theHORSE.com
YOUR GUIDE TO EQUINE HEALTH CARE

West Nile Virus

Vaccination is recommended to protect horses from this deadly mosquito-borne disease

Overview

Mosquitoes transmit a myriad of pathogens, such as Eastern Equine Encephalitis (EEE) and West Nile virus (WNV).[1] In mammals, WNV causes an inflammation of the brain and spinal cord (called encephalomyelitis), and up to 40% of infected horses ultimately die.[2]

Although WNV has long been recognized throughout the world, the first cases in North America weren't diagnosed until 1999. The virus then spread rapidly throughout the United States and Canada, infecting birds, humans, horses, and other mammals. As of 2012 more than 25,000 horses have been infected since 1999.[2,3]

The number of WNV cases has decreased steadily following the identification of the WNV and the prompt manufacture of vaccines against the disease.

ERICA LARSON

The American Association of Equine Practitioners recommends vaccinating all horses against West Nile virus.

How WNV Spreads

The WNV is maintained in the wild bird population and, just like with Eastern and Western equine encephalitis viruses, is spread between birds by mosquitoes.[5] Birds are therefore referred to as the "natural reservoir" for WNV, because high levels of the virus circulate in their bloodstream. Horses and humans most often become infected after being bitten by a mosquito infected by feeding on an infected bird. Once an infected mosquito bites a horse, the virus enters the horse's bloodstream and spreads to the spinal cord and brain, causing a widespread inflammation.[4]

Unlike birds, infected humans, horses, and other mammals do not have high virus levels in their blood. These animals are called dead-end hosts because they can become infected with the virus, but do not spread the disease to mosquitoes. WNV can also be spread via mechanical transmission, such as through a blood transfusion or vertical transmission from mare to foal.[6]

Clinical Signs

Once a horse is infected, the virus multiplies in the bloodstream, crosses the blood-brain barrier, and invades the central nervous system (brain and spinal cord). Clinical signs of disease typically develop three to 15 days after the horse was initially exposed to the virus.

Classic signs of WNV-infected horses include fever, ataxia (wobbly gait), stumbling, hind limb weakness, lethargy, off feed, recumbency (with the inability to rise), muscle tremors, teeth grinding, dysphagia (inability to swallow), head pressing, signs of colic, a flaccid (limp) paralysis of the lower lip, aimless wandering, excessive sweating, behavior changes, and convulsions or even coma.[1]

Diagnosis

Any horse exhibiting abnormal behavior or neurologic signs (such as ataxia or muscle trembling) should be examined by a veterinarian as soon as possible. It's important to rule out other neurologic diseases such as rabies, equine protozoal myeloencephalitis, other viral encephalitides, the neurologic form of equine herpesvirus-1, botulism, wobbler syndrome, among others.

A veterinarian can perform blood tests to help diagnose WNV in horses with clinical signs consistent with infection.[7]

When interpreting test results, veterinarians will also consider a horse's vaccination status, as some tests are incapable of distinguishing between infected and vaccinated horses. Good recordkeeping regarding vaccine history is recommended. While waiting for the test results, veterinarians typically initiate symptomatic treatment.

Treatment

No specific treatment or cure for horses infected with the WNV exists. Veterinary care includes administering anti-inflammatory drugs and, if necessary, intravenous fluids. Supportive care is very important for infected horses to ensure adequate food and water intake, to protect the horse from self-inflicted injuries, and to prevent pressure sores in recumbent horses.

Some veterinarians have attempted treating WNV-infected horses with antiviral drugs such as interferon and passive antibody products. Published clinical trials demonstrating this approach's efficacy or safety are lacking at present, but this is an important and actively researched topic in both human and veterinary medicine.

Prognosis

Compared to humans, who rarely die from WNV, the case fatality rate in horses is higher (as mentioned, approximately 40% in nonvaccinated horses). Recumbent horses are at higher risk of dying than infected horses that remain standing, and older horses reportedly have higher fatality rates.

That said, many infected horses will recover completely following infection (60%), which means that infection with WNV is not a "death sentence." Unfortunately, approximately 40% of horses that recover from the infection experience residual clinical signs such as gait and behavior

the HORSE.com
YOUR GUIDE TO EQUINE HEALTH CARE

abnormalities. In addition, a small percentage (10%) of horses can suffer a relapse after the initial recovery.

Prevention

Although the number of infected horses has declined since the spread of the virus throughout the United States from 1999 through 2003, WNV remains an important disease in unvaccinated horses.[3,4]

The American Association of Equine Practitioners recommends vaccination of all foals and horses against WNV.[2,8] Yet some owners elect not to vaccinate their horses against WNV. This may be, at least in part, to the fact that owners do not consider WNV a "real" threat.[9]

Prevention through vaccination of equids against WNV and mosquito control is the most important way to minimize a horse's chances of becoming infected.

In the northern regions of the United States, veterinarians recommend vaccinating horses in the spring prior to peak mosquito levels. In the south, where mosquito populations are present year-round, horses might be vaccinated more frequently.

In addition to geographic location, age and exposure play important roles in deciding how often to vaccinate horses. Studies have shown that the WNV vaccine has a substantial effect on preventing disease.

Minimizing mosquito populations near your horses by eliminating mosquito breeding and resting areas will make it more difficult for the insects to bite and infect horses and the people who care for them.

For example, reduce or eliminate sources of stagnant or standing water, remove muck from areas near the horses, stable your horses during peak mosquito periods (i.e., dawn and dusk), use equine-approved mosquito repellants, place fans inside the barns or stalls to maintain air movement (mosquitoes don't fly well in wind), keep weeds and grass trimmed, and avoid using incandescent bulbs inside stables at night. Instead, place incandescent bulbs away from the stables to attract mosquitoes to areas away from horses.[1]

Finally, discourage wild birds from roosting near or in your stables. Report any dead birds—particularly crows, blue jays, magpies, owls, and hawks—to your local Department of Health.

KEY REFERENCES

1. Oke, S. Mighty Mosquitoes. *The Horse*, July 2012
2. American Association of Equine Practitioners. West Nile Virus Vaccination Guidelines. 2012. www.aaep.org/vaccination_guidelines.htm.
3. United States Department of Agriculture Animal and Plant Health Inspection Services. Animal Health Monitoring & Surveillance. West Nile Virus. www.aphis.usda.gov/vs/nahss/equine/wnv.
4. Center for Disease Control. Division of Vector-borne Diseases: West Nile virus. www.cdc.gov/ncidod/dvbid/westnile/USGS_frame.html
5. Smith Thomas H. EEE, WEE, and VEE (Eastern, Western, and Venezuelan Equine Encephalitis). www.TheHorse.com/14452.
6. Venter M, Human S, van Niekerk S., et al. Fatal neurologic disease and abortion in a mare infected with lineage 1 West Nile virus, South Africa. *Emerg Infect Dis* 2011;17(8):1534–6. www.ncbi.nlm.nih.gov/pmc/articles/PMC3381566.
7. LeQuire E. Rapid testing for West Nile virus. www.TheHorse.com/4837.
8. American Association of Equine Practitioners. West Nile virus. www.aaep.org/health_articles_view.php?id=284.
9. Dickenson K, Paskewitz S. Willingness to pay for mosquito contro: How important is West Nile Virus risk compared to the nuisance of mosquitoes. Bector Borne Zoonotic Dis 2012 in press. www.ncbi.nlm.nih.gov/pubmed/22651384

Authored by Stacey Oke, DVM, MSc; reviewed by Josie Traub-Dargatz, DVM, MS, Dipl. ACVIM