

Cerebral Disorders of the Adult Ruminant

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KEYWORDS

• Cerebral disease • Ruminant • Adult

KEY POINTS

- Cerebral disorders are frequently diffuse and can be manifest by alterations in mentation and behavior.
- Clinical signs may include hyperesthesia, obtundation, stupor, head pushing, central blindness, and possibly seizures.
- Many cases are caused by metabolic derangements, toxicity, or infectious agents.
- Because of the limitations of clinical signs and antemortem tests in differentiating cerebral disorders, knowing which diseases can be ruled in or out and how, will help focus disease treatment and control efforts.

INTRODUCTION

Clinical impression suggests that cerebral disorders of the adult ruminant are uncommon in routine practice. Although many diseases can cause cerebral disease in ruminants, many occur in younger animals, and some of these diseases and disorders are reviewed elsewhere in this edition. When cerebral dysfunction is observed in adult ruminants, it is often associated with metabolic derangements such as acid/base and electrolyte imbalance, dehydration, and ketosis.¹

This article approaches cerebral disorders from the perspective of workup of the adult ruminant with cerebral disease. A discussion of patient history, physical examination findings, differential diagnoses, diagnostic procedures, and general approaches to treatment are presented.

PATIENT HISTORY

Ruminants with cerebral disease generally have a history of altered mentation. Because many of the causes of cerebral disease in ruminants tend to be metabolic, toxic, or infectious, a thorough understanding of the time course of disease onset

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and progression, animal's diet, housing conditions, reproductive status (eg, periparturient), stage of production, and recent changes to husbandry are important factors in performing workup on an animal with cerebral disease. Recent changes in behavior should also be noted.

PHYSICAL EXAMINATION

An in-depth discussion of the neurologic examination of the ruminant and neuroanatomic localization of lesions are reviewed in Gilles Fecteau and colleagues' article, "[Neurological Examination of the Ruminant](#)," and Dusty W. Nagy's article, "[Diagnostics and Ancillary Tests of Neurologic Dysfunction in the Ruminant](#)," in this issue.

Cerebral or forebrain (cerebral hemispheres, thalamus, and hypothalamus) disease is often caused by metabolic derangement, toxic insult, or an infectious agent; hence, clinical signs are usually diffuse (symmetric) and will include lethargy, obtundation (decreased alertness), dementia (behavioral changes), and head pushing (defined as impedance of forward motion by an immovable object) with a normal gait when walked on a level surface.¹ With some disorders, excitement and hyperesthesia rather than obtundation may be manifest. Animals with forebrain disease may exhibit central blindness in which the pupillary light response and palpebral reflex are intact, but the menace response is diminished or absent. In contrast to animals with diffuse disease, animals with an asymmetric lesion may circle toward the side of the lesion with proprioceptive and postural deficits on the side contralateral to the lesion. Contralateral deficits in proprioception and postural reactions without a head tilt, strabismus, or nystagmus are consistent with a forebrain lesion and differentiate forebrain disease from vestibular disorders. Depending on etiology and severity of the disease, focal or generalized seizures may also be a feature of cerebral disease.

DIFFERENTIAL DIAGNOSES

A multitude of differential diagnoses exists for cerebral or forebrain disease in ruminants ([Table 1](#)). Although the list of differential diagnoses is lengthy, these diseases and disorders seem to be uncommon in adult animals in clinical practice. For the purposes of discussion, differential diagnoses are organized according to general categories, including metabolic, infectious, transmissible spongiform encephalopathies (TSEs), parasitic, other, and toxicity/poisoning (see [Table 1](#)). Toxicoses of the central nervous system are covered in Gene Niles's article, "[Toxicoses of the Ruminant Nervous System](#)," in this issue.

Metabolic

Probably the most frequent causes of cerebral clinical signs in the adult ruminant are metabolic disturbances.¹ Alterations in electrolyte concentrations (calcium, magnesium, sodium, and potassium) and acid/base and hydration status should be evaluated in cases presenting with evidence of cerebral or forebrain disease, as these derangements are often associated with lethargy, obtundation, or stupor.

Although hypoglycemia is uncommon in adults, hypoglycemia can result from derangements in energy metabolism as seen in ketosis and pregnancy toxemia. In the absence of glucose, the central nervous system becomes dependent on ketones as an energy substrate. Affected animals may exhibit episodic bizarre behavior including hyperesthesia, walking in circles, head pushing, blindness, licking and chewing, and salivation. The nervous system derangement seen in ketosis is thought to be caused

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