

# Memorandum

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**To:** WVMA  
**CC:** Andrea Bill,  
**From:** Benjamin J. Darien  
**Date:** 2/15/2006  
**Re:** Equine Herpes Virus 1 (EHV-1) Myeloencephalopathy

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The UW-School of Veterinary Medicine has very strong evidence that a horse from the University of Wisconsin Hooper Riding club has contracted the neurological form of Equine Herpes Virus-1. Our strong suspicion is based on the clinical signs of neurological disease exhibited by the patient and a high acute titer as determined by serum neutralization. Furthermore, PCR analysis on nasal swabs submitted to the University of Kentucky Livestock Disease Diagnostic Center for EHV-1 was also positive. Taken together, we are confident of the tentative diagnosis of EHV-1, but confirmatory results by virus isolation and histopathology are pending and may not be available until next week.

The horse was admitted for treatment to the UW-School of Veterinary Medicine on February 8<sup>th</sup> but was humanely euthanized on February 10<sup>th</sup> due to progressive neurologic signs that were not responding to aggressive treatment. It was the second horse from the Hooper riding facility to be euthanized for progressive neurological signs during the last 10 days. The first horse was euthanized on the premises, but ante-mortem serology also demonstrated a high acute titer to EHV-1, in that individual.

The following represents background information on the disease that members should feel free to share with owners, trainers and concerned individuals in the horse industry.

## **Equine Herpes Virus 1 (EHV-1) Myeloencephalopathy**

**General Information:** EHV-1 is one of the more important contagious, infectious pathogens in horses and can cause abortion in pregnant mares, early neonatal death in foals, respiratory disease, and occasionally neurologic disease often referred to as myeloencephalopathy. Outbreaks of neurological disease due to EHV-1 infection are often reported in association with fever, nasal discharge, and cough in a group of horses.

**Clinical Signs:** The clinical signs of the neurological form reflect the predilection of the virus to attack the spinal cord and brain stem such as ataxia (incoordination), paresis (inability to stand). Horses may be unable to urinate (incontinence) or may frequently dribble small volumes of urine. Horses may have difficulty producing manure. Sometimes the neurologic signs are accompanied by cellulitis (inflammation or swelling of the limbs) and petechiae (small hemorrhages on the gums).

**Pathogenesis:** EHV-1 infection is acquired by aerosolized infective droplets which occur over limited distances (estimated to be less than 35 feet). Fomite transmission (contaminated hands, water, feed) is also possible. The virus replicates in the nasal epithelium and spreads to local lymph nodes. EHV-1 infections induce a biphasic fever where the first fever spike is associated with nasal shedding of the virus, and the second with the viremic phase of the infection. Shedding of virus in nasal secretions may occur for as long as 14 days in immunologically naïve horses. This is termed the infectious period and

during this time the affected horse may transmit virus to susceptible horses in the immediate environment via aerosolized nasal secretions. EHV-1 may establish a latent infection in the brain such as the trigeminal ganglia in affected horses, in which case infection is life-long. Factors that induce recrudescence of EHV-1 infection are incompletely understood; concurrent disease and "stress" are suggested to be important, and experimentally, administration of immunosuppressive drugs has been shown to cause reactivation of the virus.

**EHV-1 during an outbreak:** In general, isolating horses for at least 21 days after potential exposure to EHV-1 is recommended. Infected horses may shed the virus in nasal secretions for up to 14 days. It is advisable that the quarantine be extended for 30 days after the last evidence of disease (fever, respiratory or neurologic disease) in the horse population at risk during the epidemic. Horses that are asymptomatic and that have been quarantined for an appropriate period after possible exposure are unlikely to transmit the virus. If a horse has not developed fever, cough, nasal discharge, or neurological signs within 21 days of potential exposure, it is unlikely the horse will do so. The risk of developing disease or transmission of the virus decreases as the time after the exposure increases. However, because Herpesvirus infection is life-long in horses, there is always some risk of exposure to this virus when horses are congregated.

**Diagnosis of EHV-1 Infection:** There are four tests that can be used to help diagnose EHV-1 infection. One or all of these tests may be employed during an outbreak of suspected EHV-1-induced disease.

- The virus can be isolated from pharyngeal or nasal secretions or whole blood. Isolation of the virus strongly suggests that the virus is the cause of the disease.
- Polymerase chain reaction (PCR) can be used to look for the presence of virus in pharyngeal or nasal secretions. A positive test indicates presence of portions of the virus or that living virus may be present, and confirms that virus has been present at some time.
- PCR can be used to look for presence of virus in whole blood buffy coat (white blood cells). The presence of viral antigens in the blood indicates that the horse is currently or has recently been viremic. Negative PCR tests do not rule out EHV-1 as the cause of the disease.
- Serology is used to look for antibody to EHV-1. The horse produces antibodies in response to viral infection or vaccination, and this process takes time, 7-14 days, depending on whether the horse has been previously exposed to the virus. Serum antibody titers are often low during the acute phase of the disease, but increase dramatically as the horse responds to the infection. When assessing serum antibody concentrations, it is therefore valuable to have two blood samples drawn 7 to 14 days apart. A 4-fold increase in antibody titer indicates recent viral infection.

**Treatment of EHV-1 Infection:**

- The antiviral drug acyclovir has been used empirically, but efficacy is unknown. Blood concentrations of the drug have been measured in 5 horses being treated with acyclovir.
  - Acyclovir was administered IV (10 mg/kg in 1 L isotonic crystalloid solution over 60 minutes) and orally (20 mg/kg) to healthy adult horses.
  - The plasma concentrations of acyclovir after oral administration were below the lower limits of detection.
  - IV administration of acyclovir to healthy adult horses achieves concentrations within the sensitivity range described for equine herpes virus-type 1, but in most cases the cost of i.v acyclovir is prohibitive.
  - The oral bioavailability of acyclovir in horses is low.
- Symptomatic treatment: anti-inflammatory drugs (Butazolidin, Banamine, DMSO, Corticosteroids); nursing care and support in slings if needed.
- Bladder catheterization, and manual rectal evacuation may be necessary in some horses, due to bladder paralysis and fecal retention.

**EHV-1 Vaccination Strategy Protocol:** There is no vaccine currently available that claims to specifically protect against the neurological form of EHV-1 infection. Vaccination may reduce the

severity of the viremia in infected horses, and may therefore reduce the amount of virus shed, thus reducing the risk of all forms of EHV-1 infection. Anecdotal evidence from recent outbreaks of EHV-1 disease suggests an association between frequent vaccination for EHV-1 and development of neurological disease. More information on the effect of vaccination on outcome and its efficacy in protecting potentially exposed horses is needed.

**Farm Management Precautions:**

- Isolate new arrivals, sick horses, and horses returning from competition for at least 7 days. If you know that horses at the competition had confirmed EHV-1 infection, isolate your horses for at least 21 days before reintroducing them into your barn.
- Disinfect all areas of the barn in which a suspect horse has been housed or worked. Use bleach (1 part bleach to 10 parts water) or phenolic based disinfectants if significant organic material is around.
- Encourage barn personnel and riders to wear leather or rubber boots/shoes that can be disinfected. Use a disinfectant tub at the entrance to the barn and ask all visitors to step in it before entering and leaving. This includes blacksmiths and veterinarians. Change bleach in the tub daily. Wash hands before handling horses. Do not share water buckets, feed tubs or stalls among horses.
- Segregate horses into the smallest possible groups. Large groups of horses sharing a common airspace may all be infected by one or a few horses shedding the virus.
- Take rectal temperatures daily. Isolate any horse with a fever (adult horses, >101F) and consult a veterinarian immediately.

**Sample Submission:**

- **For serology and virus isolation: University of Wisconsin, Wisconsin Veterinary Diagnostic Laboratory (WVDL), [www.wvdl.wisc.edu](http://www.wvdl.wisc.edu):**
  - Madison: 6101 Mineral Point Rd. Madison WI 53705-4494 Phone (608) 262-5432; Toll Free (800) 608-8387; FAX (608) 262-5005
- **For Virus Isolation and PCR analyses: University of Kentucky, College of Agriculture, Livestock Disease Diagnostic Center (LDDC), <http://ces.ca.uky.edu/lddc/services.htm>**
  - LDDC, 1490 Bull Lea Road, Lexington, KY 40511. Phone: (859) 253-0571; Fax: (859) 255-1624