



Upper Respiratory Infections and Equine Herpes Virus

Upper respiratory infections are a significant problem across all equine industries and in the racing industry, in particular. Studies have demonstrated considerable economic losses resulting from subclinical disease (when horses don't look obviously sick but are performing below expectations), from acute infection (when horses have nasal discharge, a cough, and obviously need rest or a reduction in training), and from the hypersensitivity and chronic inflammatory airway disease that develops in the lungs as a result.^{1,2} As there has been a sudden increase in the number of upper respiratory infections in racing stables in New Zealand over recent months, I thought now might be a good time to write something about Equine Herpes Virus.

Most frequently, outbreaks coincide with yearling sales or a change in season, as this is the time of year in which racing stables introduce new horses to their yards, many of whom will bring "colds" or upper respiratory infections with them. Horses get "colds" just like people. They will have a fever, runny nose, sore throat, and occasionally a cough. Many will also appear depressed and lose their appetite.

There are a number of pathogens that cause upper respiratory infections in horses including Equine Herpes Virus, adenoviruses, rhinovirus, Equine Viral Arteritis (EVA), Streptococcus Equi Equi (Strangles), Streptococcus Equi Zooepidemicus, and Equine Influenza (EI). (In New Zealand, so far, we haven't had EI...touch wood...) Equine Herpes Virus (EHV), identified over 60 years ago, remains the most common and economically significant cause of upper respiratory infections, world-wide.^{3,4,5,6,7}

There are actually nine different strains of Equine Herpes Virus, but only a few of them are clinically significant. The most important are EHV type 1 and EHV type 4 as they produce the most virulent, easily communicable, and most costly outbreaks across equine industries, all over the world. While EHV types 2 and 5 are ubiquitous (everywhere) and commonly cultured, the respiratory signs produced are generally mild, and they have not been demonstrated to produce serious outbreaks and economic loss. A recent study done in New Zealand determined that 44% of individuals from a small group with nasal discharge had positive cultures for EHV type 2 and type 5 was identified in 50%. EHV types 1 and 4 were only identified in 6% and 27%, respectively, though the small sample size and specific population tested were cited as limiting factors. Some healthy horses also cultured positive for EHV type 2 in the study, and the author explained that there were difficulties in positively identifying EHV type 4.⁸ All in all, the researcher found that EHV was strongly associated with respiratory disease. Previous studies done in New Zealand demonstrated evidence of recent EHV Types 1 or 4 infections in 72- 100% of horses and foals.^{9,10}

Equine Herpes Virus can be transmitted directly from horse to horse, but it can also be transmitted by droplets in the air (which can travel the length of a football field when a horse coughs). Exposure to virus particles in the environment on fences, gear, water troughs, clothing, shoes, etc. can also produce infection.

Horses of all ages are susceptible, but animals under three years of age and those under stress are most frequently affected. This would include most weanlings, yearlings, racehorses, and horses in training of any sort.⁶

Immunity from natural infection lasts for only 2 to 6 months, so the same individual can become infected more than once in a year or their lifetime. While horses older than 5 years of age seldom show signs of illness, they often harbour the virus and provide a source of infection for the younger, more susceptible horses in the population. Young horses, with little immunity, will almost certainly become clinically ill when exposed. As they recover, over about 4-28 days, the virus, rather than being eradicated, enters the latent (silent) stage, sheltering in lymph nodes.⁶ Once the horse is under stress due to travel, training, or co-mingling at sales, the virus becomes reactivated and is shed into the environment, infecting other susceptible individuals. Studies have shown that between 60 and 88 percent of horses may be silent carriers.⁶

Other Clinical Syndromes Including Abortion and Neurological Disease

Equine Herpes Virus can cause a few different types of disease syndromes including respiratory disease, abortions, and neurological problems. EHV type 4 is believed to cause the vast majority (up to 90%) of significant upper respiratory infections¹¹ and has been identified in some abortion cases, while EHV type 1 causes the majority of abortion cases, some respiratory infections, and most of the neurological cases.⁶

The evidence, so far, suggests that EHV infection begins in the respiratory tract, and once the virus multiplies enough in susceptible horses, it gets into their blood stream where it produces a “viremia”. (This just means virus in the blood.) If there is a large enough amount of virus in the blood, it gets into the central nervous system where it can damage the brain and spinal cord. It appears that EHV-1 is the only type, or at least, the type most likely to produce neurological symptoms as it appears to be the only one that settles in central nervous tissue.¹²

The neurological form of EHV (Equine Herpes Myeloencephalopathy or EHM) is fairly rare, especially in Australia and New Zealand, though there is some evidence that the incidence is increasing.¹³

Clinical signs often develop 8 to 12 days after a respiratory infection and begin with weakness in the hind legs and incoordination. It can quickly progress, and within a day or two, horses will go down and be unable to get up. In some cases, no signs of respiratory infection are obvious, and the only early indication of a problem is a fever. Sudden weakness and death may be the first noticeable sign.

Alternatively, the viremia can allow the virus to get into the uterus. Once there, it causes the placenta to detach and the foal to be aborted. EHV-1 abortion was, up until the mid-80's the most costly equine disease in North America, resulting in abortion storms that affected large percentages of mares on stud farms. From the mid-80's, a widespread, aggressive vaccination program was instituted, and the incidence of EHV-1 abortion was reduced by 75%. Fortunately, in New Zealand, the incidence of abortion has been lower than in other countries.

Vaccinations

Treatment of viral infections is difficult. There are no really effective, economical anti-viral drugs available. Antibiotics do not kill viruses, and can only be used to treat animals with bacterial infections.

The best way to deal with EHV infection is to prevent it. Prevention requires a multi-faceted approach including quarantine, hygiene, and vaccination programs. Isolation of sick horses and quarantine of exposed animals and premises are useful measures, but they are not always practical at racing stables and farms. When horses attend sales or races, they are almost certain to be exposed to individuals who may not have been adequately isolated at their home stables and who may be shedding virus. Vaccination is the most practical way to reduce the rate and severity of infections in a racing stable environment where the horse population travels and changes regularly and in the racing industry as a whole.

Vaccinating a single horse will not reliably prevent that horse from getting sick if it is exposed to an overwhelming dose of virus.¹⁴ Instead, to protect individual horses from viral infection, it is necessary to produce “herd immunity”. The epidemiological term, herd immunity, can be explained like this. If 100 percent of the horses on a farm are vaccinated, it is expected that 70 percent of those horses will become immune. If 70 percent of the individuals in a population have immunity, then virus will not have enough susceptible hosts in which to multiply. This will reduce the overall viral load in the environment and reduce the viral challenge to each individual. This will stop the transmission of virus in the herd.¹⁴

That is the long way of saying that ALL of the horses on a farm or in a population must be vaccinated to prevent respiratory infection from being transmitted from horse to horse and therefore to protect individual horses.

A vaccinated horse may still get sick if it is exposed to an overwhelming viral challenge at the races or during shipping. They may be exposed to a sick horse or placed in a stall where a sick horse has been. Vaccination, however, will ensure that the horse will not get as sick and will recover faster than if not vaccinated.¹⁵

Vaccinate all young horses frequently and older horses regularly, particularly if there is an outbreak. Use a modified live vaccine containing EHV 1 and 4, if possible. If horses have never been vaccinated for EHV before, 1 to 2 booster shots are recommended at 4-6 week intervals after the first dose. Foals should have their first dose at 4 months of age. Since immunity only lasts 12 weeks, one EHV 1+4 vaccine should be given every 3 months for optimal protection and for young horses in higher risk environments (racehorses in training would fall into this group), though the minimum recommendation is every 6 months.^{11,16,17}

Vaccinate pregnant brood mares at 5, 7, and 9 months of gestation with an inactivated vaccine that contains only EHV-1, preferably at high antigenic levels. Pneumabort K, which is available in New Zealand, and Prodigy are two brands to consider.

There is very little evidence that vaccination can specifically prevent the neurological form of the disease, but recent studies have found that modified live vaccines can reduce the viremia and this may reduce the likelihood that the central nervous system of the horse will be affected.¹⁸

It has been noted that EHV types 1 and 4 are fairly consistent and antigenically stable,¹⁹ so unlike influenza viruses that mutate regularly, the same strains of EHV 1 and 4 remain basically unchanged over many years. The implication of this is that vaccines need not be adjusted annually or for each outbreak to be effective.

It is important to understand that once horses are affected with Equine Herpes Virus, they can continue to be carriers for life. At times of stress, they may begin to spread the virus around in their environment and infect susceptible horses around them. As a result, it is worthwhile to vaccinate young horses regularly to reduce the likelihood that they will become infected and then become silent carriers, even if there are no reports of a serious outbreak.

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