
Guidelines for Management of EHV-1 Abortion – 2002

AEVA GUIDE TO MANAGEMENT OF EHV-1 ABORTION

This management guide was compiled by an AEVA committee and includes contributions from AEVA members with expertise in stud practice and in the epidemiology of EHV-1

Aetiological Agent

- EHV-1 causes abortion, respiratory disease and CNS disease.
- EHV-1 is closely related to EHV-4, which mostly causes respiratory disease, but has caused abortion.
- EHV-1 spreads via the respiratory tract, but aborted foetuses, foetal membranes and fluids are a particularly dangerous source of infection.

Prevention of abortions

- Segregate pregnant mares from all other horses.
- Maintain pregnant mares in small groups based on foaling date.
- Avoid stress in pregnant mare groups:
 - Do not introduce mares into established foaling groups.
 - Do not transport mares late in gestation (within two months of foaling).
 - Pregnant mares from broodmare sales are common sources of EHV-1.
- Vaccination is available as an aid in the control of EHV-1 abortion when used in conjunction with appropriate management practices.

Management of abortions

- Train staff on your farm in what to do if there is an abortion.
- Keep abortion kits at strategic locations around the farm.
- Send all aborted foetuses for laboratory diagnosis.
- Immediately isolate all exposed mares:
 - Isolate the mare that has aborted.
 - Isolate contact mares in small groups (2-3 mares) until they foal/abort.

Communication after abortions

- Open communication between the affected stud and other stud farms will facilitate safe movement of horses between properties.
- Farms receiving horses from an affected stud can do so safely if they are aware of the history of the animals and this is only achieved by communication between farms.

Summary

Effective management strategies to minimise exposure of mares to potential EHV-1 sources combined with rapid diagnostic confirmation of EHV-1 remain the most effective means of minimising the impact of EHV-1 abortion after diagnosis of an index case.

An inactivated EHV-1 / EHV-4 vaccine is commercially available in Australia. This vaccine is registered to reduce the severity of the clinical signs of respiratory disease caused by EHV-1 and EHV-4 and is registered as an aid in the control of EHV-1 abortion when used in conjunction with appropriate management practices. It is important for veterinarians and their clients to realise that vaccination alone will not prevent sporadic abortions and will not stop abortion storms.

There are three management aspects important in both reducing the incidence of EHV-1 abortion on an affected property and minimising the risk of spread of EHV-1 to other studs.

1. Institution of preventive measures.
2. Immediate management of an EHV-1 abortion.
3. Communication and stock movement after confirmation of EHV-1.

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By using these guidelines, farm management and the attending veterinarian can minimise the severity of an EHV-1 outbreak while still allowing breeding of low-risk mares to continue, thus avoiding the implications of total quarantine approach.

EHV-1 disease

Abortions: Abortion due to EHV-1 usually occurs late in pregnancy between 8-11 months of gestation but can be as early as 4 months. The incubation period is highly variable with abortions occurring from 10 days to 4 months after initial infection. Most abortions occur within 30 days of the presumed initial exposure. Abortion is usually spontaneous with the mare showing no signs of the impending abortion and the placenta is usually passed covering the foal. Foals that are aborted before 6 months of gestation may be severely autolysed. At full term infected foals may be born alive but are often abnormal from birth with signs of weakness, jaundice and difficulty in breathing. These foals usually die rapidly within one to three days, but occasionally some foals may survive longer.

Respiratory Disease: EHV-1 can cause respiratory disease, but in Australia respiratory disease has not been a feature associated with abortion storms. EHV4 causes respiratory disease and in rare instances has been responsible for single abortions.

Neurological Disease: EHV-1 may cause neurological disease manifesting itself as ataxia and paralysis. Horses affected by EHV-1 CNS disease that become recumbent have a very poor prognosis for survival.

Epidemiology

EHV-1 is endemic in the horse population of Australia. Serological evidence indicates that approximately 30% of the adult horse population in some studies have previous exposure to EHV-1. As with all herpesviruses, once infected with EHV-1 horses will be latently infected for life. Studies in Australia have demonstrated that foals can be infected very early in life, presumably by their dam. This mare to foal spread of EHV-1 has been shown to occur in both vaccinated and unvaccinated groups of animals. EHV-1 is then spread from foal to foal both before and after weaning. This silent cycle of EHV-1 spread often occurs in the absence of any discernable clinical disease, which emphasises the importance of maintaining pregnant mares in isolation from other groups of horses on the farm. Pregnant mares are the group of horses at most risk from EHV-1 disease and management should ensure that these animals are subjected to as little stress as possible to avoid possible reactivation of latent infection.

There are only two sources of EHV-1 on a farm; either:

- a resident animal that reactivates a previously latent infection or,
- the introduction of EHV-1 from outside the group.

To minimise reactivation it is important to reduce stress, particularly in groups of mares in late gestation. To minimise the chances of introducing EHV-1 from outside the group it is important to segregate the pregnant mares from weanlings/yearlings as these young horses may be a source of EHV-1. It is also advisable to divide mares into small groups (to minimise the extent of exposure in the event of an abortion) based on their foaling date and to maintain these groups until foaling. Introducing new mares into these established foaling groups may directly introduce EHV-1 (especially if the mare is straight off a truck or from the sales etc where she may have been stressed and reactivated a latent EHV-1 infection). This introduction of a new mare may also indirectly be a source of EHV-1 as the pecking order needs to be re-established after the introduction and the associated stress may cause reactivation. To this end it is advisable not to introduce new mares into established groups of pregnant mares.

Natural infection of EHV-1 occurs via the respiratory tract from contact with:

1. Aborted fetuses, foetal membranes, foetal fluids and uterine discharges.
This is the most important source of virus in the event of an abortion storm. Prompt attention to the index case and other in contact mares is a critical issue in reducing the impact of EHV-1 abortion.
2. Nasal and ocular discharges and aerosols from the respiratory tracts of horses with an active EHV-1 respiratory infection. This may include recently aborted mares or clinically infected young horses as well as asymptomatic carriers.

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- Contaminated material such as pasture, feed, feeding utensils, grooming equipment, halters, rugs, bedding, vehicles and staff. This route of infection is of most concern after there has been a case of abortion on the farm. It is always good hygienic practice to limit sharing of equipment, and this is especially important when dealing with the massive amount of EHV-1 around the aborted foetus.

After EHV-1 abortion or the birth of an infected foal, the virus clears rapidly from the genital tract. Mares generally recover well after abortion with no compromise to their reproductive efficiency and can be bred to the stallion on the second oestrus post abortion. However, aborting mares may shed the virus via the respiratory route for up to 2 weeks.

Horses infected with EHV-1 develop latent infections. Stress is thought to play a role in reactivation of the latent infection with resultant shedding of the virus into the environment via the respiratory tract. Postulated stresses include concurrent disease, poor nutrition, travel, adverse environmental conditions and pregnancy.

The virus is readily destroyed outside the body by heat, ultraviolet radiation and a wide range of commonly used disinfectants including those containing surfactants, iodophors, hexachlorophenes or phenols. The virus can survive in the environment for one to two weeks in cool and moist conditions if cleaning and disinfection are not adequate.

Institution of Preventive Management:

Good management procedures on studs developed in conjunction with knowledgeable veterinary input are instrumental in preventing or limiting EHV-1 abortion storms. The following are some useful recommendations to reduce the chances of EHV-1 abortion occurring.

- Segregate pregnant broodmares from non-pregnant mares and maintain pregnant mares in as small a group as possible (about 10) subdivided according to stage of gestation. This should be done as soon as possible after the end of the breeding season and at least by weaning time. These groups should be maintained without additions until mares have foaled.
- Maintain horses other than broodmares in age-matched groups. Run weanlings, yearlings in paddocks well away from pregnant broodmares and avoid co-mingling or use of the same facilities eg yards. Arrange the duties of stud staff so that pregnant mares are handled and fed by separate staff using separate equipment, or if this is not possible arrange staff work schedules so that pregnant mares are handled and fed first in the day.
- Avoid co-mingling resident mares with non -resident mares. If feasible have two separate foaling units. Isolate mares in small groups of 2-3 on arrival at stud. After an initial quarantine period of about 3 weeks these could be amalgamated to groups of ideally about 10.
- Minimise stress factors for pregnant mares. Avoid overcrowding, poor feed conditions and avoid travel later than 8 weeks prior to foaling.
- Establish isolation facilities and emergency abortion protocols.
- Routinely clean and disinfect horse floats.
- Staff education should be encouraged with regards to means of spread of disease, prevention, control procedures, isolation protocol and disinfection procedures.
- Records of paddock movements of horses and introductions are always useful. Accurate records of pregnant mare movements or introductions could be particularly helpful in the sudden abortion storm situation where the initial abortion could have been missed.

Vaccination

An inactivated EHV-1 / EHV-4 vaccine is commercially available in Australia. This vaccine is registered as an aid in the control of EHV-1 abortion when used in conjunction with appropriate management practices. Mares should be vaccinated in the 5th, 7th and 9th months of gestation as per the manufacturers instructions. Vaccination is widely practiced throughout the thoroughbred breeding industry and is required by some studs before mares can be transported to the farm. Vaccination, however, is not 100% protective and is not a substitute for effective management of the index case of EHV-1 abortion. Vaccinated horses have been known to abort and outbreaks of EHV-1 abortion storms have been reported in vaccinated horses when the first abortion was not dealt with appropriately.

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Immediate Management of an EHV-1 Abortion:

"Abortion kits" can be kept at strategic positions around the stud. These strategic positions for ready access should be away from pregnant mare positions eg in reproductive examination sheds, the feed shed, arrival area and feed up vehicles. These abortion kits could be made up in weather proof plastic containers which double as rubbish bins for items used on affected mares. Appendix 1 is a simple step by step set of instructions which could be followed in the event of an abortion. Instructions are within a plastic cover attached by masking tape to the side of each kit.

The actions that are most important in minimising the spread of EHV-1 abortion on a farm are the actions taken when the foetus is first found. The first action (after notifying the farm management by radio/phone) should be to isolate the mare that has aborted and if possible remove her from the paddock to an isolation area. The area in which the abortion occurred should be identified, fenced off and disinfected (see Appendix 1). The aborted foetus should be sent to the laboratory for diagnostic testing. All in-contact mares should be identified as these mares are potentially exposed. Mares should be considered as in-contact if they are in the same paddock as the aborted foetus, or if they are able to have direct contact with mares in the same paddock as the abortion (ie if they share a water trough or have direct contact over a single fence line). All in-contact mares should be placed in isolation (or if these mares cannot be moved then all mares from surrounding paddocks should be moved away) until they abort or until they deliver a live, healthy foal. In-contact mares should be kept in small groups (2-3 mares) until they foal/abort, to minimise the risk of spread from subsequent abortions.

Diagnosis:

Always suspect EHV-1 abortion until proven otherwise.

All aborted foetuses should be submitted to the laboratory for definitive diagnosis of the cause of the abortion.

Diagnosis of EHV-1 abortion is based on histological, virological and in some cases serological tests. In most situations a provisional diagnosis can be established by post mortem examination and histopathological examination. It is best practice for the foetus or foal and placenta to be submitted to the laboratory for virus detection by culture or PCR to establish a definitive diagnosis.

POST MORTEM EXAMINATION: Most foetuses are aborted late in gestation without significant autolysis and are often enveloped in the intact placenta. Foetuses aborted before 6 months gestation may, however, be severely autolysed. Characteristic gross pathological changes include the presence of small pale cream coloured foci up to 5mm diameter in the liver, excess serosanguineous thoracic fluid and turgid lungs with fibrin casts in the trachea and bronchi. These pathological changes are highly variable and many EHV-1 aborted foetuses do not have these gross changes.

HISTOPATHOLOGY: Most equine diagnostic laboratories can achieve at least a provisional histological diagnosis in one to two days. Samples of lung, spleen, thymus, adrenal gland, kidney, liver and placenta preserved in 10% formalin are required.

VIRUS ISOLATION AND PCR: Virus detection by culture and/or PCR tests are required for a definitive diagnosis. Laboratory time for EHV-1 PCR is one day after receipt of sample. A positive EHV-1 culture takes 1-3 days, but culture is only done on samples that are PCR positive (Centre for Equine Virology CEV, University of Melbourne). Virus detection should be considered essential to confirm a diagnosis and should ideally be performed on all aborted foetuses. Tissues for virus isolation include lung, thymus and spleen. These samples need to be collected early in the post mortem by aseptic technique and should be submitted chilled to the laboratory. If neonatal infection is suspected and the foal is still alive then nasal or nasopharyngeal swabs should be collected and sent chilled to the laboratory for virus isolation.

SEROLOGY: An EHV1 specific ELISA is available at the CEV. Serology on a single sample is not useful for diagnostic purposes as a positive result may merely indicate previous infection experience or vaccination. It may be of value in some cases where EHV1 is suspected but the foetus has not been found. If a serum sample can be collected soon after abortion and again 2 weeks later, a rising antibody titre may be demonstrated.

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3. Communication and Stock Movements after Confirmation of EHV-1 Abortion:

Overly restrictive movement controls can be counter-productive. Veterinarians have an opportunity to present a stabilising influence in what can be a very unsettled situation for stud management and mare owners. The situation should not be created where the disease is less feared than the imposition of unofficial quarantine by peer group studs.

THE FIRST ABORTION:

EHVI is a notifiable disease in NSW, Victoria, Queensland, South Australia and the Northern Territory but not Western Australia and Tasmania. As such there is a responsibility of the attending veterinarian to inform the District Veterinary Officer in the relevant government departments:

- NSW - District Veterinary Officer, Department of Agriculture
- VIC - Chief Veterinary Officer, Department of Natural Resources and Environment
- QLD - District Veterinary Officer, Department of Primary Industries
- SA - District Veterinary Officer, Department of Primary Industries
- NT - District Veterinary Officer, Department of Primary Industries & Fisheries.

Government animal health authorities are obliged to deal with any report of a notifiable disease in strictest confidence unless the owner (or the owner's agent) authorises release of the information. Stud management should feel no commercial threat to open communication of confirmed EHV-1 abortion when appropriate management procedures are in place. However, studs that decide not to advise mare owners and interacting studs must be certain that non-disclosure will not result in secondary abortions in non-stud owned mares.

Movement of horses after a confirmed case(s) of EHV-1 abortion

Movement of horses after EHV-1 abortion is facilitated by open and honest communication with farms that may be sending horses to, or receiving horses from, the affected farm. In order to facilitate the movement of horses after an EHV-1 abortion, so the consequences of reporting the disease are not greater than the consequences of the disease itself, it is critical that the affected farm must be able to ensure that all in-contact mares were identified and isolated and that the abortion outbreak is not spreading rapidly throughout the pregnant mare herd. It is useful to divide horses as to their farm of origin:

1. Horses on the affected farm at the time of the abortion

- Mares that have aborted should be isolated on the affected farm (or an appropriate isolation premise) until their second post abortion oestrus when they can be sent to the stallion for breeding. *[Studies of horses experimentally infected with EHV-1 via the respiratory tract showed that EHV-1 was not isolated from the respiratory tract after 14 days post infection. EHV-1 is also rapidly cleared from the reproductive tract of mares that have aborted.]*
- All pregnant mares in the exposed group should be isolated on the affected farm (or an appropriate isolation premise) in small groups until they foal/abort.
- After the exposed mares foal or abort they should be kept in isolation until their second post abortion / post foaling oestrus when they can be sent to the stallion for breeding.
- Unexposed mares (pregnant and dry mares) on the affected stud should be handled and bred as normal (the affected farm must ensure they can identify all in-contact animals).
- Unexposed young horses (weanlings / yearlings etc) should be handled as normal

It is good farm management practice at all times to handle pregnant mares before all other groups of horses. After an EHV-1 abortion, unexposed pregnant mares should be handled before young unexposed horses. As this virus (and other contagious diseases such as strangles etc) can be transmitted by fomites on equipment such as head collars etc, care should be taken to avoid sharing equipment or personnel where possible.

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2. Horses on unaffected farms sending mares to an affected farm

- Pregnant mares should be foaled at home on the unaffected farm and sent to the stallion with foal at foot (pregnant mares should not be transported within 2 months of foaling to reduce stress and so reduce potential EHV-1 abortions).
- Dry mares should be bred as normal.
- The unaffected farm should ensure that there is no possible contact between mares going for breeding and mares that have been exposed to an EHV-1 abortion in the last 14 days (as per the guidelines above).

These guidelines presuppose that pregnant mares are kept separately from all other horses and that all in-contact horses can be identified and isolated appropriately. In cases where this cannot be assured the entire farm must be treated as potentially exposed and more onerous movement restrictions should be applied.

No management guide can possibly cover all possible permutations and combinations of circumstances. Ultimately stud management in conjunction with the consulting veterinarian must work out the best possible protocol for the individual situation on the individual stud. Open and honest communication between the attending veterinarians and all of the farms involved means that business can continue as usual.

August 2002

APPENDIX 1

ABORTION PROCEDURE:

Immediate Action:

- An abortion is found in a paddock.
- Assume EHV-1 abortion until proven otherwise.
- Communicate with management by radio / mobile phone etc.
- Go get an abortion kit containing:
 - a halter & lead rope
 - two disposable overalls (mares don't like white)
 - long and short plastic gloves
 - plastic boot covers
 - 2 black body bag & ties
 - bottle of iodine scrub
 - plastic bag of cotton wool
 - all the above within disposable rubbish bin.
- Two people only to be involved.
- Both don overalls, long gloves and plastic boot covers.
- One person puts the halter on mare.
- Put the foetus plus placenta in the 2 black body bags tying each bag securely. Both people will probably be required for this. Spread the lime where dead foal was lying to kill virus and discourage mares. If possible this area should be fenced off.
- Bagged foetus can then be put in a vehicle not normally used near pregnant mares eg gardeners or farmers vehicle. Non-horse person takes foetus to laboratory.

(If transport to a laboratory is impossible a post mortem can be performed on the spot or in a quarantine area. Samples are collected and sent to a fast turn around equine equipped pathology laboratory. Samples collected must conform to the requirements of the receiving laboratory. See section on DIAGNOSIS for details of specimen requirements and collection).

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- The first person leads the mare to the closest isolation-holding yard (or if movement represents a risk to other groups of pregnant mares leave the mare where she is).
- The two people wash rump and tail of mare using the gloves, cotton wool, iodine scrub with tap water. Put all the cotton wool, gloves boot covers etc in disposable rubbish bin supplied and leave bin outside mares yard. Also leave the mare's halter at yard.

(Some veterinarians discount rump washing as unnecessary with perhaps unnecessary risk of gross contamination of attendants. This is particularly so if the mare has no retained placenta, is medically well and the veterinarian does not have to become involved. If the abortion has resulted from EHV-1 the mare will be isolated for 30 days beyond the isolation period required for spread of infection via uterine discharges or tail hair contamination.)

At this stage the Veterinarian can become physically involved if there is a possibility of retained afterbirth or injury to mare. Afterwards the two staff and Vet involved go home to shower and change clothes. Give boot uppers a good clean and polish. Washing clothes and sun drying is quite effective in killing the virus.

After thorough cleaning disinfect vehicle with any good surface disinfectant on arrival back from the laboratory. Do this in a non horse area eg workshop. EHV-1 is susceptible to a wide range of disinfectants such as iodophors, hexachlorophenes or phenols.

Treating the affected paddock as a unit may be most practical if the in contact mares number only about 10 mares. If preventive guidelines have been overlooked and a pregnant mare aborts in a paddock with many other pregnant mares then abortion minimisation within this group should be immediately attempted. These mares may need to be further subdivided into smaller groups prior to foaling to limit the losses within the group. Internal electric fencing could subdivide the mares within the affected paddock or mares could be subdivided on a quarantine property.

Follow Up Measures:

- If feed up vehicle or other vehicle is involved in finding the abortion disinfect tyres on vehicle and it may be necessary to discard the rest of feed and disinfect trailer if mares have nuzzled feed.
- Don't take any feed up trailer or other vehicle into the paddock in which mare aborted. Feed over fence into feeders or onto ground.
- Feed and if necessary water aborted mare over fence in isolation yard. Don't go into the yard if avoidable. If necessary use gloves and plastic boot covers or a 5% formalin foot bath outside the yard.
- After the mare has been cleared of EHV1 infection transport her to dry mare paddocks.

