WEST NILE VIRUS INFECTION: TREAT OR REALITY

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Introduction

International interest in equine vector-borne diseases has increased as result of recent infections such as West Nile Virus outbreaks in Italy and Austria.
Competent vectors for West Nile Virus (WNV), such as Culex, Aedes en Ochlerotatus spp., are present in Western Europe. Furthermore, Western Europe has direct contacts with endemic areas through wild bird migrations. The very rapid spread of WNV in the USA makes it clear that the Netherlands have the potential to be similarly affected. The European Committee agrees on this point and has already (in 2004) asked that all member states investigate all unexplained encephalitis cases. The Netherlands takes an active part in this project. However, until the present time all samples have been negative (excepting horses that were imported from endemic areas).
In the Netherlands WNV is not a notifiable disease, and this is based on the fact that the horse is a 'dead-end host'. However, there is some discussion as to whether it may be considered to be an equine viral encephalopathy. This will become clearer after the revision of the new European Animal Health Regulations.
As WNV infections are also a human problem, it is of great importance that any outbreaks of WNV among horses is detected early.

Epidemiology

People and animals become infected following the bite of certain kinds of mosquitoes that are infected with WNV. Following a bite from an infected mosquito a low-grade viraemia occurs first, then the virus replicates in the lymph nodes and subsequently spreads to the neural tissues either by passing the blood brain barrier or by direct transmission through axons.
The virus can replicate in mosquitoes and vertical transmission in mosquitoes is possible. In people vertical transmission from mother to child is also possible. Horses (and people) are 'dead end hosts', this means that the replication of the virus in these hosts is so limited that a mosquito that sucks blood from these hosts does not become infected.

Clinical symptoms

Infection with WNV does not always lead to signs of illness in people or horses. Whether a horse develops clinical signs is mainly dependent on differences between virus strains but also on the infection dose and the immune status of the host. In horses systemic signs of WNV consist of low grade fever (38.6-39.4°C), anorexia and dullness. In some cases colic seems to be the first clinical sign. Neurological signs can be very variable. Some horses start with abnormal gait and others with muscle fasciculation or an abnormal mental status. The muscle fasciculation often starts around the eyes and the muzzle and may be limited to this area. However, in some cases the whole body and all four limbs can be affected. Abnormal mentation means that a normally quiet horse can become very excited and a nervous horse can be very quiet. Incidentally the signs may resemble narcolepsia. Neurological signs often appear abruptly and progress quickly. The spinal cord pathology may induce ataxia and paresis; both fore and hind limbs can be affected and signs may be both unilateral and bilateral.

Diagnosis

The diagnosis WNV infection will probably not be established if the horse only shows limited fever. However, if the case also shows neurological signs, WNV must be considered and a serum sample then should be sent to a laboratory that is able to perform the IgM ELISA or a blocking ELISA (IgG and IgM) for WNV. In the Netherlands the screening tests are performed by the Animal Health Service (Deventer) and the confirmation is made by the National Institute for Public Health and the Environment (RIVM) by means of the plaque reduction neutralisation test (PRNT).

Post mortem examination

In horses that have died of WNV, a polioencephalomyelitis will be found. The macroscopic changes can be very subtle and limited to small haemorrhagic foci in the brain and spinal cord. Whilst performing a post mortem examination on a suspected WNV case, it is important to prevent cross contamination. When a horse is referred for post mortem examination it is important also to warn the pathologists in advance.

Treatment and prevention

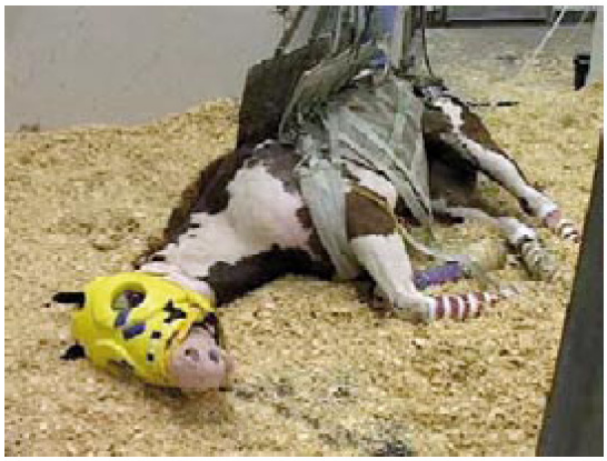
Treatment of a WNV infection is only symptomatic as there is no specific therapy. Recently an 'inactivated vaccine', Duvaxyn WNV® (Fort Dodge), was been licensed in Europe. In the Netherlands a small successful trial was performed at Utrecht University in cooperation with the Animal Health Service (Deventer).

In the USA specific campaigns are undertaken to inform the general public of the risks of mosquito bites and WNV. With relatively simple measures the number of mosquito breeding sites can be reduced by eliminating stagnant water sources (discarded tyres, bird baths, buckets, ceramic pots etc). Mosquitoes may breed in any puddle that lasts for more than four days. Humans are advised to wear long sleeves and use proper insect repellents. The same measures would be effective for horses.

Conclusion

At the moment the expectation is that WNV will occur in The Netherlands in the near future. It is important to consider WNV as a differential diagnosis in horses with neurological problems, especially in the summer months when mosquitoes are active

References available on request.



Horse with paralysis resulting from a WNV-infection (photo courtesy of Fort Dodge and Kansas State University College of Veterinary Medicine)