EDITORIAL COLLABORATION

World's Most Widespread Zoonotic Disease Poses New Risks

Focus on Leptospirosis

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Leptospirosis: The Most Widespread Zoonotic Disease

Emerging diseases are always a concern for clinicians. But, in addition to new diseases, existing diseases may sometime reemerge as significant public health threats. New information tells us that this may be the case with leptospirosis.

Leptospirosis is a bacterial disease that affects humans and animals. Caused by bacteria of the genus *Leptospira*, it is considered the most widespread zoonotic disease in the world and is most commonly found in tropical or temperate climates.

The disease is spread through the urine of infected wild and domestic animals, including dogs, cattle, pigs, horses, and rodents. People can get the disease when they are exposed to the urine of infected animals or soil, water, or food contaminated with the urine of infected animals.

In humans, leptospirosis can cause a wide range of symptoms, but it usually presents as an acute febrile illness that might be mistaken for other diseases. Some infected persons, however, have no symptoms at all.

Although some diseases can be prevented through vaccination, there is no human leptospirosis vaccine licensed for use in the United States. When infection occurs, however, antibiotics (such as doxycycline or penicillin) can provide effective treatment. For maximum effectiveness, antibiotics should be given early in the course of the disease. Without treatment, leptospirosis can lead to kidney damage, meningitis, liver failure, respiratory distress, and even death.

What's New in the United States: Increasing Cases and Risk Groups

Traditionally, cases of leptospirosis have been associated with occupations that require close contact with animals, such as farmers, slaughterhouse workers, veterinarians, and animal caretakers. But, according to new data, reported cases are increasing in some states, and new groups of people may be at an increased risk for the disease.

Of note, recent trends in Hawaii represent a situation that could be happening all over the United States. From 1999 through 2008, the annual incidence in Hawaii was 1.63-2.85 per 100,000 people. This is a significant increase from the mean annual incidence of 1.29 per 100,000 people documented in Hawaii from 1974 to 1998.[1]

In addition to increasing incidence, new risk groups have been identified. Although traditional occupational groups remain at risk, infections among people who raft, kayak, and swim in fresh water (including triathletes and adventure racers) have become more common. For example, in 1998, an outbreak occurred in Illinois and Wisconsin among triathlon participants from 44 states and 7 countries. Of the participants, 90 had symptoms of leptospirosis and 30 cases were laboratory-confirmed.[2]

Another outbreak occurred in 2005 among participants of an adventure race in Florida. Among participants from 32 US states and Canada, 44 suspected and 14 laboratory-confirmed cases of leptospirosis were identified.[3]

Urban children have also emerged as a risk group. A Detroit study showed that inner-city children had a significantly higher incidence of antileptospiral antibodies than did suburban children, even though none of the inner-city children had been diagnosed with leptospirosis. The findings reinforced the results of a previous study, which found that 16% of serum samples from patients at an inner-city clinic were positive for exposure to leptospires, suggesting that unrecognized leptospirosis may be common in US cities.[4]

Unrecognized urban cases are probably related to exposures to rat or dog urine. In many urban areas, social and economic conditions might lead to more persistent exposures to these reservoirs, possibly establishing an environment in which the disease could become endemic.

Identifying Suspected Cases of Leptospirosis

Even outside of particular risk groups, leptospirosis is thought to be underdiagnosed. Generally, this is the result of the protean nature of its clinical presentations, the difficulty of distinguishing leptospirosis from other undifferentiated febrile illnesses, and delayed results from clinical testing.

Disease onset is typically 2 days to 4 weeks following exposure. About 90% of infections are subclinical or self-limited mild disease. Approximately 10% of infections, comprising the majority of recognized cases, are characterized by abrupt onset of fever, headache, muscle aches, vomiting, or diarrhea. Infected patients may experience a biphasic illness, with a short recovery period after the first week of illness followed by more severe symptoms.[5]

Approximately 10%-15% of patients with clinical disease experience severe leptospirosis, a high-mortality syndrome with multiorgan involvement, such as kidney failure, liver failure, pulmonary hemorrhage, or meningitis.[5] Because many symptoms can be mistaken for other acute febrile illnesses, use of laboratory diagnostics can help identify and treat patients with leptospirosis.

Confirmation of Leptospirosis Through Laboratory Testing

Leptospirosis is confirmed by laboratory testing of blood, urine, serum, or other clinical specimens. Many diagnostic methods are available to diagnose leptospirosis, including culture, microscopic agglutination test (MAT), immunofluorescence, darkfield microscopy, other serologic tests, and real-time polymerase chain reaction (PCR).

The MAT is considered the gold-standard serologic test to confirm leptospirosis. Because it is a difficult test to maintain, CDC is the only laboratory in the United States that offers the MAT for leptospirosis. Serum samples should be obtained at least 10-14 days apart (acute and convalescent) to identify seroconversion; a titer of at least 1:800 or a 4-fold rise in titer is confirmatory.[5]

Isolation of leptospires from a clinical specimen is confirmatory, although this lacks sensitivity and growth may be slow. Immunofluorescence is a useful diagnostic measure when performed as immunohistochemistry for antigen detection in tissues (direct); however, it is typically performed on tissues obtained at autopsy. Darkfield microscopy is timelier relative to stage of disease; however, it lacks sensitivity and specificity.

Strengthening Prevention and Response Through Collaboration

As a result of the expanded groups at risk for leptospirosis, as well as other factors that might contribute to the increasing burden of the disease, CDC encourages clinicians to work with local and state health departments to share information that can lead to better prevention and care for leptospirosis.

More than 30 states require reporting of cases of leptospirosis to the state health department. In addition, interaction between states and CDC can improve surveillance, data-sharing, prevention programs, and diagnostic methods for detection. If you suspect that a patient has leptospirosis, contact your local health department to learn about testing that can be done at the state health department or CDC, and to find out whether leptospirosis is reportable in your state.

Web Resources

CDC: Leptospirosis

CDC: Bacterial Special Pathogens Branch -- Zoonoses and Select Agent Laboratory (guidance for shipping *Leptospira* isolates)

CDC: Leptospirosis Risk in Outdoor Activities

Suggested Reading

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References

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