

Should I consider West Nile Virus, if a horse is lame?



Federation of European Equine
Veterinary Associations

Ongoing climate changes and the constant increase of our worldwide temperatures in combination with growing globalization has led to conditions favourable for West Nile Virus (WNV). This virus is creating increasing problems and human casualties in Southern Europe but also creating the potential for it to extend in Northern Europe. Disturbing potential scenarios are now close to reality: one dead horse, was confirmed in Germany in September 2018 and Hungary has ongoing problems with outbreaks.

It is time for Equine vets across Europe to recognise the essentials of what West Nile Virus infection in a horse looks like!

How do I recognize if a horse is infected with West Nile virus?

Horses can become clinically affected by WNV. However, many horses exposed to the virus for the first time experience no clinical illness and are subclinical cases.

In some instances, the virus may breach the blood-brain barrier and hereby cause inflammation of the brain and spinal cord (encephalomyelitis).

The clinical signs of WNV encephalomyelitis can vary in range and severity, which can make diagnosis a challenge.

Incoordination or ataxia, most often affecting the hind limbs is one of the frequently observed clinical signs. It can resemble regular pain-induced and/or biomechanical lameness or neurological conditions. Only one limb may be partly or fully paralysed. Toe-dragging, stumbling, leaning to one side can be seen with varying severity.

Infection can be observed as a ***mild to moderate increase in rectal temperature*** (38.6–39.4° C) followed by anorexia and being poorly. Sometimes abdominal pain follows.

Twitching of muscles (muzzle, lower lip, eye lid, neck, shoulder, pectoral region) may also be observed.

Generalized weakness, inability to swallow, cataplexy and generalized paralysis resulting in recumbency and even coma and death are observed for some horses.

Behavioral abnormalities have been reported (depression, sleepiness, heightened sensitivity to external stimuli, aimless wandering). Visual impairment and heightened sensitivity to light due to loss of pupillary reflexes can be detected sometimes.

The onset of disease can be sudden and progressive. Neurological manifestations are to be expected in 8% of affected horses and are lethal in 30-50% of the cases. Surviving horses often suffer from chronic long-term effects of the infection.

The nature and severity of clinical signs depend largely on the area(s) of the central nervous system affected by the virus and the extent of damage.

The incidence of disease tends to be greater in older horses and a favourable clinical outcome is less likely.

How do I confirm a suspected case of West Nile Virus infection?

The alive horse:

Diagnosis of West Nile Virus is usually based on the nature of the clinical signs displayed by an affected horse together with **paired serum samples** (acute phase and convalescent phase) to detect an increase in antibody titer in the blood or the **detection of IgM by capture ELISA**. Attempts to detect virus by qRT-PCR may be unsuccessful due to the low level of viremia.

The IgM antibody capture ELISA detects antibodies resulting from recent exposure to WNV. These antibodies are usually detectable 7-10 days post exposure and persist for 1-2 months. The majority of the horses that present with acute neurological signs due to infection with WNV are seropositive by the IgM ELISA.

Unlike IgM antibodies, the antibodies detectable by the IgG ELISA and neutralization tests persist for more than one year. Thus, the presence of these antibodies does not necessarily indicate recent exposure to virus. These tests are frequently used in surveillance studies and the vaccination history needs to be taken into account when interpreting the results.

For diagnosis, paired samples need to be tested. Neutralization tests such as the Plaque Reduction Neutralisation Test (PRNT) are considered the most specific of the WNV serological tests. A fourfold increase between the neutralizing antibody titers in the paired serum samples collected 2-4 weeks apart is seen as a confirmation of the diagnosis.

The dead horse:

The horse is a dead-end host for WNV but for all dead horses suspected of neurological disease a protocol should be followed to secure the veterinarian against zoonotic infections like rabies.

Collect CSF, brain (particularly hind brain and medulla, spinal cord and other tissues for PCR, culture (virus isolation), histopathology and immunohistochemistry).

What should be on my differential diagnosis list?

As clinical signs of West Nile Virus can be very varied the differential list is also extensive. You have to think wide!

First of all: remember most cases are subclinical, you won't find any signs of disease in these horses.

Key differential diagnosis list:

- All sorts of neurological abnormalities
- All sorts of lameness (particularly hind limb)
- Other Equine Neurological infection diseases (EHV 1, rabies, botulism, verminous meningoencephalomyelitis borna etc.

The above is not a detailed exhaustive list, as the clinical signs can vary a lot!

Where did the horse get WNV from?

For a horse to be infected with West Nile Virus, the virus is transferred to the horse from a bird via a vector, mainly mosquitos (Culex spp. are considered the primary vector but WNV has been detected in many different species of mosquito).

If horses live in a WNV endemic area the birds and vectors can occasionally spread disease to the horse. In these areas most people, including vets, are aware of the risk.

If WNV is diagnosed in a horse located in a non-endemic area there are two options of how it happened:

- 1) the horse has recently visited or been re-located from an endemic area, and was infected in the endemic area before being diagnosed in another area
- 2) WNV has entered a new area with migrating birds and a horse has been infected. In this instance the infected horse can be seen as an index case of presence of WNV in the area (the area might become endemic from now on)

Always be aware of previously vaccinated horses, as they will have antibodies against WNV, but not necessarily infection. Remember to use paired serum sample test for confirmed diagnosis of WNV or to request the laboratory to perform the IgM ELISA.

There is a possibility for horses to be infected via blood transfusions and other invasive interventions, but this is very rarely seen due to low viral load.

Can a horse spread WNV to other horses or humans?

No. The amount of virus in the horse is very low compared to what is found in birds, so the horse does not spread WNV to humans.

The horse is categorized as a "dead end host", like humans, as they do not spread WNV disease. Birds are primary hosts, they amplify virus and it can then be transmitted to horses and humans via vectors.

However, precaution should be taken by veterinarians to avoid viral exposure when handling body fluid and performing postmortem examination of horses as they are potentially exposed to virus in a higher than expected ratio due to the nature of the examination.

Where is West Nile Virus now?

During 2017 127 outbreaks among equids in EU member States have been reported. As of November 2018 the amount of outbreaks recorded were 279, distributed in 10 different countries:

Italy (145), Hungary (91), Greece (15), France (13), Spain (7), Austria (2), Romania (2), Germany (2), Slovenia (1) and Portugal (1)

(Source: European Centre for Disease Prevention and control (ECDC))

As WNV is spreading across Europe (Germany being an example of having confirmed cases in 2018 in a new area) it is of major importance that all European Equine vets are able to identify index cases.

Migrating birds can spread the virus from endemic to non-endemic areas.

Unusual findings of dead birds in the surroundings can be indicative of recent WNV outbreak in the bird population, hence there is a higher risk of spread to a horse in the area as well.

Horses showing signs comparable to WNV should always be examined carefully including laboratory testing.

The authorities should be notified according to national rules.

How do we treat horses with West Nile Virus?

At the present time there is ***no specific anti-viral treatment for WNV*** encephalomyelitis.

Management should focus on controlling pain and inflammation. Antiinflammatory drugs should be provided to control inflammatory changes in the central nervous system.

Other supportive measures such as intravenous fluids, sedatives and nutritional support can be important components of therapy.

How do we prevent infection with West Nile Virus?

Prevention is key to control West Nile Virus infection!

Measures can be taken to protect horses from West Nile Virus. The below measures are mainly to be used in case of confirmed presence of West Nile Virus in an area:

- 1) Management strategies to reduce exposure to mosquitos

Reduction of potential mosquito breeding sites (disposal of old receptacles, tires, containers and areas of standing water on farms)

Keep horses indoor during peak mosquito activity periods (dusk to dawn)

Install electric bug zappers and fans in the stall over the horses to help deter mosquitos

Avoid turning on light inside the stable during evening and night, as light attracts mosquitos.

Remove birds located close to or in the stable

Under some circumstances use of mosquito repellants and larvicides can be necessary.

2) Vaccination against WNV

Vaccines to protect against WNV is available in most European countries. For many countries vaccinations are only recommended in confirmed endemic areas or areas with recent outbreak.

For competition horses or horses travelling to endemic areas for other purposes vaccination is recommended before going to an endemic area.

(Remember to advice the owner of the horse of the potential risk of infection when entering an endemic area)

There are currently three vaccines licensed in Europe (European Medicines Agency):

Proteq West Nile™, Boehringer Ingelheim

West Nile recombinant of canary pox virus

Vaccination schedule: Primary course from 5 months of age and onwards, second injection 4-6 weeks later. Re-vaccination: yearly booster-vaccination

Equip WNV™, Zoetis

Inactivated West Nile Virus

Vaccination schedule: Primary course from 6 months of age and onwards, second injection 3-5 weeks later. Re-vaccination: yearly booster-vaccination

Equilis West Nile, MSD/Intervet

Inactivated chimeric flavivirus strain YF-WN

Vaccination schedule: Primary course from 6 months of age and onwards, second injection 3 to 5 weeks later. Re-vaccination: yearly booster-vaccination

Vaccination does not prevent infection, but protects against clinical disease. Vaccinated horses have a significantly reduced viremic phase and a lower overall virus burden.

According to recommendations from AAEP horses in endemic areas should be vaccinated more frequently (every fourth month)

If vaccination is initiated in new areas due to outbreak of WNV caution should be taken to try to finalise the initial course before the annual mosquito season begins (April-May in most European areas)

So, what is West Nile Virus, then?

West Nile Virus (WNV) is a flavi-virus. Through mosquitoes it circulates primarily in birds, many of which show no overt signs, but can also affect humans and horses (dead-end hosts).

The virus is transmitted by many different species of mosquitoes.

In 2018 279 outbreaks of WNV among Equids were reported in 10 EU Member States. The probability is that the actual amounts of outbreaks are under-reported.

WNV was first isolated in Uganda in 1937. From here it has extended across Africa to Southern Europe. It is continuing to extend across Europe, with all European Countries potentially being at risk today.

In 2017 index cases of WNV were observed in 8 new European regions.

Two horses in the Southern part of Germany were diagnosed with WNV in September 2018. The bird population of the area having been identified as WNV positive previous to the horse cases.

The German Authorities expects the disease to potentially spread in the coming year.

We should all be aware of West Nile Virus, it is our problem too!

The FEEVA West Nile Virus Awareness Campaign

is kindly supported by Boehringer Ingelheim



**Boehringer
Ingelheim**