The Control and Management of Herpes Virus Infection in Horses  
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INTRODUCTION

Respiratory disease outbreaks commonly occur whenever horses are assembled. They are often referred to as rhino or “the virus.” There is paranoia about herpes virus with the increased occurrence or diagnosis of the neurological form of herpes (Equine Herpes Myeloencephalitis). The causative agent of most respiratory disease outbreaks can’t be distinguished by the presenting clinical signs but requires laboratory confirmation. Equine herpes virus is a common etiological agent. Equine herpes viruses are not known to cause illness in humans.

The other respiratory viruses, which need to be differentiated from equine herpes, include: influenza subtype 2, equine rhinovirus subtypes 1 and 2, equine arteritis virus and equine adenovirus. The equine rhinoviruses should not be confused with equine herpes virus. They are a separate group of viruses. The term “rhino” usually refers to herpes virus. The relative prevalence and importance of each virus in causing respiratory disease vary from year to year and between geographic areas. Laboratory testing is usually required to distinguish between viruses.

The subtypes of herpes virus that commonly affect horses are:
1. Equine herpes virus type 1 (EHV-1), the virus formerly called equine viral rhinopneumonitis, which can cause respiratory disease, abortions, or neurological disease.
2. Equine herpes virus type 2 (EHV-2) or equine cytomegalovirus (not known to cause clinical disease in horses with a normal immune system).
3. Equine herpes virus type 3 (EHV-3) or coital exanthema.
4. Equine herpes virus type 4 (EHV-4), which can cause respiratory disease.

Both EHV-1 and EHV-4 can cause a highly contagious respiratory tract infection, particularly in yearlings and young horses. The condition can vary in severity from mild to severe and is characterized by fever, lethargy, anorexia, nasal discharge, and cough. EHV-1 has the greatest potential to cause clinically severe outcomes, including abortion of a virus-infected fetus from infected mares and the paralytic neurological disease (myeloencephalopathy), secondary to vasculitis (inflammation of the blood vessels) of the spinal cord and brain.

CLINICAL ILLNESS

Respiratory Syndrome
Most horses have been exposed to herpes viruses by two years of age. The majority of such respiratory infections are subclinical. In fully susceptible horses, clinical signs include pyrexia (fever) and a harsh dry cough, followed by a mucopurulent nasal discharge. Secondary bacterial infections may cause more serious invasive diseases. Horses at greatest risk are those 2 and 3-year-olds that are assembled for, and confined in barns at, sales, races or shows. As many as 60% of recovered horses can become asymptomatic carriers (don’t show outward signs) of latent herpes virus (virus waiting to be activated).

Abortion Form
Most commonly, EHV-1 abortions occur in only one or two mares but outbreaks of abortions (abortion storms) do occur. The abortions can occur at the same time or spread over a period of weeks on the same farm. The mares rarely show outward signs prior to aborting. Young infected horses moving from one facility to the next are a major source of virus and endanger pregnant mares.
Neurological Form
In the past few years, outbreaks of the neurological form of herpes have been of great concern. The cases are sporadic and can occur without warning, but are usually linked back to a common source, such as exposure at a recent sale or event. Horses with the neurological form of EHV-1 typically exhibit weakness and paralysis of the muscles of the hind limbs. This results in incoordination, gait abnormalities and, in many cases, the inability to rise from the sitting position. The neurological deficits result from a thrombotic, ischemic inflammation of small blood vessels in the spinal cord and/or brain. The interval between initial EHV-1 infection of the respiratory tract and the subsequent onset of neurological signs is 8 to 12 days. The neurological deficits appear suddenly and reach their peak intensity within 48 hours. The disease is resistant to vaccination; the clinical attack rate is high; and large numbers of fatalities are the rule. The prognosis for non-recumbent horses is favourable, but is poor for animals that remain down for longer than 24 hours. The basis of EHV-1 paralytic disease was recently discovered. A single gene alteration endows mutant virus strains with enhanced virulence for the horse. This discovery has led to a genetic test for identifying latent equine carriers of mutant, neuropathogenic strains of EHV-1.

TRANSMISSION
Most horses have developed some immunity to the herpes viruses through repeated exposure. The virus can remain latent (dormant) in the majority of horses without showing clinical disease. Recrudescence (reactivation) of latent infection in affected horses occurs and shedding of the virus ensues. The virus can be found in the lymph nodes in 2 to 3 days post infection and abortions can occur as early as nine days post infection. The most intense shedding of the virus occurs during the first few days of the disease. Recrudescence of the virus is the reason why horses in closed populations may experience an outbreak of herpes virus. Horses are not protected against the abortion or neurological forms of the disease, even after repeated exposure.

Sporadic outbreaks of equine herpes occur and will continue to occur. A continuous repetition of three events helps to maintain the virus in the horse population: vertical transmission from mare to foal; post-infection development of latent virus in affected foals; and periodic reactivation and shedding of latent virus with horizontal transmission to other horses.

The horizontal transmission is primarily by aerosolized droplets dispersed by coughing, but it may also be spread by contaminated equipment (i.e., buckets, grooming aids), contaminated hands and, in the case of EHV-1, by aborted fetuses, fetal fluids and placentas associated with abortions.

CONTROL AND MANAGEMENT
Strategies to reduce transmission of herpes virus are based on four key pillars:
- Maintaining rigid biosecurity procedures
- Quarantining newly arrived horses and horses returning to the group
- Reducing stress-induced reactivation of the virus
- Vaccinating horses appropriately before exposure.

Biosecurity
Biosecurity refers to management practices that reduce the introduction of infectious diseases by animals or people and the spread of infectious disease on the farm.

Animal + Infectious Agent + Environment = Disease

Activities which reduce the risk of a disease entering and spreading within a facility or a group of horses include:
- Maintaining horses in the smallest, closed, physically-separated groups as possible.
- Preventing entry of the virus into horse groups by limiting exposure to high-risk young horses.
- Limiting admittance of people into the barn area to only necessary personnel.
- Enforcing the washing of hands, the use of footbaths to disinfect outer footwear, and insisting on the wearing of newly laundered outer clothing, e.g., coveralls, when entering the stable or barn.
- Washing of hands with soap and water, or by using an alcohol-based hand disinfectant after handling each horse.
- Minimizing the use of shared equipment. Equipment, such as water buckets, lead ropes, grooming equipment, etc., should not be shared between horses. These items should be labelled as belonging to an individual horse. Other equipment, such as twitches, shovels, forks and bits, should be disinfected daily and between each use. Care should be taken when filling water buckets and feed troughs. Neither the hose nor the feed scoop should have contact with an individual horse's bucket or trough.
- Not sharing multi-dose oral medications between horses.
When possible exposure to a disease agent is suspected:
- Take rectal temperatures a minimum of twice daily, and maintain a temperature log on each horse for presentation to event officials.
- Notify the stable’s veterinarian immediately if fevers > 101.9°F, or > 1 degree above their normal temperature, occur.
- Isolate suspect horses. Samples should be taken by the stable veterinarian for EHV-1 testing.

Quarantine
Quarantine is voluntary or compulsory isolation, typically to contain the spread of something considered dangerous, often but not always disease. The word comes from the Italian word *quarantena*, meaning forty-day period. In the horse world, trying to get horse owners to physically separate horses into different barns, pastures or geographic locations for 40 days is merely impossible. However, that is what is needed. A designated quarantine area, which physically separates horses, is a necessity on all farms. The degree of isolation determines your success in preventing disease transmission. For a respiratory disease, such as herpes, strangles or influenza, that is spread by aerosol as well as fomites (feeders, waterers, halters or grooming equipment, dirty hands and clothing), quarantined horses should not be able to touch or share the same airspace or equipment with resident horses. Personnel will need to change outer clothing between resident horses and quarantined horses and care for them in that order. For diseases that are spread by biting insects (e.g., piroplasmosis, Equine Infectious Anemia), special attention to distance separation and insect control will be needed. An ample supply of clean clothing and footbaths must be maintained for personnel, if they are moving between barns.

The quarantine period should be a minimum of twice the maximum incubation period. In the case of neurological herpes with an estimated incubation period of 8 to 12 days, this means a minimum of 16 and preferably 24 days. In reality, a minimum of 21 days and preferably 30 days is used for most diseases for horses returning from breeding, showing, etc.

Reducing Stress
Herpes viruses can remain latent (dormant) until something reactivates them and shedding of the virus ensues. Situations that may predispose to recrudescence may include: use of steroids, extended periods of transportation, or mixing with unfamiliar stable/pasture mates.

Vaccination
Vaccination against herpes viruses does not provide 100% protection; however, it appears to reduce the frequency and severity of respiratory disease. It is recommended in yearlings and young horses to reduce the EHV-respiratory diseases, and broodmares to try to reduce EHV-related abortions. Since, EHV-associated respiratory disease is not thought to be a major problem in adult horses, and vaccination does not prevent the neurological form, it may not be necessary to vaccinate adult horses (5 years and older) that are not broodmares or exposed to broodmares. Revaccination of all at-risk horses may be needed at 3-month intervals. Vaccinate mares according to label and in consultation with your veterinarian. Vaccines against equine herpes 1,4 are available for use as inactivated (killed) intramuscularly, as recommended by your veterinarian. In general, this entails the administration of the first vaccine, followed by 2 subsequent vaccines at 4- to 6-week intervals. Revaccination may be required every 3 - 6 months, depending on relative risk. To avoid concerns with potential local swellings at vaccination sites, avoid giving vaccines within 7 - 10 days of a performance event.

- Vaccinate all foals starting at 4 to 6 months of age with a primary series of 3 doses administered 3 - 4 weeks apart.
- Revaccinate horses greater than 1 year of age at intervals of 3 to 6 months, depending on age and risk of exposure.

Regulatory Information
The annual incidence (number of cases per 1,000 horses) of herpes virus infection is unknown, since there are no requirements for owners and veterinarians to notify any agency when equine herpes virus is diagnosed. In Canada, there are no federal or provincial regulations restricting the movement of infected horses or horses exhibiting signs of a respiratory virus. However, with increased concern around the neurological form of herpes, state, provincial and racetrack officials have restricted horse movement to and from various events or geographic areas, or imposed biosecurity measures to reduce the introduction of infected horses.
REFERENCES


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