

West Nile Fever

Nature of the disease

West Nile Fever (WNF) is an emerging zoonotic disease caused by a flavivirus and transmitted by mosquitoes (an arbovirus) from birds to susceptible mammals. The development of the disease is variable from influenza-like illness to fatal meningitis and encephalitis.

Classification

Not classified by the Office International des Epizooties.

Classified in list D of the SPC diseases list: Transmissible diseases which are exotic to certain countries within the Pacific Region and are considered to be of potential socio-economic and/or public health importance (SPC).

Classified in humans notifiable disease in most countries.

Susceptible species

West Nile Virus primary affects wild birds (at least 110 species), which are considered to be the reservoir of the disease. Domestic birds such as chicken can be infected without developing the disease, but ducks and pigeons exhibit clinical signs.

Mammals can be infected by mosquito bites, with horses and humans appearing to be the most susceptible species. The virus has also been identified in bats, rabbits, rodents, cattle, camels and dogs and cats.

Very recently, evidence of West Nile Virus has been found in alligators in Miami. The epidemiology of the disease in this species is still unknown.

Distribution

The present outbreak of WNF originates from Africa, but it is also endemic in the Middle East and West Asia. In 1996 the virus started to spread in Romania (Europe), since when it has become established in Europe. At present, the virus is spreading through United States of America, where it was first recognised on the east coast (New York) in 1999. It reached the west coast (Los Angeles) in 2002, and can be considered to be a threat for the Pacific region.

Clinical signs

In birds

In wild birds the disease is not systematic, making them good reservoirs as they can carry the virus along their migrations. Signs are generalised and often include neurologic abnormalities and emaciation. Clinical signs can include encephalitis, pneumonitis, nephritis, myocarditis and massive die-off (especially of corvids).

Domestic birds such as chicken do not seem to develop the disease. However, ducks and pigeon develop similar signs to those observed in wild birds.

In mammals

Among mammals infection includes: fever, listlessness, stumbling, lack of coordination, ataxia, partial paralysis, and death. Usually horses develop a more severe form of the disease but without fever.

In humans

In humans clinical signs are not systematic. In most of the cases there is only mild infection with an influenza-like illness that includes fever, headache and body aches, often with skin rash and swollen lymph glands. In more severe infections there is headache, high fever, neck stiffness, stupor, disorientation, coma, tremors, convulsions and paralysis. In some individuals, especially the elderly, West Nile Virus cause aseptic meningitis and encephalitis, which are often fatal.

Post-mortem findings

No lesions are pathognomonic for West Nile Virus infection.

In birds, there is usually no pathology indicative of West Nile Virus infection on necropsy.

In mammals there usually are no macroscopic lesions; histologically there is slight to moderate non-suppurative encephalomyelitis, primarily in the spinal cord and lower brainstem, affecting both grey and white matter. The most severe lesions were in the thoracic and lumbar spinal cord.

Differential diagnosis

In birds differential diagnostic includes Newcastle disease

Generally in mammals differential diagnostic includes other diseases causing neurological disorders such as rabies, botulism and other causes of encephalitis.

Particularly in horses differential diagnostic includes:

- Equine protozoal myeloencephalitis,
- Cervical vertebral myelopathy,
- Equine herpes virus 1,
- Equine degenerative myelopathy,
- other encephalitis such as western equine encephalitis; eastern equine encephalitis and Venezuelan equine encephalitis.

Specimens required for diagnosis

Whole blood, serum and cerebrospinal fluid (if collected) samples, processed by PCR and immuno-histochemistry.

Transmission

There is no direct transmission of West Nile Virus from animal to animal — passage through an arthropod is necessary. In most cases, the vector is a mosquito from the *Culex* genus. However, the virus has been isolated from 28 different species of mosquitoes and has also been isolated from ticks in Asia.

Mosquitoes get contaminated by biting infected birds. It has not yet been demonstrated that mosquitoes can become contaminated after biting mammals. Mosquitoes become infective after 10 to 14 days of incubation. Vertical transmission of the virus in mosquitoes has been shown.



Horses, humans and chicken seem to be dead-end hosts. That is, the level of viraemia in these species is too low to cause the infection of mosquitoes.

Risk of introduction

Recognising that mosquitoes do not become contaminated from biting mammals, West Nile Virus can only be introduced into the region through:

- migratory birds
- imported live-birds from an infected country
- mosquitoes (or ticks) from an infected country

Control / vaccines

There is no specific treatment for West Nile Fever.

There is a killed vaccine for horses. However, it must be given in two doses initially, three to six weeks apart. Efficacy data is not available at this time; however, the vaccine is considered very safe.

Destruction of mosquito breeding sites, reduction of exposure to adult mosquitoes, provision of screened housing, use of insect repellents and reduction of outdoor exposure are also employed.

Monitoring sentinel birds such as chicken (dead-end hosts having an immune response) and the reporting of clinical suspicion or abnormal die-off of wild birds is essential to initiate an early response to the disease.

**Produced by the Regional Animal Health Service (RAHS) of SPC
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Information available online
on the RAHS website: <http://www.spc.int/rahs>

References

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Preventive measures taken in the Pacific region

The Hawaii State Department of Health (DOH), along with the State Department of Agriculture (DOA), the Department of Land and Natural Resources (DLNR), the U.S. Geological Survey (USGS) and the University of Hawai'i (UH) announced on 25 September 2002 a precautionary, statewide effort to prevent the introduction of West Nile Virus (WNV) in Hawaii.

A new public education website has been created that features information about West Nile Virus, and what the public can do to help prevent the spread of the disease (<http://www.state.hi.us/doh/wnv>).

Source: Press release of 25 September 2002 available online on the Hawaii Department of Health website (<http://www.hawaii.gov/doh/about/press/2002/02-56wnv.html>).

In Guam, an embargo bans all live bird and poultry shipments to the island from the US mainland except hatching eggs, and also shipments that originate from Hawaii, where no signs of the West Nile Virus have been detected. The embargo, announced at the end of September 2002, followed similar action taken in Hawaii as the West Nile Virus was confirmed in California, where many of the islands' shipments originate.

Similar measures should be recommended in islands with live bird importation from the US mainland.

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