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## **Leptospirosis**

### **Introduction**

Leptospirosis is a zoonosis caused by spirochetal bacteria of the genus *Leptospira*. Rats are an important animal host for transmission of leptospirosis to man, but nearly all mammals and reptiles are capable of harbouring the bacteria and transmitting disease. The most common hosts worldwide are dogs, cattle, goats, and rodents.

The species that accounts for human disease is *L. interrogans*. It comprises more than 200 serovars, the most common being *L. canicola*, *L. icterohaemorrhagiae*, *L. hardjo* and *L. hebdomadis* [1].

The disease has a worldwide distribution including temperate countries such as the UK and USA. In tropical areas there is year-round transmission with an increase in rates during periods of heavy rainfall.

### **Epidemiology**

#### Global epidemiology

The number of worldwide cases is not known, but is estimated to be between 0.1-1 per 100,000 population per year in temperate climates to 10 or more per 100,000 population per year in the humid tropics. During an outbreak this figure may rise to 100 or more per 100,000 [2]. Case fatality rates can be as high as 22% [3].

#### Leptospirosis in UK travellers

There has been an increase in the number of cases identified in U.K. travellers between 1997 and 2003, compared with the number between 1992 and 1996. Of the eight cases in travellers during 2003, seven were known to have had contact with surface water. The countries visited were Thailand, Brazil, Malaysia and the Dominican Republic [1].

### **Risk for travellers**

Leptospirosis occurs in rural areas, but urban outbreaks are occasionally reported. The risk of acquiring the disease is higher in those who are exposed to animals in an occupational setting such as veterinarians or farmers; adventure travellers who participate in water sports including swimming or white water rafting, may also be at increased risk. The risk increases following periods of heavy rainfall, because as water saturates the environment, leptospires in the soil pass directly into surface

waters In 2000, an outbreak of leptospirosis was reported among Eco-Challenge participants in Sabah, Malaysian Borneo, where events included sailing, swimming, kayaking and canoeing in rivers that were swollen after heavy rainfall [4].

## Transmission

Animal hosts harbour the spirochetes in their kidneys; the spirochetes are then excreted in the urine. Spirochetes can survive for weeks or months in soil or water.

Transmission to humans occurs when spirochetes penetrate mucous membranes or skin following contact with infected animals, or soil and water contaminated by animal urine.

## Signs and symptoms

Leptospirosis in humans is associated with a wide range of symptoms.

Approximately 90% of infected persons will be asymptomatic or experience a self limiting, systemic illness. Ten percent will develop a severe, potentially fatal illness.

Following an average incubation period of five to 14 days, an abrupt onset of fever, headache, chills, myalgia, conjunctival suffusion, abdominal pain, nausea and vomiting occurs. This phase persists for between three to eight days and corresponds to septicaemia with *Leptospira*.

An asymptomatic phase follows in approximately 50% of individuals and lasts for one to three days. The patient then has a recurrence of symptoms. During this period there may be fever, myalgia, aseptic meningitis and rash; it can last for up to a month.

Weil's disease is a severe clinical syndrome usually associated with infection with *L. icterohaemorrhagiae*, and is characterised by impaired renal and hepatic function. Weil's disease and other serious manifestations may follow the brief asymptomatic phase or continue from the initial presentation. Complications of severe disease include acute renal failure, jaundice, myocarditis, respiratory distress and arrhythmias. This can be fatal in five to 40% of patients.

After infection, immunity develops against the infecting strain, but this may not protect against infection with unrelated strains.

## Treatment

During the first phase of illness spirochetes can be cultured from the blood or CSF, but not the urine. At a later stage organisms can be detected in the urine although this is difficult as they rapidly die in acidic conditions.

Supportive treatment and intensive therapy including renal dialysis may be required. Traditionally treatments have included the penicillins for severe disease and the tetracyclines, particularly doxycycline for mild to moderate infections. These

therapies are still useful. Other antibiotics that have been effective in the treatment of severe disease include cephalosporins, specifically ceftriaxone and cefotaxime. Macrolide antibiotics may be useful in treating mild disease [3].

## Prevention

Travellers should be advised to avoid potentially infected animals and to limit their exposure to fresh water that may have been contaminated by rodent or other mammalian urine. Rodent populations can be reduced by clearing rubbish from campsites and dwellings, and preventing rodent access into buildings.

Protective clothing should be worn by those who may be in direct contact with rodents, sewage or contaminated water. Cuts and grazes should be covered.

There is no human vaccine available. Pre-exposure chemoprophylaxis can be offered to those travellers who may be unavoidably exposed to rodents or waterways either by their planned activities or as a result of their occupation. Doxycycline has been shown to be an effective chemoprophylactic at dosages of 200 mg weekly commencing one to two days prior to exposure and continued while at risk [5].

## References

1. Health Protection Agency. Foreign Travel Associated Illness. England, Wales and Northern Ireland - Annual Report 2005. Health Protection Agency Centre for Infections; 2005.  
<http://www.hpa.org.uk/publications/2005/travel/travel.pdf>
2. World Health Organisation. Water-related diseases. 2001  
[http://www.who.int/water\\_sanitation\\_health/diseases/leptospirosis/en/](http://www.who.int/water_sanitation_health/diseases/leptospirosis/en/)
3. Griffith ME, Hospenthal DR, Murray CK. Antimicrobial therapy of leptospirosis. *Curr Opin Infect Dis* 2006; 19: 533-7.
4. Sejar J, Bancroft E, Winthrop K, *et al.* Leptospirosis in "Eco-Challenge" athletes, Malaysian Borneo 2000. *EID* 2003; 9: 702-7
5. Takafuji ET, Kirkpatrick JW, Miller RN, *et al.* An efficacy trial of doxycycline chemoprophylaxis against leptospirosis. *N Engl J Med* 1984; 310: 497-500.

## Reading list

Antony S. Leptospirosis- An emerging pathogen in travel medicine: A review of its clinical manifestations and management. *J Trav Med* 1996; 3: 113-8.

Bharti AR, Nally JE, Ricaldi JN, *et al.* Leptospirosis: a zoonotic disease of global importance. *Lancet Infect Dis* 2003; 3: 757-71.

## Link

Health Protection Agency  
[www.hpa.org.uk/infections/topics\\_az/zoonoses/leptospirosis/menu.htm](http://www.hpa.org.uk/infections/topics_az/zoonoses/leptospirosis/menu.htm)