



Down on the Farm

by HEATHER SMITH THOMAS

Equine Protozoal Myeloencephalitis (EPM) is one of the most common causes of neurological problems in horses. It is probably the most common disease in North America that affects the equine spinal cord. The protozoa that cause EPM, invade the brain and spinal column and can affect nerves that control movement. This disease may leave the horse uncoordinated, and can also be fatal.

Yet many horses exposed to EPM never show signs of illness; studies in various parts of the U.S. have shown that 50 to 80 percent of horses have antibodies in their blood, specific to *Sarcocystis neurona*, the protozoan parasite that causes EPM, but only a small percent of those horses have had clinical signs of the disease. Stress and/or a compromised immune system may be the determining factors in whether or not an exposed horse actually develops EPM. The primary host for the protozoa that cause EPM is the opossum. The horse is just an accidental host if he eats feed contaminated with opossum feces that contain protozoa.

Diagnosis

There are several methods used in diagnosing a case of EPM, including blood tests and a spinal tap. Kevin Hankins, DVM, Fort Dodge Animal Health (Kansas) says that the blood test itself, if it turns up positive, only indicates that the horse has been exposed to these protozoa. It does not mean the horse actually has EPM. "If the blood test shows up negative, you can be sure the horse has not been exposed and does not have EPM," he says.

"But if the blood test is positive, then the veterinarian may do a spinal tap, which is more definitive. But the problem with a spinal tap, besides just the risk of doing it, is that we now know that a positive spinal tap does not necessarily mean the horse has EPM either. There are too many false

positives, due to such things as having a little blood get into the spinal tap, which is sometimes hard to see. If some blood gets into it, it may show up as a false positive. So now the only thing recommended is that if the spinal tap comes up negative, you know the horse does not have EPM. This test is more to rule it out," explains Hankins.

"For diagnosis of EPM, a veterinarian will generally go by clinical signs, exposure, and try to rule out other possibilities. Some people go ahead and treat the animal for EPM with one of the approved drugs, and if the horse gets better, they generally assume the horse did have EPM. Granted, this is not the way you'd hope to be able to diagnose this disease, and it's a little expensive. But, unfortunately, until we get a really sound diagnostic tool, we generally have to just work from what we see as possible exposure, clinical signs and how the horse responds to treatment," he says. The treatments on the market today seem to be very effective, however, and better than what we've had in the past.

Prevention

The best prevention is to limit exposure to opossum feces, by keeping feed covered, keeping barns opossum-proof, etc. Realizing that opossum feces may contain the protozoa, many horse owners are trying to adopt management practices to reduce their horses' exposure. "The intermediate hosts include house cats, raccoons, skunks, etc., that harbor the parasite in their muscle tissue. Then, when their bodies are eaten by the opossum (feeding on road kill, etc.), the parasite ends up in the digestive tract of the opossum and is passed out in the feces," explains Hankins.

"One of the reasons we see EPM in regions where there are no opossums (such as in California and other arid western regions) is through shipments of contaminated feed and hay. The heat-processed feeds are safest, because heat kills the protozoa. But in some of the mixed feeds or hay, there can be contamination—and thus EPM can be spread all over the country," says Hankins.

Vaccine

Hankins says Fort Dodge's EPM vaccine (the only vaccine for EPM) is still available in many states under a conditional license vaccine—which means it's not available over the counter. A conditional license vaccine is only sold to veterinarians. It must be approved by the state vet, to be sold in that state, and may have additional restrictions put on it by the state (such as that it can only be given by a veterinarian, for instance).

Under the terms of the conditional license, as mandated by the USDA, it can only be sold and dispensed where there is a valid veterinarian-client-patient relationship, so



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there can be close monitoring of the vaccine. A conditional license vaccine is one that has not been fully tested; efficacy has not yet been fully proven. The conditional license states only that the vaccine must be pure and safe and that there is reasonable expectation for it to be effective in preventing the disease.

Fort Dodge developed the EPM vaccine, which received its first conditional license approval in December 2000 for a six-month period. That license was renewed in June 2001, for a year, after the USDA reviewed the company's progress toward fulfilling requirements for a full license. The conditional license was renewed in October 2002, for another year, based on safety demonstrations and continued research. Fort Dodge still makes the vaccine under a conditional license. Though they have conducted further studies to determine effectiveness of the vaccine (and to alleviate concerns about it) they have not yet been able to develop an adequate challenge model to reproduce EPM in the laboratory, for more complete testing.

"We are still doing the research that is needed for extension of this license," says Hankins. "You can still get the vaccine, depending on the state in which you live—if it's approved in your state. If you check with your vet, they can tell you whether it is available in your state. It is still sold under a conditional license, which has to be updated and recertified every few years. We are currently in the process of doing this again. It depends in part upon what the USDA requirements are for reapplying for that conditional license, or for working toward a full license," he says.

At this point they're just keeping a conditional license. "To get full license we must have a reliable model to repro-

duce the disease. There was hope we would develop a model with a project at Ohio State that could consistently reproduce the disease. But this has not come to fruition. You must be able to reproduce the disease so you can show the vaccine works effectively to protect against it, and so far we've not been able to do this," he says.

"There are other conditional license vaccines that have been on the market now for quite awhile, such as the rotavirus vaccine (given to pregnant mares to produce antibodies in their colostrum, to protect their newborn foals from rotavirus diarrhea). This is also a disease that cannot be clinically reproduced in order for full testing. But through various trials and field studies, the vaccine has been shown to help reduce incidence of rotavirus in the foals so it continues to get a conditional license. We do the same thing with our EPM vaccine, every time it needs to be relicensed," he says.

"The requirements for getting a vaccine licensed have changed considerably during the past few years. Originally, it didn't require a challenge study; all a company had to do to get a license was show an immune response in the vaccinated animals. Now those rules have changed, which is actually for the better. In order to bring a vaccine out, you now have to show, in a challenge model, that it actually does work. The horse owner can be assured that what they are giving their horse actually works for that specific disease," says Hankins.

Treatments

Prior to 2001, the primary treatment for EPM was a combination of sulfadiazine and pyrimethamine (drugs that inhibit the growth of protozoa and cause their eventual slow death), since this combination of drugs was the least expensive. This drug combination had to be given for three to six months, however. If a horse did not respond, veterinarians generally used diclazuril—a feed additive for young chickens to protect against the protozoa that cause coccidiosis. Diclazuril required less treatment time (28 days) and had another advantage—it actually killed the protozoa. The drawback was that it was not available in the U.S. and had to be imported from Canada, was more expensive, and very unpalatable (necessitating administration by stomach tube in some horses). Toltrazuril, a similar drug, was formulated into a more palatable oral paste. Then a dewormer, nitoxoxanide (NTZ), came into use for EPM treatment, and a number of veterinarians felt it worked best.

In July 2001, the FDA approved the oral paste formulation of ponazuril (trade name Marquis, made by Bayer). This is an anti-protozoal drug related to toltrazuril and was the first approved treatment for EPM in the U.S. "There are now two others. Navigator (NTZ) is made by IDEXX. The other FDA approved drug is called ReBalance, and it is made by Phoenix Laboratories. It is actually the pyrimethamine/sulfadiazine combination. It just became approved a few months ago by FDA," says Hankins.

"The treatments today are much safer than what we used in

Stress Plays A Role

Any time the immune system is hindered by stress, the body has less resistance to disease. "The model that Ohio State was working on, trying to produce EPM in the test horses, involved transporting them. In the past, they've had horses at research facilities where they fed them the protozoa and then administered dexamethasone at high levels to suppress the immune system to give the horses EPM. It didn't always work, so they were hopeful that the transportation stress would work better; the horses were fed the organism, then transported long distances. This worked pretty well to get the majority of horses to break with the disease. They found it was usually younger horses (with a more naive immune system), however, that would develop EPM. There are so many variables—including age and immune status of the horse, previous exposure, etc.—that can determine whether or not it will get EPM. This is a disease in which we are still learning a lot about it," says Kevin Hankins, DVM, Fort Dodge Animal Health (Kansas).

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the past, and more reliable, even though they are expensive. They seem to do a good job, though this will depend on what stage of the disease you start treatment. Horses in early onset of EPM are more likely to respond well to treatment and recover better than horses who are farther along in the disease process. Sometimes the best you can hope for is just to halt the process; the horse may not get any better, but may not get any worse," he explains. The horse may never regain his full potential as an athlete, but may be able to shift to a less athletic career or might be used for breeding.

"As with all other medications, there are some possible side effects with EPM treatments, and horse men need to be aware of these. Any time you give an oral drug to horses, it may cause digestive problems, and the horse may get diarrhea. The horse being treated should always be carefully monitored," he says.

The costs for treatment are very similar for Marquis and Navigator. "I think those are the two most expensive products, not only because of the chemicals involved but also because they have a shorter duration for treatment," says Hankins. There is a lot less time and effort involved, treating the horse for 30 days versus for several months, and the convenience of shorter treatment is worth quite a bit to most horse owners. In contrast, the sulfa/pyrimethamine

(ReBalance) is quite a bit cheaper, but since you have to treat the horse for several months, it may actually become nearly as expensive by the time you are finished.

Incidence Of EPM May Be Decreasing

"We don't see as much EPM now in Kansas. It's been quite awhile since we had a diagnosed case of it here in the University's veterinary hospital; we've only had one during the past year," says Hankins.

"Early blood testing in Kansas showed more than 80 percent of horses had been exposed, but we haven't seen many cases lately. We don't know whether this is due to better management, vaccination, or if a lot of horses have been exposed and developed immunity and do not get the disease. I think horse owners are becoming more aware of how it's spread and what they can do, in management, to prevent it—by keeping feed covered and protected from opossums."

There are theories that there might be more than one strain of protozoa that can cause EPM, and some research is looking into this possibility. "There is probably a predominant strain, but there may be some others that also cause similar problems. This could be the difference, in why some horses develop the disease and others don't (when exposed) or why one treatment might work better than another when treating a case of EPM, or why vaccine might work better in some horses than others. It also will depend in part upon the immune status of that horse, and stress," says Hankins. ■