Examination of Risk Factors for Equine Protozoal Myeloencephalitis

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Young horses, particularly race horses and show horses, may be at greatest risk for equine protozoal myeloencephalitis (EPM). The highest risk for EPM appears to be in the warmer months of the year. Stress appears to have an effect on the risk for developing clinical signs of EPM. Authors’ addresses: College of Veterinary Medicine, The Ohio State University, Columbus, OH 43210 (Saville and Reed); College of Veterinary Medicine, Colorado State University, Ft. Collins, CO 80523 (Morley). © 1999 AAEP.

1. Introduction
Equine protozoal myeloencephalitis (EPM) is a serious and often fatal neurologic disease of horses. There are currently no known preventive measures for this disease. Studies of infectious diseases in other species have shown that control programs based on identified risk factors can be as important as implementation of vaccination programs. The purpose of this study was to identify potential risk factors for the development of clinical EPM.

2. Methods
Horses presented to The Ohio State University Veterinary Teaching Hospital from 1992 through 1995 were eligible for enrollment. All horses that had any neurologic deficits diagnosed were enrolled in the case series if cerebrospinal fluid (CSF) analysis identified antibodies to Sarcocystis neurona using Western blot analysis or species-specific DNA using polymerase chain reaction (PCR). Two separate control series were identified; one group included horses with other neurologic diseases (neurologic controls), and the second included horses presented for reasons other than neurologic disease (nonneurologic controls). Horses with EPM were compared with the two control series independently to identify risk factors for disease.

3. Results
There were 251 horses with EPM, 225 horses with other neurologic diseases and 251 horses with problems in other organ systems. Ages ranged from 1 day to 30 years. Horses of 27 breeds were enrolled, including 304 females, 164 intact males and 259 male castrated males.

Compared with horses that were 1 to 5 years old, horses <1 year old had a lower risk of EPM, as did horses 6 to 13 years old. Breeding horses had approximately one-fifth as much risk of having EPM as racehorses. Compared with horses presented to the Veterinary Teaching Hospital in the winter, horses were approximately 3 times more likely to have EPM diagnosed in the spring or summer and 6 times more likely in the fall. The risk of EPM
among horses that resided on property located near a creek or river was approximately half that of horses that did not. The risk of EPM was approximately 3 times greater among horses whose hay was not kept secure from wildlife. Horses residing where opossums were not commonly seen had about approximately the risk of EPM. Horses kept on premises where EPM had previously been diagnosed in other horses were approximately 3 times more likely to be have EPM diagnosed. Compared with horses with no reported stressful event before admission, horses that experienced such an event 30 to 90 days before admission were approximately 10 times more likely to have EPM diagnosed. Risk factors important when comparing EPM cases with neurologic controls were similar to those important in comparison with nonneurologic controls.

4. Discussion

Several factors associated with EPM were identified that may be used to design preventive strategies because there are no proven methods of preventing EPM at this time.

We found a seasonal effect on the risk of EPM. It is possible that hot weather acts as a stressor for horses because heat stress has been shown to affect suppression of T-cell function in sheep.5

Horses residing on premises where EPM had been diagnosed previously had an increased risk for EPM. The presence of important risk factors that predispose other horses to develop EPM may be similar for all horses on a farm.

Several risk factors involving wildlife were associated with development of EPM. These findings suggest that horse owners should reduce horses' exposure to wildlife.

Our data suggest that stress influences the risk of developing EPM. Stress leads to suppressive proteins produced by the CNS that suppress lymphocyte production and function.6 These proteins, in combination with other factors that may affect T-cell function, may increase the risk of EPM.

Racing and showing were associated with increased risk of EPM. It has been demonstrated in horses and humans that moderate exercise enhances the immune system, but high-intensity, exhaustive exercise suppresses the immune system.7,8 Most racehorses and some show horses are under high-intensity training.

Age is an important risk factor for EPM, particularly in the 1-to-5-year-old horses. The higher risk in the young horse population is consistent with the findings of other studies.9–12

Probably the best studied parasitic disease of humans is malaria, caused by Plasmodium species. Vaccines often fail to protect against this disease.13 Similarly, great difficulty was encountered in the development of a vaccine for protection against abortions caused by Toxoplasma gondii in sheep.14

The same obstacles probably will occur in the development of vaccines against Sarcocystis neurona. Therefore, it is critically important to identify risk factors that may guide the design of effective control programs.

References