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Seizure-Like Disorder in a Golden Retriever

A 2-year-old castrated male golden retriever was presented due to 3 episodes of seizure-like activity.

History. The owners acquired this dog as a 6-month-old from a local breeder. The dog had been well immunized as a puppy, with boosters given within the past year. The owners considered the dog's behavior, growth rate, and appetite to be normal. Three times in the past week, while sleeping in their bedroom, the dog had awakened the owners by banging up against the wall or bed. These episodes consisted of rapid paddling movements of all 4 limbs and vocalizations described as "muffled barking." There was no loss of control of bowel or bladder. Once the owners were aware of the dog's nocturnal behavior, they immediately tried to calm and soothe the dog by stroking and talking to him. This stopped the behavior and the dog was dazed for a brief "second or two" before acting normal in every way.

Physical Examination. The dog was bright, alert, and responsive. While panting, he had a heart rate of 110 beats/minute and a body temperature of 101.5°F (38.6°C). Mucous membranes were pink, with a capillary refill time less than 2 seconds. No abnormalities were noted upon heart/lungs auscultation and neurologic examination. The patient was normal save for the seizure-like activity.

Laboratory Analysis. A complete blood count; serum biochemical profile, including electrolytes; and urine analysis were performed (Table 1).

ASK YOURSELF ...

- What are the differential diagnoses for this episodic behavior?
- What is the significance of the laboratory results and what diagnostic tests would you perform next?
- What additional questions are important to ask the owner to ensure a complete history?

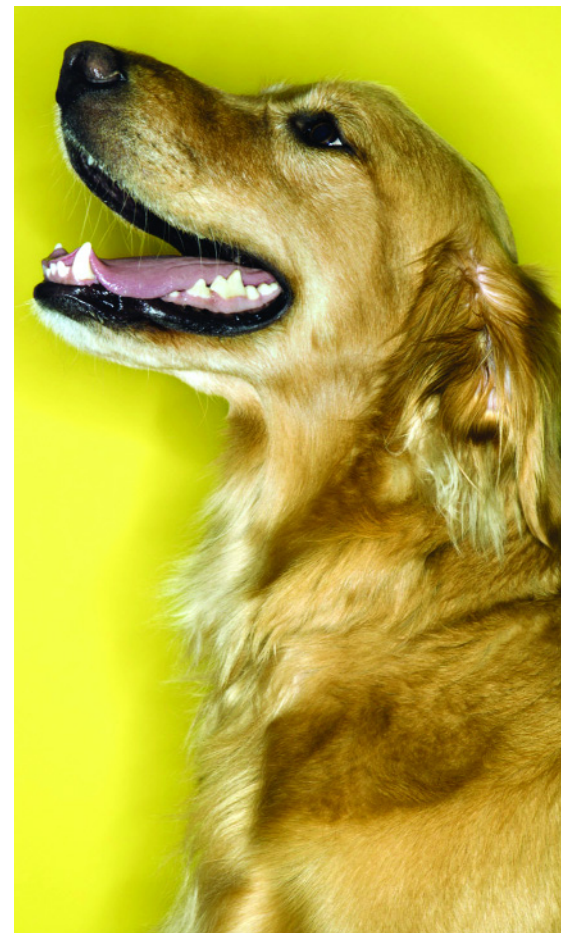


Table. Meaningful Laboratory Results

Test	Result	Reference Interval
Blood urea nitrogen (mg/dL)	9	10–25
Packed cell volume (%)	39	40–55
Total protein (g/dL)	5.2	5–7
Urine specific gravity	1.109	1.105–1.045

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Diagnosis: Rapid eye movement behavior disorder

Rapid eye movement (REM) behavior disorder (RBD) is characterized by spontaneous episodes of excessive limb movement, vocalization, and aggressive behavior that occur during sleep. These episodes are due to the loss of function in inhibitory pathways normally activated during REM sleep, which paralyze the limbs. RBD must be differentiated from nocturnal seizures in dogs.

Sleep-related disorders are relatively uncommon in cats and dogs.¹ A few known sleep disorders of animals are narcolepsy, geriatric insomnia, obstructive sleep apnea, sudden death syndrome, sleep-associated epilepsy, and REM behavior disorder.¹

Sleep Cycle. The sleep cycle has 2 stages: non-REM sleep and REM sleep. Non-REM is the first stage, and lasts approximately 20 minutes in animals.^{2,3} During non-REM sleep, animals are immobile and have no eye movement. REM sleep follows non-REM sleep and lasts approximately 10 to 15 minutes in cats and dogs.^{2,3}

During REM sleep, animals have brain activity characteristic of an alert state, as demonstrated with electroencephalography; however, they have reduced or absent electromyography activity.²⁻⁴ Despite the highly activated brain, there is complete motor inhibition of muscles except for twitching of the distal small muscles of the face, paws, larynx, and tail. Normal dogs, but not cats, can exhibit rhythmic paddling of all 4 legs during REM sleep. Sounds heard during normal REM sleep are caused by the irregular respirations and the passage of air across the twitching laryngeal muscles.⁴

Atonia during the REM cycle is important in preventing overt movements during sleep.¹ To maintain atonia, there is a balance between the

DID YOU ANSWER...

- Idiopathic/true epilepsy, symptomatic epilepsy, and rapid eye movement behavior disorder.
- The low blood urea nitrogen level and low normal total protein level may be considered a clinical sign of hepatic disease. To confirm the possibility of hepatic disease, pre- and postprandial bile acids may be evaluated; if the diagnostic laboratory is closeby and timely, ammonia testing would be a better choice.
- Because this dog came from a breeder and the family history should be available, the owners should contact the breeder to explore the possibility of inherited epilepsy.

highly activated neurons in the brain and the powerful inhibitory neurons in the medulla oblongata.^{1,3} When the balance between activity and inhibition is disrupted, muscle activity is preserved during sleep and RBD may occur.¹

Rapid Eye Movement Behavior Disorder.

RBD is characterized by violent behaviors, caused by preservation of muscle activity during sleep.^{5,6} The exact cause of RBD is unknown, but it may be idiopathic, congenital, or caused by traumatic injury.^{1,5-8} In humans, RBD usually occurs late in life and is associated with or often precedes neurodegenerative disorders, such as Parkinson's disease. Humans with RBD can physically harm themselves or their partners in bed as they act out their dreams.¹ Animals with RBD also show signs of spasmodic, violent limb and trunk movements with bursting eye movements.^{1,2} Some animals raise their heads, urinate, bite, or have such vigorous limb movements that they propel themselves across the floor.^{1,2} Arousal of animals with RBD from REM sleep is usually prompt and complete without confusion, ataxia, or dullness.^{2,3,8}

Few studies have reported RBD in animals. A 1989 study observed 3 cats and 3 dogs in which half of the animals had a progressive, adult-onset central nervous system abnormality that caused RBD.² One study reported 2 cases where the sleep disorder preceded any other clinical signs by 5 to 10 months.⁴ More recently, a study reported on a 9-month-old Labrador retriever

presenting with RBD, which appeared to be congenital with unknown pathologic origin.⁸ The studies of RBD in humans and the few studies conducted in animals suggest that RBD may be an early sign associated with pathologic brain disease.

Treatment. In humans, the standard treatment is clonazepam, which tends to control symptoms. Melatonin has also been used, with some effect. Both of these drugs have been tried in animals, with very little benefit. Gabapentin, diazepam, and diphenhydramine have also had no effect. The drug with the most consistent effect is potassium bromide. It is given orally at the standard antiseizure dose of 22 to 44 mg/kg daily.

Prognosis. In patients with juvenile-onset RBD, the disease is nonprogressive and does not affect lifespan. However, in those with adult-onset disease, the prognosis is poor; as in humans, the cause or precipitating factor is often an underlying neurologic pathologic abnormality. ■

See Aids & Resources, back page, for references, contacts, and appendices. Article archived on cliniciansbrief.com



Check out cliniciansbrief.com for a video of a dog exhibiting rapid eye movement behavior disorder.

REM = rapid eye movement; RDB = rapid eye movement behavior disorder