

Neurologic Diseases in Horses



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KEYWORDS

• Equine disease • Brain • Spinal cord • Gross lesions • Diagnosis

KEY POINTS

- Location of the lesion based on a thorough neurologic examination, gross examination of the nervous system, and adequate tissue collection and preservation are important steps toward the definitive diagnosis of neurologic diseases in horses.
- The most common diagnostic tools for neurologic diseases include histopathology, viral isolation, fluorescent antibody test, polymerase chain reaction, immunohistochemistry, and bacterial and fungal culture.

INTRODUCTION

Neurologic diseases are often fatal and are one of the most common reasons for euthanasia in horses. Necropsy is needed to confirm the clinical diagnosis and/or differential diagnoses. One of the most challenging and demanding tasks for a practitioner is to perform a field necropsy in cases of equine neurologic disease that requires removal of the brain, spinal cord, ganglia, and peripheral nerves. Sampling the nervous system of a horse takes the same amount of time than evaluating all other organs during a necropsy. However, it is almost impossible to diagnose a neurologic disease unless the nervous system is examined, with the possible exception of hepatic encephalopathy (HEP) when the pathologist can infer the brain lesion from the lesions observed in the liver.

Despite the general concern about how fast postmortem (PM) changes set in the central nervous system (CNS) tissue, the brain and spinal cord are relatively protected from PM autolysis and putrefaction when compared with other organs such as those of the gastrointestinal tract. The CNS is further away from the ports of entry of PM proliferated bacteria; being encased by a relatively thin osseous case, almost deprived of adipose and other insulating tissues, it can disperse heat and remain cooler than

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other organs. Brain and spinal cord sampled from a horse dead from 24 to 36 hours will still have useful information.

This article is divided in 3 topics: (1) gross examination of the CNS, (2) main neurologic diseases approached by the affected neuroanatomic site, and (3) recommended diagnostic methods for definitive diagnosis of neurologic diseases (Table 1).

Removal of the Brain and Spinal Cord

The removal of the brain was already covered elsewhere in this issue by Chad Frank and colleagues. Sampling the entire spinal cord is necessary for the diagnosis of many neurologic diseases in horses because lesions are often located in this area. Although a laborious process, the easiest way to take a spinal cord from a horse in the field is to use a human spinal cord remover (Mopec, Oak Park, MI) (Fig. 1A). First, with a handsaw, cut the vertebral column in segments of 40 to 50 cm each (see Fig. 1B). Next, grasp the dura mater using a rat tooth forceps (see Fig. 1C) and insert the spinal cord remover in the epidural space on each lateral side of the spinal cord to cut the nerve rootlets off. Then, pull the spinal cord covered by dura mater out of the spinal canal. Because multiple segments of the spinal cord will be collected, an effective way to properly label each segment is to write the location of the spinal cord segment on a paper towel and wrap around the spinal cord segment and place in formalin (see Fig. 1D). Using a hatchet or an axe to cut off the lateral processes of the vertebral column is an alternative way to access the whole length of spinal cord of adult horses; however, it should be performed by trained personnel. Proper sampling of the brain, spinal cord, and to less extent ganglia, nerves, and associated muscle is critical for the accurate diagnosis of neurologic diseases.

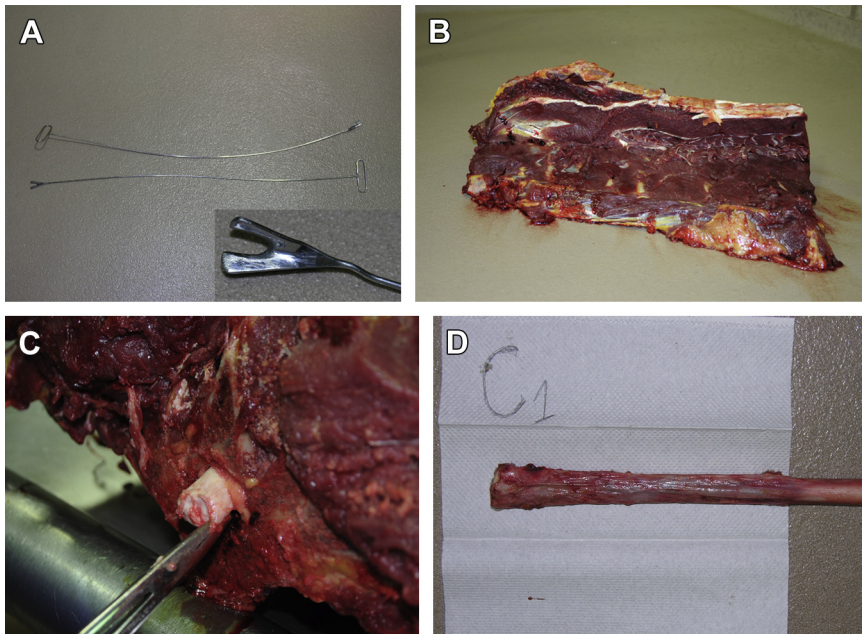


Fig. 1. (A) Spinal cord remover. Inset: Note the butterfly shape of the tip of the spinal cord remover that enables cutting off the nerve rootlets. (B) Section of spinal column from a horse cut with a handsaw. (C) Exposed segment of the spinal cord by grasping the dura mater with a rat tooth forceps. (D) Portion of a section of fresh spinal cord with appropriate labeling.

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