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## New Treatments for EPM

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Equine protozoal myeloencephalitis, better known as EPM, is a parasitic infection which affects the spinal cord and the nerves that control the horse's movements. Lately, it has received a lot of press and is causing a great deal of concern, and for good reason; it can leave a horse uncoordinated and useless, and can be fatal.

What is EPM?

Few equine diseases have raised more fears, more questions or been more confusing. It's relatively rare in horses (since they are essentially an accidental host) yet the protozoa that cause it are everywhere. The disease in horses is treatable, yet severely affected horses may not survive. The signs of infection may be very mild, or the horse may be so weak and uncoordinated he has trouble getting up. The neurologic problems may develop slowly or suddenly.

Three independent studies (in Oregon, Ohio and Pennsylvania) completed in 1997 found that half to 80 percent of all horses tested had been exposed to one of the organisms that cause EPM, with antibodies in their blood specific to the protozoan (*Sarcocystis*), yet the vast majority of these seropositive horses have no outward signs of the disease. This may indicate that some horses have stronger immune systems than others; which may be why horses under stress or receiving immune suppressants such as steroids tend to be more susceptible.

The opossum seems to be the definitive host for EPM (though there may be more than one such host), passing the protozoa in its feces. It is suspected that an intermediate host (such as a bird) eats the opossum feces containing the parasite, and the protozoa form cysts in the bird's muscle tissue. According to this theory, after the bird dies, its remains are eaten by an opossum, along with the protozoa, which then multiply rapidly in the intestine of the opossum, to pass out with the feces and begin the cycle anew. The horse encounters the parasite if feces of the opossum (or possibly the intermediate host) contaminate hay or grain.

The equine immune system may resist the parasite, but if it cannot, the parasite may cross the blood-brain barrier and affect the spinal cord. When this happens, the cerebrospinal fluid will test positive for EPM, and the horse will eventually show signs of neurological disease. The protozoa, once inside the horse, are not passed to other horses; the disease is not contagious horse to horse. The offspring (merozoites) of the protozoa migrate into the nerve tissue and begin to divide and grow, and this is what causes problems for the horse. The nerve tissue reacts to the presence of these organisms and becomes inflamed.

Hemorrhage and swelling in the spinal cord create neurological signs: the incoordination, stumbling, lameness, hindquarter weakness, etc. Since the parasite can attack the spinal cord at any point, the signs can be varied. Paralysis or muscle atrophy affecting predominantly, or only one side of the body, is a common sign of EPM, along with hindquarter weakness due to lesions in the mid-spine area of the back. The horse may experience lameness that shifts from one leg to another, stumbling, facial paralysis, muscle wasting, head tilting or loss of sensation in parts of the body.

A number of researchers have been studying EPM for many years, but solid information about this disease is elusive and there are still many unanswered questions. There are many things we do know about it, however useful information that can help the horse owner or veterinarian deal with this disease.

Diagnosis & Treatment

One of the veterinarians who has been working with EPM horses for a number of years is Dr. Joe Bertone, presently at the Idaho Equine Hospital at Nampa, Idaho. He sees a number of EPM patients from all over the Northwest, and consults nationally and internationally on this and other equine problems.

For the horse owner who is worried about a lameness problem that might be EPM, Dr. Bertone says the important thing is to get an accurate diagnosis. He does not recommend that people start treating for EPM without evidence that a horse has it, "because none of the treatments are cheap, and all of the responses to treatment take a long time." Treatment for a horse with EPM may cost \$500 to \$1500, depending on the method used. Some people are too quick to start treatment for EPM (when the problem is actually something else), while other horsemen don't get on it soon enough.

There are basically four treatments being used for EPM at present: a combination of pyrimethamine sulfadiazine (which has been in use the longest), Diclazuril and Toltrazuril which are both coccidiostats, and nitazoxanide (which is a coccidiocidal drug). Diclazuril and Toltrazuril have mainly been used in other countries to protect poultry from coccidiosis and only recently used in the U.S. for treating horses with EPM. They are licensed in Canada as chicken feed additives, and were first imported to the U. S. for use in horses on an experimental basis.

Bertone says that laboratory information indicates that Diclazuril and Toltrazuril do not actually kill protozoa, and in his opinion, the recommended treatment length (one month) is probably not enough. "These are coccidiostats; they hinder but do not kill protozoans, and the rate of recurrence of EPM is high at least with the protocol that is being proposed."

He says that "my experience with both of them has been an initial improvement during the month of therapy, and up to 60 days later, then many horses relapse." It's not known how long a horse should be kept on these drugs, for best results.

Another drug being used experimentally in horses is NTZ (nitazoxanide), which has also been proposed for human AIDS patients. He says, "There have been pretty good results. This drug is coccidiocidal; it kills the organism."

What he uses depends on the client. "NTZ is my preferred choice at this time. However, it is expensive. The pyrimethamine-sulfadiazine is cheaper, but you have to give it a lot longer at least 3 to 6 months, once or twice a day. Although once a day is reported to be effective, I give it twice a day, for a minimum of 4 to 6 months of therapy." The possible side effects of treatment, which are similar with all the drugs, are diarrhea and/or anemia. Treatment can also cause problems for pregnant mares (abortion, or birth of foals with congenital defects).

In a horse that is severely affected and unable to get up, or nearly so Bertone will also give DMSO, since this acts as an anti-inflammatory and reduces some of the swelling in the spinal cord which is causing the problem.

"One of the things to expect, with treatment for EPM, is it may be up to 3 to 6 months before you see substantial improvement," he says. "Although some horses improve much faster, my usual rule is that if after 3 months of treatment there's no improvement, the prognosis is poor. The drug has killed the organism but the damage is too severe, or it was an incorrect diagnosis."

EPM can affect horses a lot of different ways. Some of the signs a horse owner should be aware of are warning signals, so to speak include incoordination, and a feeling the horse moves oddly. Many lameness problems that are troublesome to pinpoint may also be indicative of EPM. Bertone calls it the wandering lameness. "It may start at the right stifle and go to the left hock, then there's a problem in a foreleg, for instance. The lameness is related to a general clumsiness, and taking a lot of missteps."

He says "There may be three clues that a neurologic problem may be implied. First, the horse seems uncoordinated. Second, there may be a wandering lameness, with multiple joints involved. Thirdly, the horse's performance changes or does not meet expectations. For instance, if the horse is a jumper, and used to jump well, now he keeps hitting the rails."

"I would say to horse owners that are worried about EPM to not make any assumptions about it. The most important thing is correct diagnosis." For pre-purchase exams, he says "One of the most important things, if you are purchasing a horse, is to take into account any subtle problems, especially in a horse that hasn't done much, like a young horse that you want to use in a specific sport."

He says there are many things we don't know yet about EPM. Though the opossum is one definitive host, the disease can crop up in areas where there are no opossums. "In areas where there are opossums we see a higher incidence of EPM, but it does exist in the mountain states also." There are other organisms that can cause EPM, besides *S. neurona* and *Neospora*. The *Neospora* that causes EPM in horses is very similar to the organism which is associated with neurologic problems in dogs and abortion in cattle. "This organism is basically everywhere," says Bertone, "and there may be others that also cause EPM." The same treatment works, if the horse's problem is caused by *Neospora*.

One reason there haven't been many cases of EPM diagnosed in mountain states is people are not looking for it; they know there are no opossums in arid country. "Since EPM is so widespread across the U.S. however, either the intermediate host is everywhere, or the opossum is not the only definitive host," says Bertone.

There are several methods to help a veterinarian diagnose EPM, including blood tests and a spinal fluid collection. Results of a spinal tap may not necessarily be correct, but are more definitive than a blood test.