ Sometimes patients will have worsened symptoms for about 24 hours after starting treatment with fever, headaches, and body aches due to the breakdown of leptospire. Like other spirochetal diseases, patients may display a more severe Jarisch-Herxheimer reaction when treated with appropriate antibiotics and should be closely monitored for shock, which will necessitate IV fluid boluses.

Avoiding exposure to possibly contaminated soil and water is the best method to decrease risk of infection. For high-risk situations, the use of oral doxycycline (200mg once a week) may prevent leptospirosis but often also causes nausea and diarrhea. A vaccination exists for dogs and livestock but not for humans.

While caring for patients with leptospirosis, regular hand-washing and gloves should be used in addition to avoiding contact with their urine.

Importance in a Deployed Setting

Infection with leptospirosis has been associated with military deployment and training exercises that involve increased and prolonged exposure to soil or freshwater (Figure 2). If avoidance of contact with possibly contaminated soil or water is not possible, protective clothing and prophylactic medication should be used to decrease the risk of infection.

Disclaimer

The views expressed in this publication are those of the authors and do not reflect the official policy or position of the Department of the Army, Department of Defense, or the United States Government.

FIGURE 2 US soldier participates in jungle operations training exercises on the island of Oahu, Hawaii.



Source: US Army

Disclosure

The authors have nothing to disclose.

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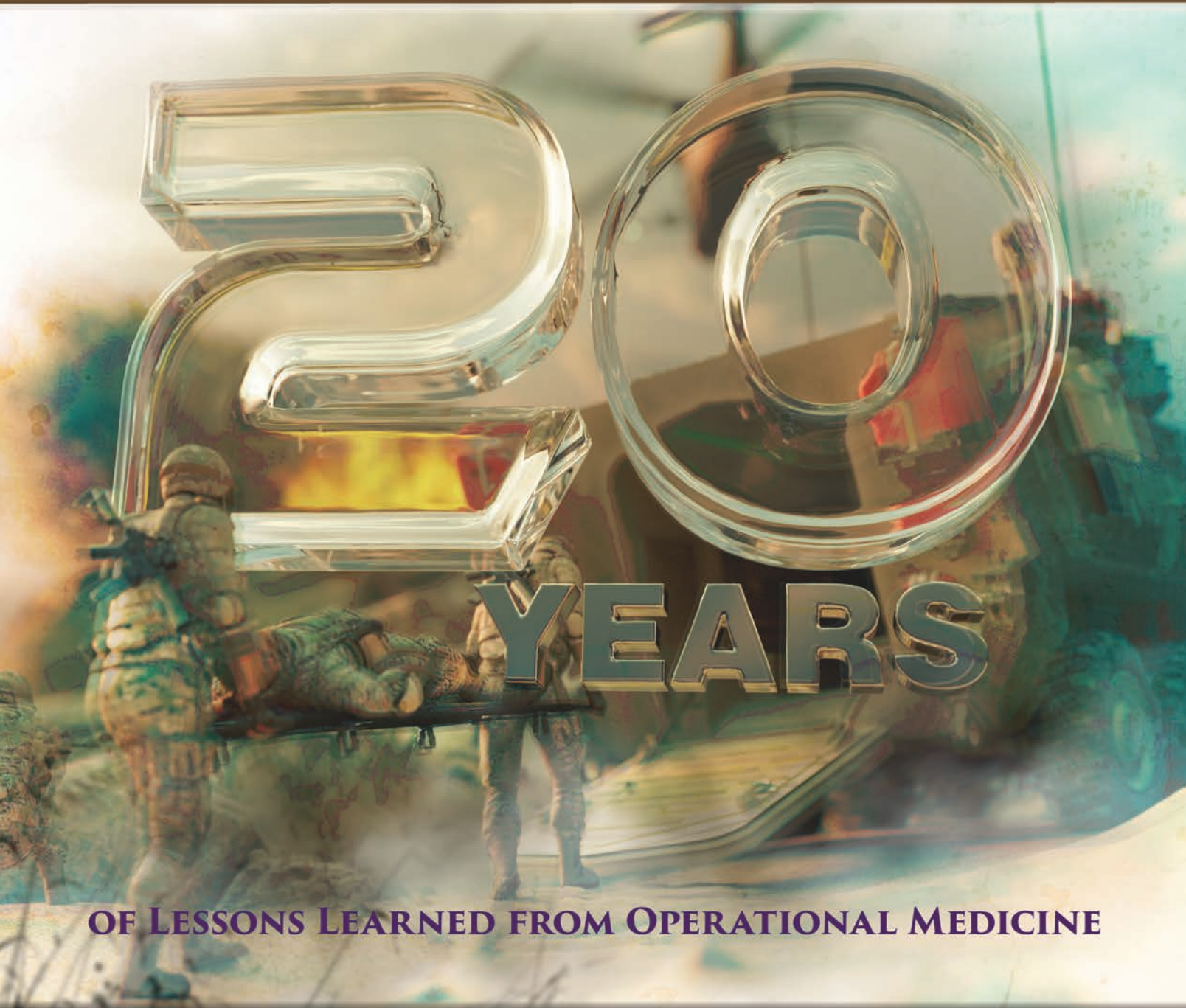
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