

What Is Your Diagnosis?

In collaboration with the American College of Veterinary Radiology

History

A 3-year-old 32.2-kg castrated male Labrador Retriever was presented to the Colorado State University Veterinary Teaching Hospital for evaluation because of anorexia and a painful left eye. The patient was evaluated by the primary veterinarian 4 days prior because of blepharospasm of the same eye with no known history of trauma. Results of fluorescein staining were negative, and the primary veterinarian empirically prescribed neomycin-polymyxin-B-dexamethasone ophthalmic ointment to be applied to the affected eye twice daily and oral administration of amoxicillin trihydrate-clavulanate potassium (12 mg/kg, PO, q 12 h) and prednisone (0.6 mg/kg, PO, q 12 h). The patient did not improve with treatment but became anorexic, prompting presentation to Colorado State University's Urgent Care Service. Pertinent physical examination findings included a rectal temperature of 40 °C. Initial ophthalmic diagnostic procedures, including Schirmer tear test, fluorescein staining, and measurements of intraocular pressures, were performed for both eyes, and results were unremarkable. Results of a CBC and serum chemistry panel were within reference limits, except for a slight toxic change to neutrophils.

The Colorado State University's Ophthalmology service was consulted, and evaluation of the left eye revealed that the dog had severe chemosis, blepharospasm, corneal edema, aqueous flare, absence of direct pupillary light reflex, the left eye was nonvisual, and signs of severe pain were elicited on left periocular palpation. Due to the severe diffuse corneal changes, the left retina could not be visualized. Ophthalmic examination of the right eye was unremarkable. Therefore, ocular ultrasonography of the left eye was performed with a linear multi frequency probe set at 9 MHz (**Figure 1**).

Formulate differential diagnoses, then continue reading.

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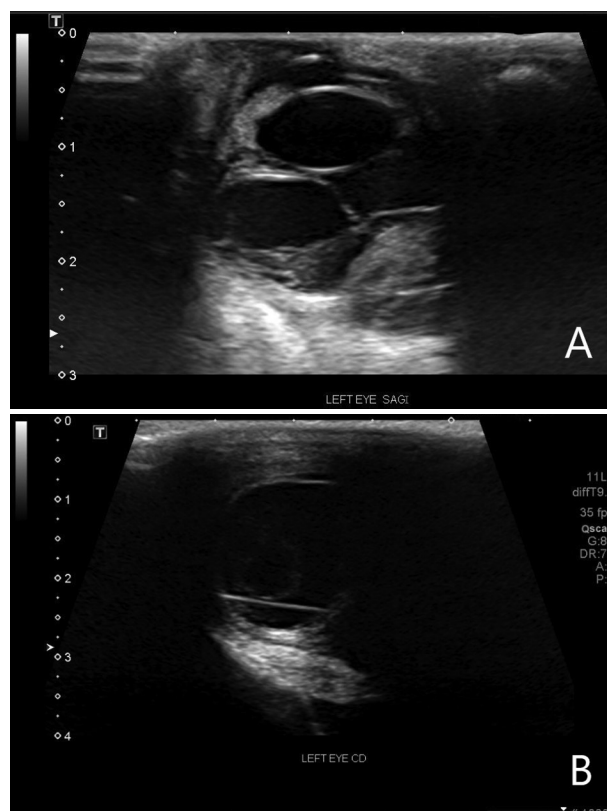


Figure 1—Sagittal (A) and craniodorsal-caudoventral oblique (B) plane ultrasonographic images of the left eye of a 3-year-old 32.2-kg castrated male Labrador Retriever with a 4-day history of anorexia and a painful left eye. The scale to the right in both images is in centimeters.

Diagnostic Imaging Findings and Interpretation

Ultrasonographic examination of the left eye revealed that the vitreous chamber was slightly small and had increased echogenic material, predominantly in the posterior aspect (**Figure 2**). Multiple curvilinear, hyperechoic, non-shadowing lines extended from the posterior aspect of the vitreous chamber with an additional thin, abnormally straight, linear, hyperechoic, non-shadowing focus that extended through the posterior sclera into the retrobulbar space. Additional focal hypoechoic tissue or fluid was suspected in the retrobulbar space, adjacent to the region where the linear structure exited the

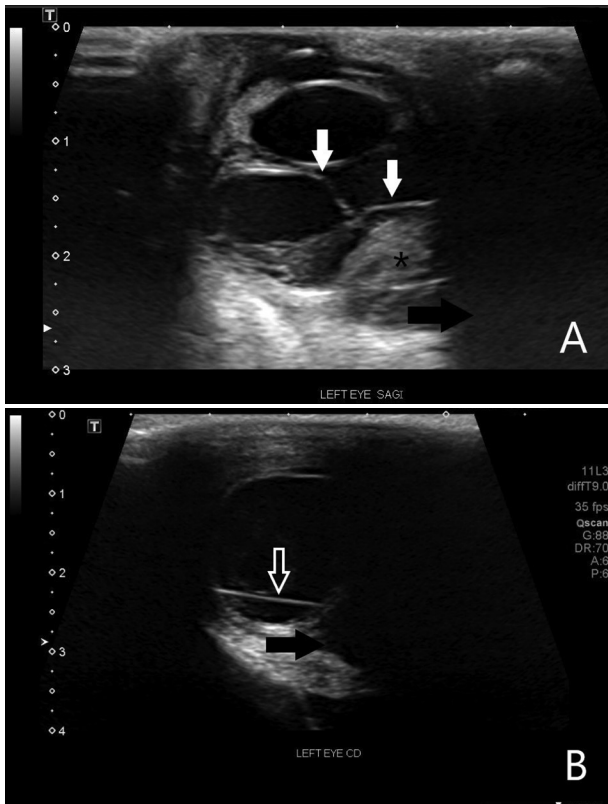


Figure 2— Same images as in Figure 1. A linear foreign body (white outlined arrow) extends through the posterior aspect of the vitreous chamber and has ruptured the globe, leading to secondary retinal detachment (white solid arrows), posterior segment hemorrhage (black asterisk), and suspected retrobulbar inflammation or abscess formation (black arrows).

sclera. Findings for the remaining segments of the eye were within reference limits. Findings were interpreted as a linear foreign body extending through the posterior aspect of the vitreous chamber, leading to globe rupture with secondary retinal detachment, posterior segment hemorrhage, and secondary retrobulbar inflammation or abscess formation.

Of note, the suspected retrobulbar abscess could not be definitively distinguished from an imaging artifact; however, an artifact was considered less likely given the patient's clinical presentation and presence of linear foreign material. The lack of distal acoustic shadowing associated with the foreign body was likely due to thin width, application of spatial compounding, and distal location of the foreign body.

Treatment and Outcome

Due to severe changes to the left globe, the owner elected for enucleation of the left eye. During

surgery, this progressed to an exenteration and orbital explore of the affected eye to locate the foreign body identified on ocular ultrasonography. A small granuloma was detected at the dorsal posterior aspect of the globe and was associated with a grass awn that extended into the vitreous chamber. The globe was submitted to the Comparative Ocular Pathology Laboratory of Wisconsin for histopathology, and findings were consistent with a migrating linear foreign body that was suspected to have entered the orbit and globe from the oral cavity.

Comments

Globe rupture is considered an ophthalmologic emergency, and rapid detection is critical in veterinary cases. With the growing availability in emergency settings, ultrasonography can be a rapid, cost-effective, and noninvasive method to quickly detect ocular and retrobulbar pathology.¹ Common ultrasonographic findings for scleral rupture in small animals are ill-defined scleral margins and echoic or hyperechoic contents in the anterior, posterior, or vitreous chambers, alone or in combination.² Appearance of an ocular foreign body may vary depending on the nature of the foreign material. The foreign material identified in our patient was a transverse, hyperechoic abnormally straight, linear focus that extended through the posterior aspect of the vitreous chamber. Evidence of retinal detachment was also visualized on ocular ultrasonography in this patient as a smooth, curvilinear, hyperechoic membrane in the vitreous chamber.³ Ocular ultrasonography is a modality that can be used in veterinary ophthalmologic emergencies, similarly to that of abdominal and thoracic focused assessments with sonography for trauma, triage, and tracking (AFAST and TFAST, respectively) used for patients with suspected thoracic or abdominal emergencies. Ocular ultrasonography allows for the early detection of various ophthalmologic emergencies that require rapid and proper intervention.

References

1. Bentley E, Miller PE, Diehl KA. Use of high-resolution ultrasound as a diagnostic tool in veterinary ophthalmology. *J Am Vet Med Assoc*. 2003;223(11):1617-1622. doi:10.2460/javma.2003.223.1617
2. Rampazzo A, Eule C, Speier S, Grest P, Spiess B. Scleral rupture in dogs, cats and horses. *Vet Ophthalmol*. 2006;9(3):149-155. doi:10.1111/j.1463-5224.2006.00455.x
3. Gonzalez EM, Rodriguez A, Garcia I. Review of ocular ultrasonography. *Vet Radiol Ultrasound*. 2001;42(6):485-495. doi:10.1111/j.1740-8261.2001.tb00975.x