

Leptospirosis

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Nature of the disease

Leptospirosis is a zoonotic disease (a communicable disease between animals and humans) caused by a bacteria from the genus *Leptospira*. The taxonomy of *Leptospira* spp. is very complicated and may be categorised according to immunological grouping (serogroups subdivided into serovars) or according to DNA variation (species differentiation).

The disease is essentially spread by animal urine contaminating the environment. Clinically it can take many forms, from a mild disease which may be difficult to detect, to an outbreak of fatal cases.

It is a major public health concern in the region and is regarded as a priority for both the Zoonoses Project of the Regional Animal Health Service and the Pacific Public Health Surveillance Network of SPC.

Classification

OIE list B disease

Susceptible species

All species of mammals can be infected, including humans. Among domestic species, cattle, dogs, horses and pigs are the most commonly infected animals. In the wild, rodents are the usual reservoirs of the disease.

Exceptionally *Leptospira* spp. has been identified in toads, however the role of non-mammal species in the epidemiology of the disease is thought to be negligible.

There is no absolute specificity between serovars of *Leptospira* and different species of animals but certain species tend to be more susceptible to particular serovars, for which they act like the 'normal host'. Under the Zoonoses project, serovars-host specificities will be explored.

Distribution

Leptospirosis is endemic in many countries of the world.

In many Pacific islands, infection with Leptospirosis is very common in domestic and wild animals

as well as in the human population. It primarily occurs in places where there is standing water, atoll countries have been found to have a low prevalence of leptospirosis. The distribution of leptospirosis in the Pacific requires further investigations, that will be done under the Zoonoses project.

Clinical signs

Signs of disease may differ considerably according to the association between the serovar-host, the serovar itself and the exposed host.

Wild animals either do not get sick or develop mild symptoms.

Domestic animals often develop chronic disease, where it is endemic with few clinical signs of illness, however under certain circumstances an acute disease occurs which can be fatal.

General signs of the disease include:

More specific signs are:

Mortality in domestic animals does not usually exceed 5% but may reach 20% in small ruminants and even higher in dogs. Mortality is higher in young animals.

In humans the clinical signs are usually non specific (flu-like symptoms) and the disease may remain undetected. The first symptoms include:

If the patient does not recover at this stage, the condition can deteriorate and the following signs can be seen:

Mortality rate can range from 5 to 40% according to the serovars involved and the patient's immunological status.

Post-mortem findings

In all species the following lesions may appear:

Differential diagnosis

In pigs the differential diagnosis include:

In humans the differential diagnosis include:

Specimens required for diagnosis

The clinical signs of Leptospirosis are not specific enough to allow a diagnosis and a definitive diagnosis requires tests to be carried out at a competent laboratory, preferably a leptospirosis reference laboratory.

Identification of the *Leptospira* by culture or immunochemical staining can be attempted from body fluid (blood, milk, cerebrospinal, peritoneal fluids) or organs (kidney, liver, lung, brain) from clinically affected animals. Samples should be collected before antibiotic treatment is given to the animal and be carefully handled. For cultures, the samples should be kept at 4°C in a culture liquid medium or a 1% bovine serum albumin solution containing 5-fluorouracil at 100-200 µg/L.

Recent development of PCR techniques, with primers that can be serovar specific, are promising for the rapid and sensitive diagnosis of the disease, including the use of urine samples. The lack of specificity of these techniques has limited their usage, however they are improving quickly and specific primers are being evaluated under the SPC-ACIAR Zoonoses project.

Serological diagnosis of leptospirosis is the most commonly used technique. Antibodies appear a few days after the onset of the disease and persist for weeks or years. As a consequence, the presence of antibodies is only indicative of active disease, if over a certain level. Serological techniques include the microscopic agglutination test (MAT) which is the reference test and allows the differentiation between a number of serovars. The ELISA provides a more rapid but less specific diagnostic test. The recent development of dip stick tests for the diagnosis of leptospirosis in dogs and humans is very promising for the quick confirmation of leptospirosis where laboratories are not available. An ELISA test for livestock is being evaluated under the SPC-ACIAR Zoonoses project.

Transmission

Transmission of leptospirosis can be direct or, more commonly, indirect.

Direct transmission of leptospirosis may occur, genitally (including AI and embryo transfer), in utero or through the milk. Human can acquire leptospirosis directly from infected animals that they handle, milk or process for food (slaughter and butcher).

Leptospirosis is also easily indirectly transmitted by environmental contamination. This occurs when infected animals (wild or domestic) urinate in their environment. Standing water, pastures, crop fields, muddy soils are places of particular risk. Less commonly transmission by contaminated objects such as food, bottles, dishes can occur.

As a consequence of the possible ways of transmission some occupations are considered at greater risk. They are, slaughterhouse workers, meat inspectors, farmers, veterinarians, scavengers and sewage workers. In addition, some activities such as fresh water sports, camping and trekking can be risky in endemic areas.

Risk of introduction

Although leptospirosis is endemic in most areas, new and exotic serovars could become established following the introduction of infected animals. De-ratting of ships is an important measure to reduce such a risk.

Control / vaccines

Treatment of leptospirosis with massive antibiotic therapy (e.g. penicillin, erythromycin, doxycycline) can be successful if given at an early stage of the disease.

Inactivated vaccines for both animals and humans exist, although they are serovar specific. Successful vaccines for some serovars are more difficult to produce. However in some countries, high risk groups within the population (humans and animals) are vaccinated.

Prevention of the disease involves:

Prevention of fatal disease requires early diagnosis and treatment.

More information

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