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Controlling and containing equine herpes virus when it finds its way into your clinic

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ABSTRACT: Equine herpes virus (EHV) is highly contagious and poses a significant risk to the horse population worldwide, in particular pregnant mares. Abortion can occur from as early as the fourth month of gestation and the virus can also cause respiratory disease in foals, weanlings and older horses. This article outlines the clinical signs, epidemiology, diagnosis, treatment and management with an emphasis on controlling an outbreak within a clinical environment. Strict biosecurity protocols combined with excellent nursing care are key when dealing with this virus.

Keywords: virus; abortion; respiratory disease; neurological disease; biosecurity; treatment; vaccination

Introduction

Equine herpes virus (EHV) occurs in horse populations worldwide and the prevalence of the virus is increasing (Ivens, 2015). The two most common types are EHV-1, which causes respiratory disease in young horses, abortion in pregnant mares and paralysis in horses of all ages and types; and EHV-4, which usually only causes low-grade respiratory disease but can occasionally cause abortion. Following the first infection, the majority of horses carry the virus as a latent infection that can reactivate at intervals throughout life (Goehring, Landolt, & Morley, 2010). EHV-3 is a venereal disease that causes pox-like lesions on the penis of stallions and the vulva of mares, while EHV-5 is a virus that is currently associated with unusual sporadic cases of equine multinodular pulmonary fibrosis in adult horses.

EHV is highly contagious and poses a particular risk to pregnant mares. Abortion usually occurs in late pregnancy, but can happen as early as four months following infection with the virus, reflecting either recent infection or recrudescence of latent infection in a carrier horse (Cruz & Newton, 2010) (**Figure 1**).

Respiratory disease caused by EHV is most common in weaned foals and yearlings, often in autumn and winter. However, older horses can succumb and are more likely than younger ones to transmit the virus without showing clinical signs of infection. It is the continual cycling of EHV respiratory disease in young horses and the periodic reactivation of latent EHV in older horses that maintains the risk of EHV abortion in pregnant mares and EHV neurological disease in horses of all types and ages (Goehring et al., 2010). Although EHV-1 may cause outbreaks of abortion, particularly in non-vaccinated mares, EHV-4 has only been associated with single incidents and is not considered a risk for contagious abortions.

Clinical signs and epidemiology

Signs of respiratory disease include mild pyrexia, occasional coughing and discharge from the nose.

Foals born alive but infected *in utero* are usually abnormal from birth, showing weakness, jaundice, difficulty in breathing and occasionally neurological signs. They usually die or require euthanasia soon after birth.

There are usually no warning signs of abortion caused by EHV. A sudden and unexpected abortion should always be treated with suspicion.

Horses affected by paralytic EHV often display incoordination of the hind limbs, and

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Figure 1. Foal aborted in the third trimester.

occasionally front limbs, anuria and constipation and, in severe cases, recumbency. These signs may or may not be preceded by initial respiratory signs (Henninger et al., 2007). A sudden and unexpected uncoordinated or collapsed horse should always be treated with suspicion, the horse isolated and tests for EHV carried out.

Infection can be transmitted between horses in any of the following ways:

- EHV respiratory infections are spread most commonly via aerosolised droplets of respiratory secretions (Hussey et al., 2006).
- Post-abortion, the foetus, foetal membranes and placental fluids are highly infectious. Once in the environment, the virus could be inhaled via the respiratory route and transmission may occur indirectly via fomites or personnel.
- Mares who have aborted or whose foals have died from EHV may transmit infective virus via the respiratory route or genital tract and transmission may occur indirectly via fomites or personnel.
- Older foals with EHV respiratory disease and horses ataxic due to EHV are highly contagious and can transmit the infection to other horses via the respiratory route and by shedding virus into the environment.
- EHV does not travel long distances as an aerosol (no greater than 50 m) so close contact between horses should be minimised by physical separation into smaller group sizes.
- Indirect EHV transmission can occur through the environment. Once the horse has shed the virus, the pathogen may survive up to a month (Hussey et al., 2006). The handling and management of the first case of abortion is critical. It is important to limit the risk of EHV exposure to other animals in the same environment and watch for subsequent abortions due to EHV infection. Biosecurity protocols should, therefore, be established that can be easily implemented.
- All horses can be 'carriers' of EHV in a latent form and clinical signs may become apparent from time to time, especially after stress or secondary to another disease. The virus is potentially contagious at these times and may be transmitted to otherwise healthy but susceptible horses, who may then develop EHV (**Figure 2**).

What to do in the face of an outbreak

Where abortion, stillbirth, foal death or clinical signs in neonates within 14 days of birth are suspected as EHV-related, control measures must be put in place immediately (Whitwell & Blunden, 1992). The aborted foetus, stillborn or dead newborn foal and its placental membranes must be contained in clinical waste bags or bins, avoiding further contamination to the environment in the process. The foetus and placenta should be sent for post-mortem, histopathology and virological investigation (Cruz & Newton, 2010). The mare must also be placed in strict isolation.

For sick live foals, place the mare and foal in strict isolation and arrange for virological and serological tests to be carried out immediately (Daly & Doyle, 2003). Ensure that any personnel who have had direct contact with the affected mare and foal do not have contact with other horses, especially pregnant mares (**Figure 3**).

There should be a cessation of movements on and off the premises. Destroy contaminated bedding, and disinfect equipment and vehicles used for transporting affected horses. Furthermore, clean and disinfect any areas of potential contamination. EHV is destroyed readily by heat and contact with virucidal disinfectants; therefore, steam cleaning is also advised. Virucidal disinfectants should be allowed to dry naturally in contact with surfaces in order to maximise the chance of destroying the virus.

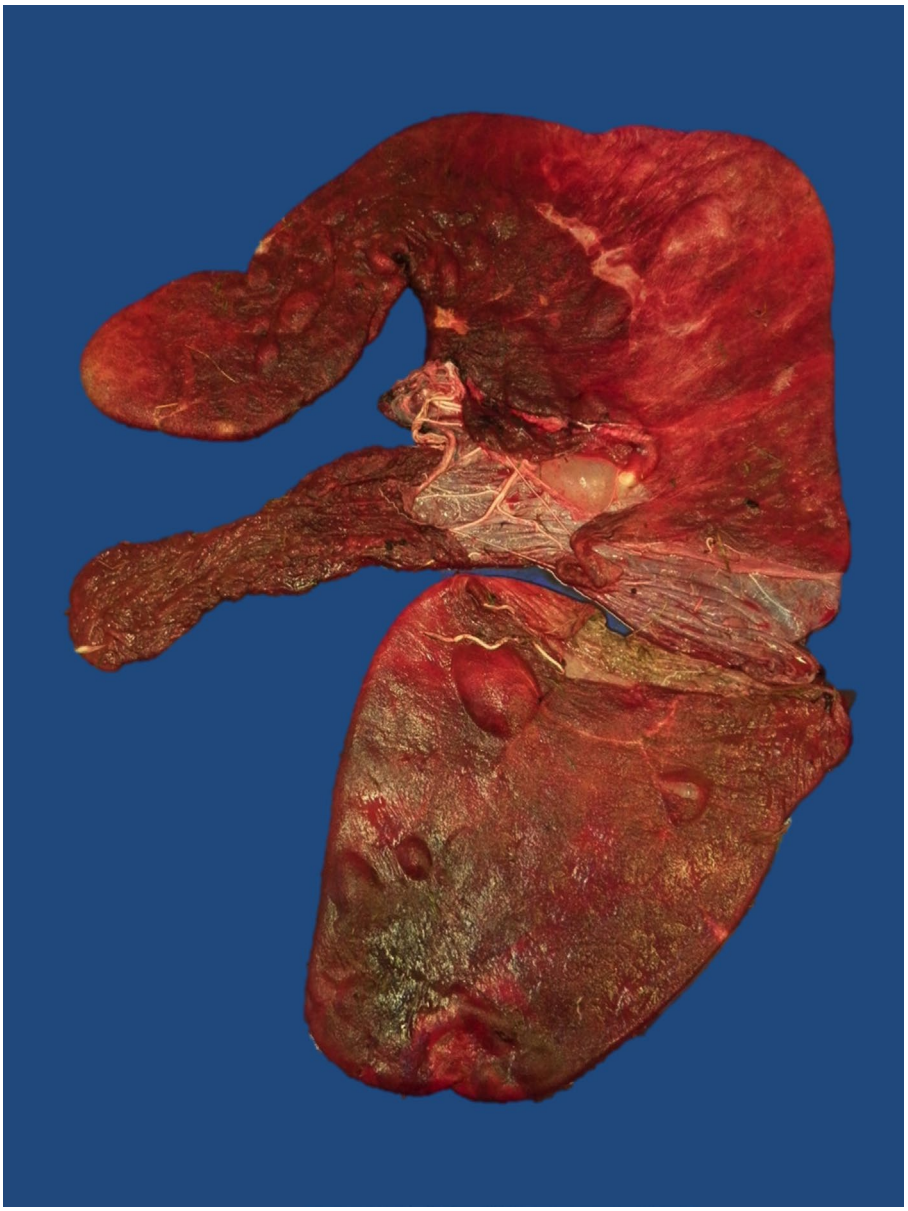

Figure 2. Placenta from a mare infected with EHV. © Rossdales Laboratories

If preliminary laboratory results indicate EHV, divide pregnant mares with which the infected mare had contact, into small groups of similar foaling dates to minimise the spread of any infection and turn them out into isolated paddocks. If the infected mare was already in a small group of pregnant mares, divide the group into even smaller groups as some may still abort. Any non-pregnant mares with which the infected mare had contact should be segregated from pregnant mares.

Figure 3. Stable set up for an EHV patient.

Early diagnosis and management

Control and management measures must be undertaken from the outset and it is essential that a diagnosis is reached as soon as possible. Even though movement restrictions and multiple tests being carried out on all horses involved in an outbreak can be time-consuming, these procedures are critical for the protection of horses on the premises and the wider horse population (Cruz & Newton, 2010).

Once EHV-1 is confirmed isolation measures and movement restrictions should be maintained for at least 28 days. Mares who have aborted must be kept isolated for 56 days post-abortion. In the case of paralytic disease, clearance is only achieved when affected horse(s) and in-contact horses test negative for polymerase chain reaction (PCR) and nasopharyngeal swabs taken at 2-week intervals (Perkins, Goodman, Dubovi, Kim, & Osterrieder, 2008).

Nursing care

Excellent supportive nursing care is paramount as part of the treatment plan for EHV-affected horses. Organisational skills and effective communication are key when managing an outbreak of EHV. This process needs to be a very strict operation to ensure all personnel adhere to biosecurity measures and protocols that are put in place at the clinic. It is also important to ensure that all personnel are fully aware of said biosecurity protocols and have had the necessary training in dealing with an outbreak situation.

Wherever possible, separate nursing staff should care for each group of mares. If this is not possible, pregnant mares should be handled first each day in order to avoid the possibility of indirect transmission of EHV from other horses (Ivens, 2015). Foaling staff should wear single-use PPE each time they foal a mare and dispose of this equipment in clinical waste (**Figure 4**).

Figure 4. A stud vet preparing to examine a mare suspected of having EHV.

Prevention and vaccination

Although vaccination will not prevent individual animals from aborting due to EHV infection, experience suggests that vaccination is advantageous in preventing multiple abortions (called 'abortion storms') on stud farms. Experience shows that 'abortion storms' are much less likely to occur in adequately vaccinated pregnant mare populations and specific vaccination is highly recommended. However, because of the nature of herpes viruses and their ability to cause latent infections, vaccination will not provide total protection; therefore, good management, preventative measures and early detection remains paramount (Bresgen, Lämmer, Wagner, Osterrieder, & Damiani, 2012).

Vaccination in the event of an outbreak is generally not recommended, as horses that have been in contact with EHV may be incubating the virus and there is the theoretical risk of exacerbating neurological signs (Henninger et al., 2007). If a primary course of vaccination has been started, this would interfere with serological monitoring and it would take several weeks before the immunological response occurs (Cruz & Newton, 2010).

Summary

Prompt implementation of control measures along with movement restrictions of patients is essential if there is a suspected case of EHV in a clinic environment. Early detection and diagnosis along with effective management and excellent nursing care are critical for the protection of horses on the premises and the wider horse population.

EHV is, to a certain extent, endemic among the horse population in the UK. Total freedom from disease can never be confirmed and vigilance is vitally important in the management of breeding stock, particularly pregnant mares, in order to minimize cases of EHV abortion, stillbirth, newborn foal death and paralysis.

References

Bresgen, C., Lämmer, M., Wagner, B., Osterrieder, N., & Damiani, A. M. (2012). Serological responses and clinical outcome after vaccination of mares and foals with equine herpesvirus type 1 and 4 (EHV-1 and EHV-4) vaccines. *Veterinary Microbiology, 160*(1–2), 9–16.

Cruz, F., & Newton, R. (2010). Focus Article: Managing an outbreak of Equine Herpes Virus-1, *6*(4). Retrieved September–December 2010, from www.aht.org.uk/skins/Default/pdfs/equine_vol6_4_focus.pdf

Daly, P., & Doyle, S. (2003).The development of a competitive PCR-ELISA for the detection of equine herpesvirus-1. *Journal of Virological Methods, 107*(2), 237–244.

Goehring, L. S., Landolt, G. A., & Morley, P. S. (2010). Detection and management of an outbreak of Equine Herpesvirus type 1 infection and associated neurological disease in a veterinary teaching hospital. *Journal of Veterinary Internal Medicine, 24*(5), 1176–1183.

Henninger, R. W., Reed, S. M., Saville, W. J., Allen, G. P., Hass, G. F., Kohn, C. W., & Sofaly, C. (2007). Outbreak of neurologic disease caused by Equine Herpesvirus-1 at a University Equestrian Center. *Journal of Veterinary Internal Medicine, 21*(1), 157–165.

Hussey, S. B., Clark, R., Lunn, K. F., Breathnach, C., Soboll, G., Whalley, J. M., & Lunn, D. P. (2006). Detection and quantification of Equine Herpesvirus-1 viremia and nasal shedding by real-time polymerase chain reaction. *Journal of Veterinary Diagnostic Investigation, 18*(4), 335–342.

Ivens, P. (2015). *Equine Herpes Virus – Best management practice*. Retrieved from www.buckinghamequinevets.com/uploads/images/PDFs/Equine%20Herpes%20Virus%20Vet%20Times%20Article.pdf

Perkins, G. A., Goodman, L. B., Dubovi, E. J., Kim, S. G., Osterrieder, N. (2008). Detection of Equine Herpesvirus-1 in nasal swabs of horses by quantitative real-time PCR. *Journal of Veterinary Internal Medicine, 22*(5), 1234–1238.

Whitwell, K. E., & Blunden, A. S. (1992). Pathological findings in horses dying during an outbreak of the paralytic form of Equid herpesvirus type 1 (EHV-1) infection. *Equine Veterinary Journal, 24*(1), 13–19.

Further reading

Equine Herpes Virus – EHV. *Codes of Practice 2017*. Retrieved form http://codes.hblb.org.uk/index.php/page/32

Multiple Choice Questions

1. Once EHV-1 is confirmed isolation measures and movement restrictions should be maintained for at least:

(a) 7 days
(b) 14 days
(c) 21 days
(d) 28 days

2. Clearance is only achieved for which type of EHV when affected horse(s) and in-contact horses test negative for Polymerase Chain Reaction (PCR)?

(a) EHV-1
(b) Mare who have aborted
(c) Paralytic disease
(d) Respiratory disease

3. What is the earliest that abortion in mares can occur due to the Equine Herpes Virus?

(a) 2 months
(b) 4 months
(c) 6 months
(d) 8 months

4. Once in the environment, the Equine Herpes Virus could be inhaled via the respiratory route

- False
- True

5. Which type of Equine Herpes Virus (EHV) usually only causes a low-grade respiratory disease?

(a) EHV-1
(b) EHV-3
(c) EHV-4
(d) EHV-5

6. All horses can be 'carriers' of EHV in a latent form and clinical signs may become apparent from time to time

- False
- True

7. How long can the Equine Herpes Virus survive in the environment?

(a) 1 month
(b) 2 months
(c) 6 months
(d) 12 months

8. Vaccination will prevent individual animals from aborting due to EHV infection

- False
- True

For the answers to the MCQs, please go to: http://www.bvna.org.uk/publications/veterinary-nursing-journal