

Equine Protozoal Myeloencephalitis: Acupuncture Diagnosis

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The most accurate method for the diagnosis of equine protozoal myeloencephalitis is the identification of clinical signs and the presence of anti-*Sarcocystis neurona* antibodies in cerebrospinal fluid; acupuncture is not useful. Author's addresses: Equine Internal Medicine Consulting, 3288 Vallahalla Dr., Lexington, KY 40515 (Fenger) and Dept. of Veterinary Science, 108 Gluck Equine Research Center, University of Kentucky, Lexington, KY 40546-0099 (all other authors). © 1997 AAEP.

1. Introduction

Equine protozoal myeloencephalitis (EPM) is a neurologic disease of horses that results from an infection of the central nervous system (CNS) by the protozoal parasite, *Sarcocystis neurona*. The prevalence of EPM is unknown, but it is believed to occur sporadically. The most accurate diagnosis for this disease is the combination of the identification of clinical signs and the detection of anti-*S. neurona* antibodies in cerebrospinal fluid (CSF).

Protozoa were initially identified in the lesions of EPM in 1974.¹ The diagnosis of EPM for the following 18 years was based on clinical presentation and the ruling out of other causes of neurologic dysfunction. The *in vitro* culture of *S. neurona* permitted the development of diagnostic tests for EPM. Antigen analysis by indirect immunofluorescent antibody (IFA) was compared with Western blot (immunoblot). Western blotting was determined to have greater specificity for the detection of exposure to *S. neurona*.² This method was expanded to the detection of anti-*S. neurona* antibodies in CSF, and it was found to have utility for the diagnosis of disease.³

Recently, interest has developed for a less invasive technique to diagnose EPM. The diagnosis of EPM by acupuncture, and specifically by reactivity on the point gall bladder 32 (GB32), has gained popularity in recent years.⁴ Therefore, a double-blind controlled study was undertaken to determine the relationship between the acupuncture and traditional methods of diagnosis for EPM.

2. Materials and Methods

A. Study Design

The study design was a double-blind comparison of two diagnostic methods. The combination of the presence of neurologic signs with a positive CSF was considered the standard for a positive diagnosis of EPM. Positive reactivity over a combination of acupuncture points, including GB32, was evaluated against this standard, and sensitivity, specificity, and positive and negative predictive value were determined. Horses that exhibited no evidence of possible neurologic disease and also tested negative for reactivity over GB32 were not tested for EPM by

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CSF collection, as requested by the trainers. Horses with neurologic signs that tested negative for EPM by Western blot and polymerase chain reaction were considered to be EPM negative.

B. Initial Case Selection

The initial study population included all of the horses in a training barn at a racetrack under management of a single horse trainer ($N = 23$). All horses in the stable underwent physical and neurological examinations by a single investigator. All horses also underwent simultaneous acupuncture evaluations by a second veterinarian experienced in acupuncture. Horses that exhibited neurologic signs or reacted positively to the acupuncture points considered to be unique for EPM were tested for the presence of anti-*S. neurona* antibodies in CSF as determined by Western blot.

C. Additional Cases

The second study group consisted of 90 horses in a training facility under the management of a single horse trainer and was independently evaluated by the same two veterinarians. The acupuncturist evaluated the study group ~6 weeks after an initial neurologic examination and 2 weeks prior to a subsequent neurologic examination by the investigator. Horses that exhibited neurologic signs or were considered to have EPM as determined by acupuncture had their CSF sampled and tested for the presence of anti-*S. neurona* antibodies. Several horses had been diagnosed during the previous examination and had been under treatment for 3 weeks when they were evaluated by acupuncture.

3. Results

A total of 113 horses was evaluated by both acupuncture and with the standard diagnostic method for EPM. The initial group of 23 horses had a total of nine EPM cases identified by conventional diagnostic methods, and 17 EPM cases as determined by acupuncture. The second group of 90 horses had a total of 42 EPM cases by conventional diagnostic methods and 15 EPM cases by acupuncture.

The total group of 113 horses had the results shown in Table 1. The sensitivity, specificity, and positive and negative predictive values are listed as follows: sensitivity, 24%; specificity, 68%; positive predictive value, 38%; and negative predictive value, 52%.

Treatment consisted of pyrimethamine (1 mg/kg q 24 h) and sulfadiazine (20 mg/kg q 24 h). All horses

testing positive by either method were treated in the initial group of 23 horses. Follow-up data are not available for this group. In the second group of horses, all horses testing positive by Western blot or polymerase chain reaction using CSF were treated at least 4 months, and in some cases a negative CSF was obtained prior to the discontinuation of treatment.⁵ All horses in this group improved and had no relapses. All horses testing positive by acupuncture and negative by conventional methods were treated for 1 month. There was no change in clinical signs of any horses in this group during this time period.

4. Discussion

The acupuncture diagnosis of EPM as determined by reactivity over a series of acupuncture points, including GB32, was objectively evaluated by a double-blind controlled study. The relationship between acupuncture and conventional methods for the diagnosis of EPM is poor, with the best relationship being a specificity of 68%. Specificity is the probability of a negative acupuncture test when a horse has no neurologic signs and, if tested, tests negative for *S. neurona* on CSF by Western blot. It is logical to assume that most horses would test negative by both conventional and acupuncture methods. Most notably, the acupuncture sensitivity, or ability of the acupuncture test to detect active disease, was only 24%. Therefore, this test missed the diagnosis of EPM 76% of the time.

The initial study included only 23 horses, of which 17 horses tested positive for EPM by acupuncture. This initial group of horses was evaluated prior to the purported identification of a separate set of points diagnostic for herpes myelitis, which may have accounted for the high proportion of horses that tested positive yet failed to exhibit clinical signs, or test positive on CSF by Western blot or polymerase chain reaction. However, herpes myelitis commonly causes leakage of serum across the blood-brain barrier, resulting in a false-positive Western blot for EPM, suggesting that at least some of these horses should have tested positive even if they had herpes myelitis. This finding calls into question the validity of acupuncture diagnostic methods for the diagnosis of EPM or herpes myelitis.

The possible accidental inclusion of an acupuncture diagnosis of herpes myelitis with the EPM diagnosis in this initial group of 23 horses prompted the further evaluation of an additional 90 individuals. This group included horses that had been diagnosed over the course of 3 months prior to the initial acupuncture evaluation. This second group of horses had less association between the two diagnostic techniques. The argument could be made that because some of the horses had been treated for as long as 3 weeks before the acupuncture evaluation, they showed sufficient improvement to test negative on GB32 and associated points. However, all of these horses continued to exhibit neurologic

Table 1. Evaluation of 113 Horses by Acupuncture and CSF Sample

Acupuncture	Conventional Diagnosis		Total
	Disease	No Disease	
Positive	12	20	32
Negative	39	42	81
Total	51	62	

signs at that time, and 3 weeks is not a sufficient duration of time to clear the organism from the central nervous system.⁵ Therefore, even if the acupuncture point fails to test positive once the disease has been treated, it cannot be useful in the many cases in which the client begins treatment of the horse before requesting veterinary acupuncture intervention.

In conclusion, the diagnosis of EPM by detection of reactivity over point GB32 in combination with other points is poor compared with that by conventional diagnostic methods.

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