LEPTOSPIROSIS

Also known as: Weil Disease, Hemorrhagic Jaundice, Mud Fever, Swineherd Disease, Canicola Fever

Responsibilities:
Hospital: None.
Lab: None.
Physician: None.
Local Public Health Agency (LPHA): None.

Iowa Department of Public Health
Disease Reporting Hotline: (800) 362-2736
Secure Fax: (515) 281-5698

1) THE DISEASE AND ITS EPIDEMIOLOGY

A. Agent

Leptospirosis is a bacterial disease caused by the spirochetes of the genus *Leptospira.*

B. Clinical Description

Symptoms: consist of nonspecific constitutional symptoms of fever, chills, headache, severe muscle pain (calves and thighs), conjuctival suffusion (red, watery eyes), and malaise. Gastrointestinal tract symptoms and a rash can also occur. Asymptomatic infections can occur, and disease severity depends on the infecting serotype.

Onset: is usually abrupt with symptoms listed above.

Complications: Subsequently, the patient can have hepatic involvement (abnormal liver function tests, enlargement of the liver, jaundice, and liver failure), renal involvement (abnormal urinalysis, presence of nitrogen-containing compounds in the blood, and renal failure), cardiovascular involvement (hemolytic anemia, hemorrhage into skin and mucous membranes, and myocarditis), pulmonary involvement (with or without coughing up of blood), and central nervous system involvement (aseptic meningitis and altered mental awareness). Inflammation of certain muscle groups is common. Conjunctival suffusion, the most characteristic physical finding, occurs in about 30% of patients.

C. Reservoirs

Common reservoirs: Wild and domestic animals are the reservoir for leptospirosis. Many animals have prolonged leptospiruria without suffering from the disease themselves. The infection is common in rodents, livestock (cattle, horses, sheep, goats, swine), canines, and wild mammals.

D. Modes of Transmission

Spread: is by direct or indirect contact of nasal, oral, or eye mucosal membranes or abraded or traumatized skin with urine or carcasses of infected animals.

Urine: Indirect exposure through water, soil, or foods contaminated by urine from infected animals is the most common route. After a short period of circulating high levels of the spirochete in their blood, animals shed the spirochete in their urine, contaminating the environment. Inhalation of droplet aerosols of contaminated fluids can occasionally occur.

Person-to-person: transmission is rare.

E. Incubation period

The incubation period is usually 5-14 days, with range of 2-30 days

F. Period of Communicability or Infectious Period

Person-to-person transmission is considered extremely rare. Infected animals can spread the disease during the leptospiruria phase, which can be prolonged (1–3 months or longer). Humans with leptospirosis usually excrete the organism in urine for 4 - 6 weeks, but leptospiruria has been observed in humans and in animals for as long as 11 months after acute infection

G. Epidemiology

In the United States, 100–200 cases of leptospirosis are identified annually, with about 50% of the cases occurring in Hawaii. The disease is considered to be under-diagnosed. Although the incidence of disease in the United States is relatively low, leptospirosis is considered to be the most widespread zoonotic disease in the world, particularly in tropical areas with heavy rainfall and neutral or alkaline soils. The greatest numbers of cases are seen in the summer months after heavy rainfalls or periods of flooding.

Leptospirosis is an occupational hazard for people who work outdoors or with animals (for example, farmers, sewer workers, veterinarians, fish workers, dairy farmers, or military personnel). It is a recreational hazard for campers or those who participate in outdoor sports in contaminated areas, and it has been associated with swimming, wading, and whitewater rafting in contaminated lakes, farm ponds and rivers. Outbreaks have been associated with triathlons in the Midwest and extreme sports contests in Asia.

H. Bioterrorism Potential

None.

2) DISEASE REPORTING AND CASE INVESTIGATION

A. Purpose of Surveillance and Reporting

- To assess the magnitude of the disease in different areas and among different risk groups.
- To assess need for prophylaxis after high-risk exposures.
- To identify outbreaks as soon as possible.
- To identify animal sources of infection.
- To design more effective control or prevention methods.
- To assure proper diagnosis and treatment of those affected.

B. Laboratory and Healthcare Provider Reporting Requirements

Iowa Administrative Code 641-1.3(139) stipulates that the laboratory and the health care provider must report outbreaks due to leptospirosis. The reporting number for IDPH Center for Acute Disease Epidemiology (CADE) is (800) 362-2736

Laboratory Testing Services Available

The University of Iowa State Hygienic Laboratory (SHL) tests single serum samples for Leptospirosis utilizing agglutination. The Hygienic Laboratory will forward specimens to the Centers for Disease Control and Prevention (CDC) for additional testing. Accurate information about date of collection, date of onset of symptoms, travel history, vaccination and disease history are essential for test interpretation. For additional information on submitting samples or testing, contact the State Hygienic Laboratory at (319) 335-4500.

C. Local Public Health Agency Follow-up Responsibilities

Case Investigation

a. Case investigation Leptospirosis in Iowa residents will be directed by IDPH Center for Acute Disease Epidemiology (CADE).
b. Following notification of IDPH, the LPHA(s) may be asked to assist in completing an official IDPH investigation. Contact CADE for proper forms. Forms can be completed by interviewing the case and others who may be able to provide pertinent information. Most of the information required can be obtained from the healthcare provider or the medical record.
c. Use the following guidelines to assist in completing the investigation:
    1) Record "Leptospirosis" as the disease being reported.
    2) Record the case's demographic information.
    3) Record the date of symptom onset, symptoms, date of diagnosis, hospitalization information (if applicable), and outcome of disease (*e.g.,* recovered, died).
    4) Exposure history: use the incubation period range for leptospirosis (4 –19 days). Specifically, focus on the period beginning a minimum of 4 days prior to the case's onset date back to no more than 19 days before onset for the following exposures:
        a) Travel history: determine the date(s) and geographic area(s) traveled to by the case.
        b) Animal contact: ask the case about potential direct or indirect occupational or recreational exposures to animals. This information can then be documented in the "Comments" section.
    5) Complete the import status section to indicate where leptospirosis was acquired. If unsure, check "Unknown." Include any additional comments regarding the case.
    6) If several attempts have been made to obtain case information, but have been unsuccessful (*e.g.,* the case or healthcare provider does not return calls or respond to a letter, or the case refuses to divulge information or is too ill to be interviewed), please fill out the form with as much information as has been gathered. Please note on the form the reason why it could not be filled out completely.
d. After completing the form, attach lab report(s) and mail (in an envelope marked "confidential") to IDPH, Center for Acute Disease Epidemiology. The mailing address is:

    IDPH, CADE
    Lucas State Office Building, 5th Floor
    321 E. 12th Street
    Des Moines, IA 50319-0075

3) CONTROLLING FURTHER SPREAD

A. Isolation and Quarantine Requirements

None.

B. Protection of Contacts of a Case

There is no need for prophylaxis for contacts of a case. Since a patient with leptospirosis usually excretes the organism in urine for 4 to 6 weeks, proper precautions (gloves, handwashing, etc.) should be used when handing urine or any articles soiled with urine.

C. Managing Special Situations

Reported Incidence Is Higher than Usual/Outbreak Suspected

If an outbreak is suspected, investigate clustered cases in an area or institution to determine source of infection and mode of transmission. A common vehicle, such as contaminated water, should be sought and applicable preventive or control measures instituted. Consult with CADE at (800) 362-2736.

D. Preventive Measures

Environmental Measures

To prevent illness, prevent contamination of living, working and recreational areas by urine of infected animals.

- Control rodent populations in areas of human habitation.
- Domestic animal owners should take necessary precautions to minimize their animal's potential contact with wildlife (*e.g.,* do not feed pets outside or allow animals to roam unsupervised).
- Do not allow animals to urinate in or near ponds or pools.
- Keep animals away from gardens, playgrounds, sandboxes, and other places children may play.
- Among domesticated animals, vaccination of swine, cattle, and dogs is effective in preventing symptoms of disease, but it does not protect completely against infection and shedding of organisms in the urine.

Preventive Measures/Education

To prevent leptospirosis, the public may need to be educated on how the disease is transmitted and the importance of proper food storage and garbage disposal. The public should also be counseled to minimize their contact with fresh water, mud, and vegetation that might be contaminated with the urine of infected animals. If their occupation or recreational activities require such exposure, education on use of personal protective measures (*i.e.,* proper clothing, footwear and gloves) should be given. Additional preventive measures include:

- Always wash hands thoroughly after touching items potentially soiled by an animal's urine.
- Use an antibacterial cleaning solution or a solution of 1 part bleach in 100 parts water to clean areas or items soiled by the animal's urine.
- Doxycycline is effective post-exposure prophylaxis (200 mg/once a week) and should be considered for high-risk occupational groups during periods of high exposure. (See Section 1)G. at the beginning of this chapter for examples of high-risk occupations.) However, indications for doxycycline use in children have not been established. There is no licensed vaccine to prevent leptospirosis in humans.

4) ADDITIONAL INFORMATION

The Council of State and Territorial Epidemiologists (CSTE) surveillance case definitions for Leptospirosis can be found at: www.cdc.gov/osels/ph_surveillance/nndss/phs/infdis.htm#top

CSTE case definitions should not affect the investigation or reporting of a case that fulfills the criteria in this chapter. (CSTE case definitions are used by the state health department and the CDC to maintain uniform standards for national reporting.)

References

American Academy of Pediatrics. *2003 Red Book: Report of the Committee on Infectious Diseases, 26th Edition*. Illinois, American Academy of Pediatrics, 2003.
Heymann, D.L., ed. *Control of Communicable Diseases Manual, 20th Edition.* Washington, DC, American Public Health Association, 2015.
CDC Web site. www.cdc.gov/nczved/divisions/dfbmd/diseases/leptospirosis/