

## EHV-1 MYELOENCEPHALOPATHY AT PENN NATIONAL RACE TRACK

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### ABSTRACT

Penn National Race Track is located in rural central Pennsylvania where approximately 1,100 Thoroughbred racehorses are housed in 27 barns. During the winter months, one of the most common problems of our equine athletes is respiratory tract infection. Most infections are resolved with supportive therapy and rest, but in the year of 2003 this was not to be the case. An outbreak of EHV-1 at Findley College, Ohio occurred in late December 2002 and early January 2003. Forty out of 135 horses developed some degree of neurological signs. Twelve of these horses had to be destroyed. The EHV-1 virus was detected in horses stabled at Penn National in February 2003. Two horses from a quarantined barn of 30 head were destroyed due to neurological signs.

### FACTS ABOUT EHV-1

Equine herpesvirus is a term that refers to any one of several highly contagious diseases in the horse. These contagious diseases can occur as a result of infection by either of 2 closely related herpesviruses, equine herpesvirus-1 (EHV-1) and equine herpesvirus-4 (EHV-4). Both EHV-1 and EHV-4 are worldwide in distribution and constitute a health risk for domestic horses of all ages. Infection with either EHV-1 or EHV-4 is characterised by respiratory tract disease. Severity of clinical signs varies depending on age and general health of the infected horse. EHV-4 is often referred to as 'Equine rhinopneumonitis' (Allen 2002a).

Although infection with EHV-4 is often confined to the respiratory tract, it may spread beyond the respiratory tract to cause more serious disease, characterised by abortions, newborn death or neurological disease. In most cases, following infection with EHV-1 or EHV-4, the virus can become latent, surviving in the animal

but not causing signs of disease, until the animal is stressed. In response to stress (weaning, transport, social disruption, racing, etc), the virus may be reactivated in latently infected animals and transmitted to other susceptible horses. The horse may or may not show signs of infection.

Horses infected with EHV-1 may be presented with a biphasic fever spiking to 102–106°F (38.8–41.1°C), and signs of respiratory disease, including a cough and a nasal discharge. Secondary bacterial infections may occur due to a compromised immune system. Abortions may occur, usually in late gestation (greater than 7 months) and affected mares do not always show clinical signs of infection before aborting. *In utero* infections may lead to premature deliveries or unhealthy neonates which may appear normal at birth, but within the first week, become weak and lethargic. Clinical signs in these foals may include respiratory problems, pneumonia, tachycardia and diarrhoea. Liver damage can occur and the prognosis is poor for these foals.

Infection with EHV-1 may also cause neurological disease in an infected adult horse, but this is a less common manifestation. Neurological disease associated with EHV-1 can range from mild incoordination to severe posterior paralysis. In exceptional cases, quadriplegia has been reported. The most severely affected animals may die naturally or be destroyed. Previous respiratory infection, either in the affected horse or in surrounding horses, may or may not be present.

Treatment of a horse infected with EHV-1 is supportive therapy including rest and stress reduction. Stalls should be well ventilated and as dust-free as possible. Antipyretics and antibiotics may be indicated in some cases.

Direct contact with virus particles is the most common means of transmitting the disease between horses. Transmission through indirect contact is possible, but less likely. Therefore, horses that are in close nose-to-nose contact with infected horses are more likely to become infected

themselves, than horses that are kept isolated. Recovered horses may continue to shed the virus for up to 3 weeks, and the virus may survive in the environment for up to 2 weeks in ideal conditions.

Although an adequate immune response usually occurs after vaccination, protection is short-lived, requiring frequent boosters. Every 60–90 days is common at most racetracks in the US. Vaccinated animals may still become infected but the severity and length of illness are usually reduced. Vaccinated animals are able to shed the virus to other horses in nasal secretions, and unfortunately vaccination may not protect against the neurological form of EHV-1

## **SIGNS, SYMPTOMS AND TIME LINE AT PENN NATIONAL**

Elevated temperatures, purulent nasal discharges, dry hacking coughs, and lack of appetite are not uncommon signs found in horses at a racetrack.

On 3rd February, a 3-year-old Thoroughbred filly (E) spiked a temperature of 102°F (38.9°C). A complete blood count was taken and the horse administered oral antibiotics.

On 6th February, Horse E had a nasal discharge.

On February 7th, 2 3-year-old Thoroughbred fillies (A & D) housed in the same barn spiked temperatures of 102°F (38.9°C). They were also put on oral antibiotics.

At 6 am on the morning of 9th February, the trainer noticed that Horse A was showing acute neurological signs and dribbling urine. By 9.30 am, Horse A was recumbent and unable to rise. The horse was destroyed and transported to the Pennsylvania Animal Diagnostic Laboratory in Harrisburg, Pennsylvania for post mortem examination.

On 11th February, a second horse (B), which was stabled next to Horse A, spiked a temperature of 102°F (38.9°C). No other signs were noted at that time.

On 14th February, the Pennsylvania Diagnostic Laboratory reported that tissue from Horse A was positive for EHV-1. The diagnosis was based on the positive results from the polymerase chain reaction (PCR) test on brain tissue. Horse C, also managed by the same trainer and barn mate of Horse A, went to the racetrack to gallop. According to the exercise rider, the horse did not train well.

On 15th February, Horse C was jogged in the morning, and by 12 pm was showing acute neurological signs and dribbling urine. This horse appeared normal while standing in the stall, but

when forced to move would become ataxic and nearly fall down. This horse showed no signs, other than not training normally the day before. It was treated symptomatically for the next 4 days until the owner decided to put the horse down.

On 16th February, 2 feet of snow fell on central Pennsylvania. Training at the racetrack came to a halt for the next 2 days and little contact occurred between horses and trainers outside of their barn.

On 18th February, nasopharyngeal swabs and blood were taken from 3 horses (B, C and E) and submitted to the laboratory.

On 19th February, Horse C was destroyed and submitted to the Pathology Service at the University of Pennsylvania School of Veterinary Medicine at New Bolton Center (NBC) for post mortem examination.

On the same day a meeting was held between track management, the private practitioner and the state veterinarians. A decision was made to quarantine the barn. Only trainers and grooms that had horses in the barn would be allowed to enter. A meeting was held with the trainers and owners to explain the measures to be taken to prevent further spread of the disease and the following precautions were mandated:

1. Security guards were placed at the barn to maintain the quarantine.
2. Footbaths were made available at the entrance of the barn.
3. Rubber gloves were provided for the trainers and grooms.
4. All personnel taking care of horses in the quarantined barn were requested to stay out of all other barns at the track.
5. They were also advised to change clothes if they were going to other horses on their farms.
6. An additional 10 blood samples were taken and submitted to Dr George Allen at the Gluck Center in Lexington, Kentucky, for possible virus isolation.
7. On 21st February, results of the post mortem examination on Horse C were received. They were based on a PCR test of the lung tissue and confirmed the horse to be positive for EHV-1. Also the results from the 3 nasopharyngeal swabs and blood on Horses B, C and E that had been submitted on the 18th February were received. All 3 swabs tested positive for EHV-1, but only the blood sample from Horse C that had shown neurological signs on 15th February tested positive for EHV-1.

On 24th February, nasopharyngeal swabs from 8 horses in the barn were obtained. The horses selected were showing nasal discharge, or had

been in close contact with the 2 horses that had exhibited neurological signs.

On 25th February, the results from the 10 blood samples for EHV-1 sent to the Gluck Center were received. Nine samples were negative and the one positive sample was from Horse C that had shown neurological signs on 15th February.

On 26th February, the results of the 8 nasopharyngeal swabs taken on 24th February were received. The horses in stalls 19 and 22 were positive for EHV-1. The horse in stall 19 had been stabled directly behind Horse C that had developed the neurological signs. On this day, Horse B spiked a temperature 102°F (38.9°C). This horse had spiked a temperature on 11th February, and had been positive on a nasopharyngeal swab on 21st February. After these results were received a decision was made to keep all horses in their stalls. Temperatures were taken daily and the trainers were advised to observe the horses in motion in the stall. Any temperature spike was to be reported to the State Veterinarian immediately. Weekly temperature charts were also made available to the State Veterinarians.

On 27th February, the horse in stall 19 that had swabbed positive from the 24th spiked a temperature of 102°F (38.9°C). The following day this horse's temperature had returned to normal.

On 5th March, a general meeting with all horsemen was held to update the situation and inform them of future plans.

On 12th March, all the horses in the quarantined barn had gone for 14 days without a temperature spike. The horses were allowed to walk outside of their stalls.

On 20th March, the mandated quarantine by track management was removed and the nightmare of EHV-1 had finally come to an end.

## DISCUSSION

At the beginning of the outbreak, there were 30 horses housed in the barn where the infections occurred. There were 5 trainers and approximately 8 grooms in charge of these horses.

The initial differential diagnosis included, Rabies, EHV-1, equine protozoal myeloencephalitis (EPM), West Nile encephalitis, and Eastern and Western encephalitis.

In summary, 2 horses that progressed to the neurological form of the disease had to be destroyed. There were 5 positive nasopharyngeal swabs from 11 swabs taken, one of which was Horse C that developed the neurological signs. From the 10 blood samples taken, only one was positive and again this was Horse C that developed the neurological symptoms. The first

horse that developed neurological signs was destroyed prior to any of the samples being taken.

Due to normal activities at the racetrack, this outbreak could have had a completely different outcome had it not been for several factors. The early diagnosis of this disease was the biggest factor in influencing the eventual outcome of the outbreak. The early recognition by the racetrack practitioner set the wheels in motion before a definitive diagnosis was made. Once the diagnosis was confirmed, many normal activities at the barn changed. Only one practitioner continued to go into the afflicted barn for treatment of the horses. This was always the last stop of her rounds at the track. One State Veterinarian was in the barn every other day for visual observation of the horses.

The heavy snowfall was a great help very early in the course of the outbreak. Training activities came to a grinding halt for 2 days until track management could remove the snow from the racetrack and the barn areas. Limited movement of the horses out of the barns decreased the exposure to other horses. The inability to train lessened the stress on the horses, which was a key factor in the onset of the disease.

Although training and racing at Penn National continued during the outbreak, several surrounding states did not allow any horse from Penn National to race in their jurisdiction. The restrictions varied among the surrounding states. Most followed the restriction that Penn National imposed on the quarantined barn. However, one state required a 30-day period of no temperature spikes from a horses in the quarantined barn before lifting their restriction. One state continued to allow horses from Penn National to run at their tracks as long as the horse did not originate from the quarantined barn.

The decision as to when to remove the quarantine from the affected barn was based on the information from G.P. Allen. An outbreak of EHV-1 disease may reasonably be considered as being over, allowing unrestricted release of horses from established isolation or quarantine restraints, as appropriate when **3 times the usual shedding period for EHV-1 in mature horses (3 x 7 days = 21 days) has elapsed without occurrence of any further case of disease** (Allen 2002b).

EHV-1 is a non-reportable disease and, as such, exposed animals can be moved at the trainers' discretion. Two trainers removed their horse from the barn. The first trainer removed his horses prior to the quarantine and the second trainer removed his horse after the mandated monitoring of temperature was imposed. Both sets of horses were moved to farms where no other horses were present. The movement of these horses had the

potential of spreading EHV-1 to another horse population.

Once the quarantine was removed from the barn, track management would not allow the horses from the affected barn to enter into a race for 30 days because the horses had not been able to train for 30 days; this was a move to protect the betting public.

## CONCLUSION

We feel very fortunate to have resolved this outbreak with the loss of only of 2 horses. The Pennsylvania State Horse Racing Commission (PSHRC) served as a coordinator between

management, owners, trainers and the private practitioner. Every resource that the PSHRC had through the Pennsylvania State Department of Agriculture was made available to help with the diagnosis and management of the outbreak

## REFERENCES

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