



West Nile Virus Fact Sheet for Veterinarians

Background

West Nile virus (WNV) is a member of the Japanese encephalitis virus complex of the genus *Flavivirus*, family *Flaviviridae*. This genus includes nine viruses distributed around the world. In the United States, the complex has two other representatives: Powassan and St. Louis encephalitis (SLE) viruses. Both cause encephalitis in humans. The epidemiology of WNV is nearly identical to that of SLE virus. Both are principally carried by species of *Culex* mosquitoes and have birds as the reservoir. They differ in that WNV causes disease and mortality in humans, wildlife (birds, particularly crows and blue jays), and domestic animals, particularly horses. SLE does not cause any remarkable disease in wildlife or mammals other than man.

WNV was previously seen only in Africa, Asia and Southern Europe. In 1999, WNV was identified in the United States when at least 62 people became seriously ill, and seven of them died. Since then, WNV has rapidly spread throughout the continental United States. In Ohio, WNV was first identified in birds and mosquitoes in 2001. The following year, the first human cases and deaths were reported in Ohio. By the end of 2002, WNV was reported in all 88 Ohio counties, either in birds, mosquitoes, humans or horses. There were 441 human and 644 horse cases identified. WNV is now established in Ohio where cases occur each year and seasonal epidemics can flare up under certain conditions in the summer and continue into the fall.

Epidemiology

Early outbreaks of WNV in horses occurred in 1962 in France, and 1963 in Egypt. Much later, outbreaks occurred in 1996 in Morocco, 1998 in Italy, 2000 in France and Israel and in 1999-2002 in the United States. In France, a 10% morbidity with a 30% mortality rate was recorded. In Morocco, the case fatality rate was 44.7% (42/94) and in Italy it was 42% (6/14). In the United States in 1999, 9 of 25 (36%) horses with clinical signs of the disease died or were euthanized. In 2000, there were 60 cases of WNV reported in horses from seven states, and 23 horses either died or were euthanized (38%). During 2001, there were 738 confirmed horses that developed clinical signs of WNV infection in 19 states with ~25% fatalities. In 2002, there were > 14,000 confirmed equine cases of WNV from 40 states; however, no mortality data is available.

Clinical Signs

In the Italian outbreak, all cases exhibited varying degrees of ataxia and weakness in the hind limbs. Asymmetric weakness was detected in the rear limbs of some horses. Some cases also had involvement of one or both forelimbs. In six cases, there was progression of clinical signs with ascending paresis leading to tetraplegia and recumbency within nine days. Depressed mental state and tremors were noted in a few cases; however, there were no behavioral or head posture abnormalities or cranial nerve involvement. In the U.S. cases, similar clinical signs were seen, however, more brainstem signs were present in some cases. For the horses that died or were euthanized, death usually occurred within five days.

Pathology

No gross pathologic lesions were detected. Histologically, all animals exhibited 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

Rabies, botulism, equine protozoal myeloencephalitis (EPM), cervical vertebral malformation also known as Wobbler's syndrome (CVM), equine herpesvirus 1 (EHV1), equine degenerative myeloencephalopathy (EDM) and other encephalitis such as Western equine encephalitis (WEE), Eastern equine encephalitis (EEE) and Venezuelan equine encephalitis (VEE), would all have to be considered. Many of the cases have looked similar to commonly diagnosed neurologic diseases, particularly EPM. Considering the ascending paralysis, mentation changes and hyperesthesia in some cases, all horses that die or are euthanized should be sent for rabies diagnostics. Diagnostic rule-outs are necessary.

Diagnosis

Due to the zoonotic potential of WNV, all horses that develop neurologic signs from June to October should be considered WNV suspects, particularly if the virus has been detected in Ohio close to the animal you are examining. Whole blood, serum, and CSF (if collected) samples should be submitted to Ohio Department of Agriculture Animal Disease Diagnostic Laboratory (ODA ADDL). Complete histories should be submitted with all samples (form available on the OSU web site). If the animal is demonstrating rapidly progressive neurologic signs with recumbency, the animal should be submitted to the ODA ADDL in Reynoldsburg, Ohio, for rabies and WNV testing. Other diagnostics include PCR of central nervous system tissues and immunohistochemistry. If you decide to perform a postmortem in the field, please refer to USDA guidelines.

Treatment

In the Italian outbreak, no treatments were effective. Similar findings occurred in the U.S. cases, as well. Regardless of the treatment, horses that survive usually recovered very quickly. Supportive care is the only therapeutic alternative.

Prevention

There is a vaccine available for prevention of WNV infection in horses. This is a killed vaccine that must be given in two doses initially, three to six weeks apart. Both doses should be completed at least 4 weeks prior to mosquito season. If the horse has already had the initial two doses, the first yearly booster should be given in early April. Horses that are stressed, such as show and race horses, should be given another booster in late July. Reduce mosquito breeding sites; decrease exposure to adult mosquitoes; provide screened housing; use insect repellents; and reduce outdoor exposure. Local mosquito control authorities may be able to help in assessing the mosquito breeding risks associated with a specific property.

Contact Veterinarian

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What is the current status of West Nile virus in Ohio?

Contact your local health department or visit the Ohio Department of Health's website for the current status of WNV in Ohio: <http://www.odh.ohio.gov/wnv>.