Neuro-ophthalmology in the Horse

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KEYWORDS

• Neuro • Facial nerve paralysis • Blindness • Neuro-ophthalmology
• Horner syndrome

KEY POINTS

- Neuro-ophthalmic disease is uncommon in the horse and requires a thorough examination to localize lesions.
- Visual deficits and pupillary size abnormalities must be approached in a systematic fashion to ensure proper diagnosis and treatment.
- Common neurologic abnormalities of the eye are discussed including facial nerve paralysis, strabismus, nystagmus, anisocoria, and blindness and their treatments.

Neuro-ophthalmic disease is relatively uncommon in horses and can prove a diagnostic challenge. In this review, the basics of the neuro-ophthalmic examination will be covered, and the most common abnormalities and their causes will be discussed with a focus on clinically relevant details.

The neuro-ophthalmic examination includes the portion of the cranial nerve examination associated with vision, pupillary light response, blink reflex, and eye position. Arguably the most important part of a neuro-ophthalmic assessment is an accurate neurologic examination. The thorough examination should start at a distance looking for asymmetries. Looking head on, the lashes of the upper lids should extend equally and laterally; downward directed lashes indicate enophthalmos, which can be associated with pain or other disorders. The nose and ears should be symmetric. As the patient is approached (before sedation), visual tracking can be observed. A menace response is assessed by making a menacing gesture with the hand toward the eye. It is important that this be silent and to ensure that air not be pushed toward the eye. The long lashes and periocular vibrissae are easy to inadvertently hit, which can result in a false-positive result. A positive menace is a blink in response to the

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menacing gesture. The menace response in different regions of the visual field may be assessed by angling from the nasal portion of the eye and then the temporal. Differences in menace coming from either side suggest a deficit of the visual field. The palpebral reflex can then be assessed by touching the inner and outer corner of the eyelids and seeing that the eyelids close. Ocular position is then evaluated at rest and by gently grasping the head and rotating to the left and right followed by a dorsal and ventral flexion. A physiologic nystagmus should be apparent with the eye rotating to center, showing the oculocephalic reflex. After assessing symmetry of eyelid and globe position, and the menace response, palpebral reflex and oculocephalic reflex, sedation, and lid blocks can be administered if necessary to help with patient compliance for the remainder of the examination.

Resting pupil size should be evaluated to look for anisocoria (different-sized pupils). Pupillary light reflexes can be a challenge to assess, as the lateral position of the eyes makes it nearly impossible for a practitioner alone to assess the consensual pupillary light reflex (PLR). The direct PLR should be a moderate constriction of the pupil in response to direct bright focused light. The brightest light available, such as a halogen penlight or Finoff transilluminator (Welch Alyn Skaneateles Falls, New York), should be used for assessing the PLR. Traditional penlights are weak and have diffuse light, which is not as effective. A false-negative result may be obtained by holding the light too far from the eye or using a light that is too weak. In bright sun conditions, the pupil may already be constricted; thus, moving to a dimmer environment may be necessary to allow dilation before assessment. To assess the consensual PLR, an assistant should direct the bright light in the position for direct PLR assessment while the clinician illuminates the contralateral eye with the dimmest light possible that still allows a clear view of the pupil to assess the consensual PLR to that eye. Positioning the clinician low relative to the horse's eye and illuminating the eye such that the tapetal reflex is apparent aids in the assessment of the PLR. The clinician should look for constriction of the contralateral pupil while avoiding activating the direct PLR on that side.

After evaluation of the cranial nerves, the clinician should complete the ophthalmic examination including direct illumination of the eye, indirect illumination of the cornea and anterior chamber, retroillumination of the tapetal reflex, and an evaluation of the optic nerve head with a direct ophthalmoscope. Any opacities of the cornea or lens should be noted as well as flare in the anterior chamber or changes to the optic nerve head. A complete ophthalmic examination would then include diagnostic tests such as a Schirmer tear test, fluorescein stain, and tonometry if available.

Having evaluated the patient, any neuro-ophthalmic abnormalities are identified. What follows is a list of rule-outs for the most common abnormalities and appropriate subsequent diagnostics or treatments. Again, an emphasis is on clinically relevant disease.

FACIAL NERVE PARALYSIS

The facial nerve is predominantly a motor nerve that innervates the facial muscles, including ears, eyelids, lips, and nostrils as well as certain salivary glands and the lacrimal gland. Paralysis originates in the medulla oblongata at the facial nucleus and travels notably close to the tympanic cavity before coming to the superficial facial structures and splitting into the auricular, palpebral, and buccal superficial branches. Facial nerve paralysis is a common finding in the equine patient. Rather than the ocular signs, the most common clinical indicator is a deviation of the nose away from the side of facial nerve dysfunction. The loss of facial tone allows the nose to be pulled to the healthy side (**Fig. 1**). Ptosis, or dropping of the upper eyelid, is also a common presenting feature of facial nerve paralysis. Depending on the location of the facial nerve