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Equine Neurologic Exams: Be Thorough and Consistent

Whether a lameness exam is to pinpoint the cause of an unsoundness or to be sure a sale horse checks out, it needs to include a thorough hands-on neurologic exam.

At the 2015 American Association of Equine Practitioners Convention, held Dec. 5-9 in Las Vegas, Monica Aleman, MVZ Cert, PhD, Dipl. ACVIM, an associate professor at the University of California, Davis, School of Veterinary Medicine who has a special interest in neuromuscular disorders, described steps involved in a such an exam, stressing that following a consistent order helps the veterinarian avoid missing abnormalities. Neurologic cases aren't always part of a veterinarian's day-to-day practice, so a good review of neurologic principles is often helpful to the practitioner.

Neurologic Evaluation

No matter the reason for the evaluation, sound or unsound, the veterinarian should begin by gathering the horse's signalment (breed, gender, and age), intended use, and medical history. If the horse is displaying neurologic signs, determine whether other horses on the farm are affected similarly.

"The exam must be tailored to the individual relative to the horse's cooperation and training," said Aleman. "Safety is essential when dealing with a horse with a neurologic condition."

It is important to establish what is normal and abnormal for that horse; an owner can often shed light on subtle changes. Assess the horse's behavior and state of consciousness, as this represents cerebral and brainstem activity. The normal horse appears bright, alert, and responsive to stimuli. An "obtunded" horse is quiet and fairly unresponsive to normal stimuli, and a horse in a stupor is unresponsive to moderate stimuli but responds to more painful sensations such as hard pinching of the skin. A comatose horse is unresponsive to any stimuli.

The veterinarian evaluates the cranial nerves, which control smell, a variety of reflexes, reactions and positions of the eyes, face and nose sensation and movement, and the gag reflex.

The practitioner also carefully examines head, neck, trunk, tail, and limb posture, as well as the horse's ability to defecate or urinate. Postural reactions are evaluated, such as proprioception (a horse's awareness of where his feet are), but Aleman reminded the audience that some abnormalities can result from mechanical musculoskeletal or lameness issues. Similarly, a very compliant and cooperative horse might leave a leg wherever it is placed simply due to training and good nature. Any lesion in the brain, spinal cord, or peripheral nerves can elicit proprioceptive deficits, so this observation is not useful for localizing a lesion.

The veterinarian then evaluates the horse's reflexes. Segmental reflexes—much like the doctor hitting your knee with a soft mallet to elicit a jerking response—are challenging to observe in standing horses, but skin shivering (such as the response to flies) and anal reflexes are more observable. Other segmental reflexes can be tested in the recumbent horse, such as flexor withdrawal and stretch reflexes (muscle contraction in response to stretching).

Gait evaluation is a very useful diagnostic tool, but it might be confounded if the horse has more than one neurologic lesion and/or a concurrent musculoskeletal problem. Depending on the horse's degree of ataxia (unsteadiness or incoordination), the veterinarian examines him at the walk, trot, canter; up and down inclines; and up and over curbs to help determine his coordination.

Palpating all body structures carefully allows the veterinarian to evaluate the horse's pain reaction, range-of-motion of joints, head and neck, asymmetry and loss of muscle tone, and the presence of swellings or tumors.

Where is the Lesion?

Veterinarians define lesions by their neuroanatomical location. Is the brain, spinal cord, or peripheral nervous system involved, or is it a multifocal issue, meaning it is influencing more than one area? Aleman described some of the effects of lesions in specific neuroanatomic locations.

Brain (including the cerebrum, the largest part of the brain which controls intelligence, memory, emotion, and senses):

- Altered behavior
- Seizures
- Visual defects
- Altered motor and/or sensory function
- Proprioceptive deficits

Brainstem (at the base of the brain):

- Altered state of consciousness
- Multiple cranial nerve deficits
- Central vestibular disease (head tilt, loss of balance)
- Cardiovascular, respiratory, and sleep centers affected
- Proprioceptive deficits

Cerebellum (located slightly behind and beneath the cerebrum; responsible for coordination and balance):

- Hypermetria (exaggerated gait)
- Ataxia (incoordination)
- Intention tremors (broad, coarse and low frequency tremors, which increase as the limb reaches the endpoint of its movement)
- Lack of menace response, which is used to test whether a horse is visual by waving a hand toward the horse's eye to see if he blinks
- Different pupil sizes
- Paradoxical vestibular disease (signs of head tilt and ataxia to the side opposite the lesion)
- Proprioceptive deficits o Gait deficits possible

Vestibular signs (dealing with the balance mechanism in the inner ear/brain):

- Head tilt
- Leaning
- Pathologic nystagmus (involuntary back-and-forth movement of the eye)
- Ataxia
- If the horse displays proprioceptive deficits with vestibular signs, then it is a central nervous system disease

Spinal cord segments (of all vertebrae) result in specific effects on limbs, depending on lesion location

Peripheral nervous system (involves the nerve roots and neuromuscular junctions) are accompanied by muscle weakness or atrophy

Take-Home Message

With thorough neurologic exams following a consistent order, it is possible to localize lesions to a specific anatomic areas of the nervous system based on observed clinical signs. Veterinarians perform serial exams on neurologic horses to monitor the lesion progression or resolution.