



West Nile Virus

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West Nile Virus (WNV) is a Flavivirus belonging to the Japanese encephalitis virus complex and which may cause neurological disease and pyrexia outbreaks in horses and humans. Mosquitoes transmit the virus from avian reservoir hosts to horses, humans and other mammals. Although West Nile Virus is endemic to South Africa, it has only become recognized as a significant cause of neurological disease in humans and horses locally in the past two decades, as it has emerged globally⁷.

EPIDEMIOLOGY

Wild birds are the principal hosts for WNV, and the virus is amplified within the bird population. When the virus reaches high levels within the bird population, an increased number of mosquitoes and different species of mosquitoes are infected⁴, increasing the risk to the equine population. As many different mosquito species can transmit WNV, the involved species varies geographically. In South Africa, the mosquito that transmits WNV is principally the *Culex univittatus* and is often found in the vicinity of dams or standing water⁹.

The virus and mosquito - host interactions result in regional changes in the virulence of the virus, and this makes predictions of future trends difficult. However, large epidemics often occur when unusually high rainfall and hot weather favour the breeding of the mosquito vector³. There is also an increased immunity to the virus within wild bird populations, which are the reservoir hosts⁵. Occasionally wild birds, such as corvids and raptors who are highly susceptible to WNV, may be found dead in an area before an equine outbreak is detected⁶.

Horses and humans are considered to be dead-end hosts for WNV. The virus is not directly contagious from horse to horse or horse to human. Also, indirect transmission via mosquitoes feeding on an infected horse is highly unlikely because infected horses do not circulate a significant amount of the virus in their blood¹. Once the WNV has entered the body via a mosquito bite, the virus multiplies

within the circulatory system, if the virus should cross the blood - brain - barrier, then meningoencephalitis develops with various neurological clinical signs evident⁴.

Although no specific signalment of the horse is noted⁴, the viral disease more commonly affects adult horses, with older and unvaccinated horses developing more severe clinical disease⁵.

West Nile Virus infection cycle

(as taken from MSD Veterinary Manual)

CLINICAL SIGNS

Clinical signs of the disease usually present within 15 days after a bite from an infected mosquito⁷. The proportion of horses infected is generally low, estimated at 10%⁵ and not all horses infected with WNV will show clinical signs. However, if a horse develops clinical signs, 90% of these horses will show neurological abnormalities.

Neurological signs⁴:

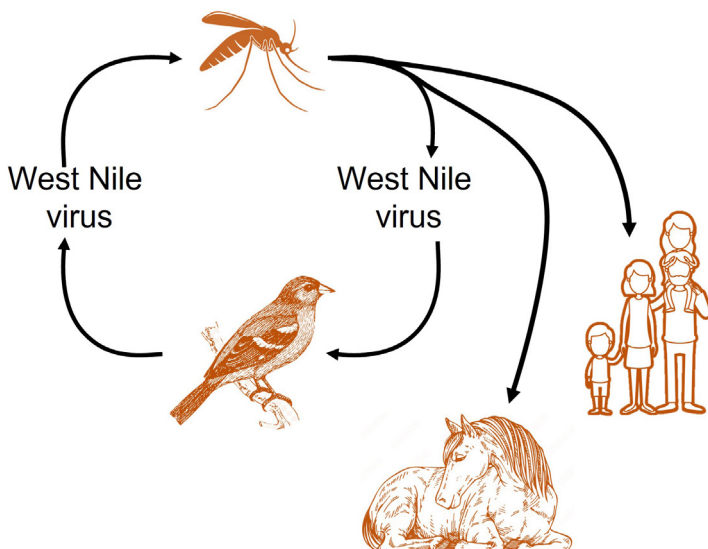
- Weakness
- Ataxia and incoordination
- Depression and lethargy
- Muscle fasciculations and tremors,
- Blindness
- Paresis progressing to paralysis
- Recumbency
- Cranial nerve deficits (unilaterally / bilaterally affected) - often the facial nerve with twitching of the face, drooping lips, head drooping and smacking, teeth grinding and facial paralysis, unable to swallow
- Sensitivity to touch and sound
- Pyrexia is not always present.

DIAGNOSIS

The neurological signs are not pathognomonic, and therefore should a horse be suspected of a WNV infection, serum blood samples need to be submitted for IgM- ELISA testing. This test will give reliable results even if the horse has been previously vaccinated⁴ and will detect the presence of the virus for up to 2 months after infection⁹.

TREATMENT

There is no specific treatment for WNV in horses, and symptomatic and supportive care based on the clinical signs, should guide treatment⁸. Anti-inflammatory drugs, including nonsteroidal drugs and/or corticosteroids, are often prescribed but may not always result in an improvement. Serum or plasma products containing antibodies to the virus have been transfused as part of the treatment plan; however, there is no evidence of its effectiveness. General nursing and good supportive care like intravenous fluids, a calm, darkened environment, dietary modification (for horses with lip paralysis), and possibly slinging with recumbent horses are important. Acupuncture can be used to help treat lingering cranial nerve deficits.



Complete rest is mandatory. Most horses that recover will return to normal function within 1 to 6 months⁵.

Prognosis is poor with recumbent horses as they are at a greater risk of death and often require euthanasia⁸. Also, it has been noted that once complete paralysis has developed in one or more legs, the death rate increases greatly⁵.

The case fatality rate for horses exhibiting clinical signs of WNV infection is approximately 33%¹. Evidence has shown that up to 40% of infected horses that survive the acute WNV infection will exhibit residual effects such as gait abnormalities (stumbling and ataxia), cranial nerve deficits, lethargy and chronic weight loss for up to 6 months post-infection and in some cases even lifelong¹.

DIFFERENTIAL DIAGNOSIS

The list of neurological causing diseases within the horse is numerous and therefore includes causes (specifically in South Africa) but not limited to⁴:

- Rabies
- Equine Herpes Virus
- Cranial Trauma
- Wobbler's Syndrome
- Equine Degenerative Myelopathy and aberrant strongyles migration.

ZOONOTIC POTENTIAL

As infected horses do not act as a source of West Nile virus for mosquitoes, infected horses do not pose a risk to humans; however, humans can be infected by WNV-infected mosquitoes⁴. In 1974, tens of thousands of people were infected with WNV in the Karoo and Northern Cape Province³ of South Africa.

Most of these cases had mild pyrexia, rash, myalgia and arthralgia, but no deaths were recorded. Approximately 5 -15 human cases are detected yearly in South Africa³, and hepatitis has been noted as an unusual clinical symptom³. Most people who contract WNV never develop symptoms. When symptoms are seen, a mild fever, headaches and weakness are noted, and these symptoms are more likely to be detected in children and old or immunocompromised people⁵.

There is no human vaccine against West Nile Virus.

People should take standard precautions, especially in areas where clinical cases of WNV have been identified in horses or birds, to avoid being bitten by mosquitoes. Veterinarians performing post-mortem examinations on horses or handling infected brain and spinal cords should wear appropriate personal protective equipment and clothing^{4 5}.

PREVENTION OF WEST NILE VIRUS

There are two methods to prevent cases of WNV: vaccination and mosquito control.

Vaccination

Vaccination is the most efficient way to prevent WNV as it reduces the disease frequency. In the unlikely event that a horse vaccinated against West Nile virus does contract the disease, the clinical signs will be less severe, and the horses will recover faster⁵. The vaccine is an inactivated West Nile Virus strain VM-2.

All foals aged six months and older and naïve adult horses can be vaccinated. A primary course of two intramuscular vaccinations, four weeks apart, can be given to the horse. The horse should then receive an annual booster at least four weeks before the start of the mosquito season to help protect against West Nile virus encephalomyelitis¹. The warm rainy seasons are the most likely time for infections to occur.

It is an accepted practice to administer WNV vaccines to pregnant mares, as the risk of adverse consequences of WNV infection outweighs any reported adverse effects to the use of the vaccine¹. Horses that have recovered from a WNV are likely to have developed life-long immunity¹.

Mosquito control

Good environmental management is important. As mosquitoes breed in standing, stagnant water, all water tanks and buckets should be cleaned out at least once weekly. Areas, where stagnant water can collect should be eliminated. Fans that blow over the horses in a barn and circulate the air can reduce mosquitoes and other flying insects. Stables or barns should be kept dark at night as any lights inside these buildings may further attract mosquitoes. Appropriate insecticides, such as pyrethroid or permethrin products, can be used according to the label directions in the summer and other times when mosquitoes are common. It is good practice to limit birds nesting in stables and barns

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MULTIPLE-CHOICE QUESTIONS

QUESTION 1

WNV epidemics occur when:

- a. Unusually high rainfall and warm weather is experienced
- b. There is an increase in the local bird population
- c. Migration of affected birds into a naïve population
- d. Prolonged drought in an area
- e. Poor owner-vaccination compliance

QUESTION 2

Common clinical symptoms of WNV include:

- i. Ataxia and inco-ordination
- ii. Anorexia
- iii. Cranial nerve deficits
- iv. Pyrexia
- v. Paresis and paralysis

- a. All of the above
- b. i and ii
- c. i, ii and iii
- d. i, iii, iv, v
- e. i and iv

QUESTION 3

Testing or diagnosis of suspected WNV cases in a live horse require:

- a. Brain and spinal cord
- b. Serum samples
- c. EDTA samples
- d. Both Serum and EDTA samples
- e. Neurological clinical signs are pathognomonic

QUESTION 4

Treatment of WNV cases:

- a. Is simple and once off
- b. Requires cases by case nursing, with symptomatic and supportive treatment
- c. NSAIDs and Corticosteroids
- d. NSAIDs with Plasma transfusions
- e. Euthanase all suspected WNV cases

QUESTION 5

Sources of human infection are:

- a. Nursing of infected horses
- b. Other WNV infected humans
- c. Handling of infected neurological tissue and WNV infected mosquito bites
- d. All mosquitoes
- e. Clearing out your bird cage

QUESTION 6

The most effective way to limit WNV infections in horses:

- a. Limit all horse in- contact with infected horse
- b. Remove all avian species from areas where horses graze

- c. Drain stagnant water
- d. Primary vaccination course with annual booster
- e. Spray your horse daily with pyrethroid insect repellents

QUESTION 7

In general, WNV vaccinations:

- a. Should not be given to pregnant mares as this may result in abortions
- b. Can only be administered to foals of unvaccinated mares
- c. Are safe and effective with few side-effects
- d. May result in a poor outcome should the vaccinated horse become infected
- e. May allow mosquitoes to become infected if they bite a vaccinated horse

QUESTION 8

Other ways to reduce the incidence of WNV

- i. Drain all stagnant water
- ii. Use pyrethroids sprays on horses daily
- iii. Use fans in barns and stable to circulate air
- iv. Limit birds nesting in stables and barns
- v. Close stable doors at night to limit vector access to horses.

- a. i,ii,iii
- b. i,iii,iv
- c. iv,v
- d. all of the above
- e. i,iii

QUESTION 9

Possibility of residual neurological symptoms in recovered horse:

- a. 33 %
- b. 80%
- c. 5%
- d. 10%
- e. 40%

QUESTION 10

Common clinical symptoms found in humans with WNV:

- a. High mortality
- b. Hepatitis and high mortality
- c. Mild fever, headache and weakness
- d. Mild fever, rash and coughing
- e. Severe fever and headache

SAVC CPD Accreditation Code:

AC/1286/23

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