



What Is Your Diagnosis?

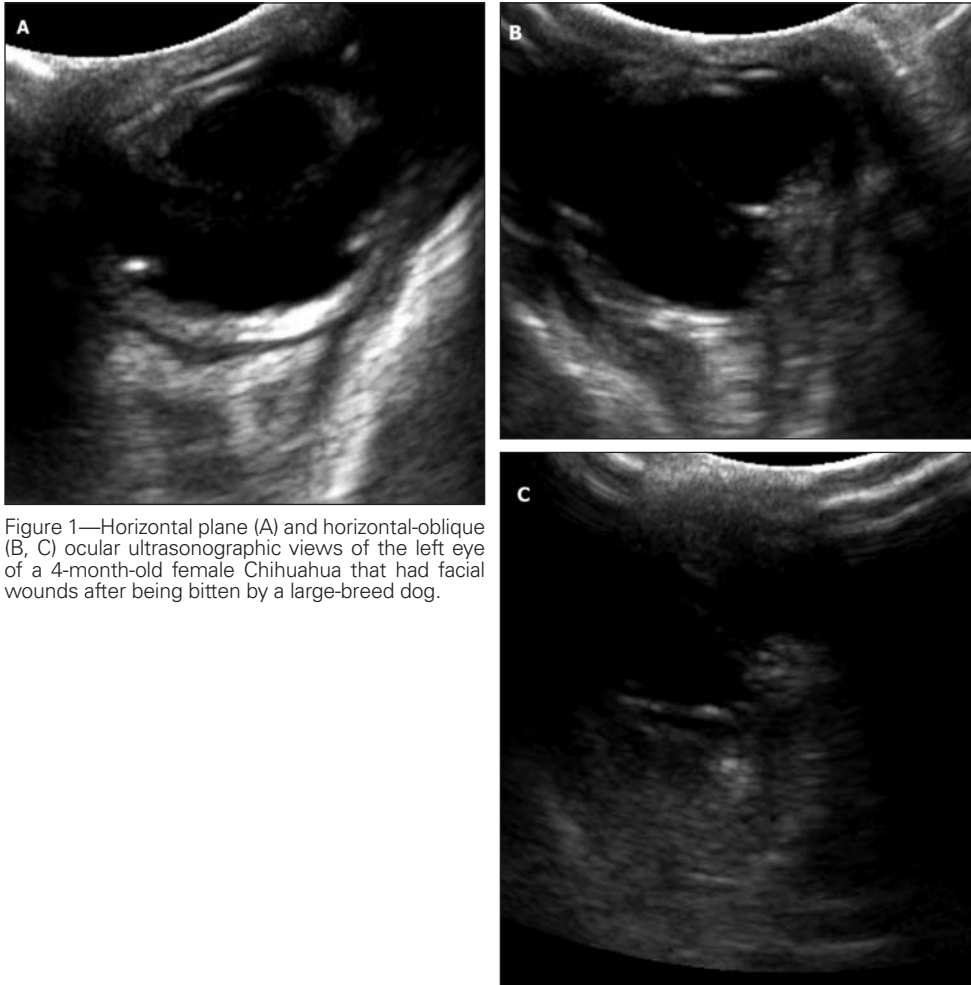


Figure 1—Horizontal plane (A) and horizontal-oblique (B, C) ocular ultrasonographic views of the left eye of a 4-month-old female Chihuahua that had facial wounds after being bitten by a large-breed dog.

History

A 4-month-old female Chihuahua was brought to the Ontario Veterinary College Teaching Hospital for post-traumatic evaluation of its left orbital area. The puppy had been bitten by a large-breed dog and was taken to a local emergency clinic for evaluation. The puppy had facial wounds. The referring veterinarian was unable to elicit a direct pupillary light reflex or menace response in the left eye. On initial evaluation, the puppy was bright and alert. A physical examination revealed a penetrating wound and swelling on the dog's forehead as well as yellow, viscous discharge from its left eye. A puncture wound was noted in the medial conjunctiva superior to the medial canthus, and signs of pain were elicited on palpation of the left periorbital region. There was periorbital swelling and ectropion of the iris margin. No other abnormalities were detected. An ophthalmic evaluation revealed hyphema and fibrin deposition in the anterior chamber of the dog's left eye. Subconjunctival hemorrhage and miosis were also observed. The patient did not have a direct pupillary light reflex in its left eye, but the consensual reflex was present. The dazzle response was also present in the left eye. Left intraocular pressure was low (4 mm Hg). No abnormalities were noticed in the right eye. On the basis of the history and ophthalmologic examination findings, a medial scleral rupture with secondary uveitis of the left eye was suspected. Ocular ultrasonography was performed with a curved array 8- to 5-MHz transducer^a to assess integrity of the eye and associated periorbital structures (Figure 1).

Determine whether additional imaging studies are required, or make your diagnosis from Figure 1—then turn the page →

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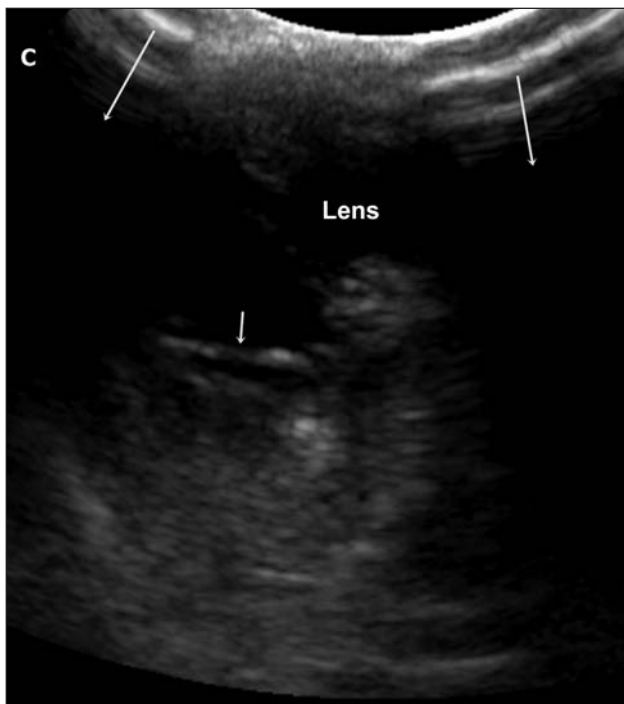
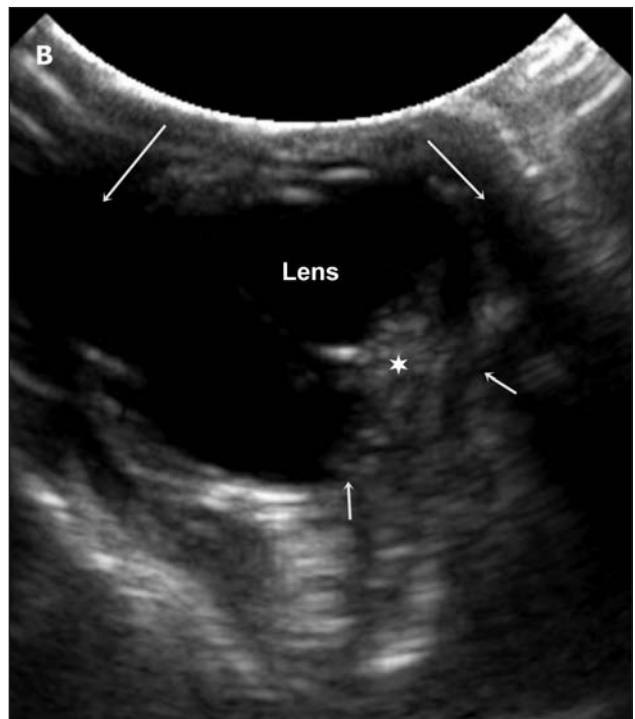
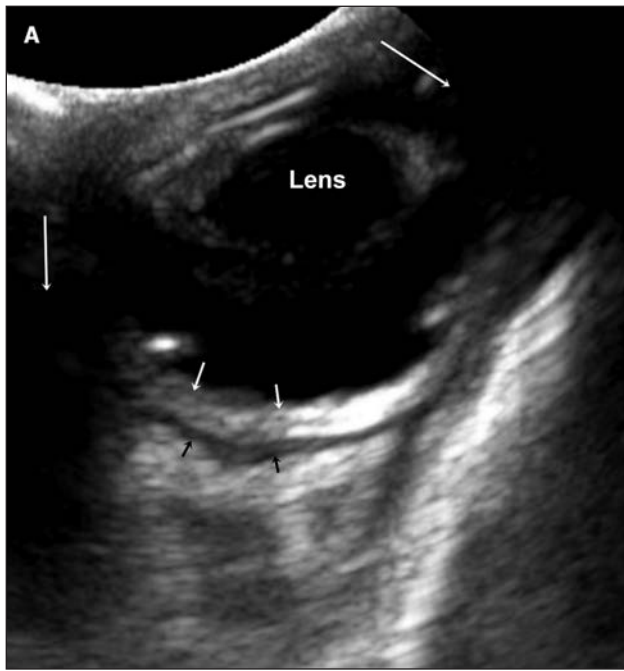


Figure 2—Same ultrasonographic images as in Figure 1. A—The globe is slightly misshapen, the wall of the globe is moderately thickened (short white arrows), a small amount of hypo- to hyperechoic material is present periorbitally (black arrows), echogenic material is present caudal to the lens, and hyperechoic retrobulbar fat is also seen. B—Notice the discontinuity of the sclera (short arrows) and the echogenic focal material associated with it (star). C—Partial potential retinal detachment is observed (short arrow). The long arrows in all images indicate shadowing artifact from the orbital bone.

Diagnostic Imaging Findings and Interpretation

On ultrasonographic images, the globe of the left eye is slightly misshapen but similar in size to that of the right eye. The entire wall of the globe is thickened with slightly irregular margins; determination of which layers of the globe are involved is not possible. A hypoechoic halo surrounds the globe, and part of the periorbital fat is hyperechoic (Figure 2). A small portion (approx 0.5 cm) of the medial aspect of the wall of the globe appears disrupted or discontinuous. A focal echogenic structure is associated with the suspected scleral laceration, which

may represent hemorrhagic and inflammatory material. A thick, hyperechoic band of tissue is seen in the posterior wall of the vitreous chamber and is suspected to be partial retinal detachment, posterior vitreous detachment, or local choroid detachment. The lens appears to be in a normal anatomic location. On the basis of these ultrasonographic findings, the proposed diagnosis includes scleral rupture and periocular cellulitis or hemorrhage, scleritis with uveitis, and partial retinal detachment. Echogenic material is present in the anterior and posterior chambers and may represent intraocular hemorrhage. Skull radiography was performed, and no bony abnormalities were found.

Treatment and Outcome

The owners were made aware of the patient's poor prognosis for vision, even with surgery. The options given were enucleation or exploration for possible repair of the lacerated area. The owners elected for repair. Exploration revealed an extensive T-shaped scleral laceration that extended posteriorly along the medial aspect of the globe. This lesion was impossible to repair, and an enucleation was performed. The dog recovered well from anesthesia. The dog was admitted to the intensive care unit and allowed to recover overnight, and was discharged from the hospital the following day. The globe was submitted for histologic evaluation. The

scleral laceration contained abundant fibrin, hemorrhage, edema, and neutrophils. Hemorrhage, fibrin, and fewer neutrophils were found in the anterior and posterior chambers. The retina was detached and hypertrophied. Scattered neutrophils were present throughout the retina. The histologic diagnosis was suppurative uveitis, choroiditis, scleritis, and retinal detachment.

Comments

Diagnosis of scleral rupture may be challenging on physical examination, and ultrasonographic evaluation of the eye may be necessary.¹ Scleral rupture is an infrequently reported consequence of blunt trauma to the skull in human² and veterinary¹ patients. It is thought to be less frequent in large-breed dogs and large animals and more common in cats and small-breed dogs.¹ In a retrospective study, Rampazzo et al¹ reported on ruptured scleras in 16 cats and 14 dogs after blunt trauma; of these cases, scleral rupture was suspected in 19 of 20 that were examined by ocular ultrasonography. The actual scleral defect, however, is not frequently detected on ultrasound examination.¹ The ultrasonographic findings of the dog of the present report are similar to those reported by Rampazzo et al¹ and Gonzales et al.³ Their ultrasonographic findings included the presence of echogenic content within the anterior and posterior chambers and vitreous humor, ill-defined scleral margins, echogenic or hyperechoic diffuse material in the retrobulbar space, retinal detachment, and lens luxation. The latter finding was not seen in the dog of the present report. For the dog of the present report, results of histologic evaluation were similar to the those reported by Rampazzo et al¹ in a retrospective study. Compared with the retrospective study,¹ ultrasonographic findings in the case described in the present report may be considered mild. The globe still had a relatively normal size, compared with the contralateral eye. The periocular hypoechoic material was subjectively mild in quantity, and the amount of echogenic material in the ocular chambers was also mild.

For ultrasonographic evaluation of the eye, the equipment required typically includes an ultrasound machine equipped with a 7.5- to 10-MHz transducer. The most common lesions diagnosed include masses of the iris and ciliary body, cataract, anterior uveitis, lens

luxation, hemorrhage in the posterior segment, asteroid hyalosis, retinal detachment, and retrobulbar disease.⁴ High-resolution ultrasonography via transducers with frequencies from 20 to 60 MHz has been reported in a horse with corneal, iridal, and lens lesions.⁵ In cases of more extensive orbital disease, CT or MRI are recommended to better assess the extent of the lesion.⁶ Computed tomography and ultrasonography have been found to have equal value in the diagnosis of neoplastic and nonneoplastic retrobulbar lesions, although CT was found to be more valuable for the detection of extraorbital involvement.⁷

Ocular trauma has been considered to be one of the most common indications for an ocular ultrasonographic evaluation.^{3,7} Given that scleral rupture appears to be difficult to identify on ultrasonography, other sonographic findings like the ones reported here and the ones reported by Rampazzo et al¹ should be taken into account when evaluating patients suspected to have scleral rupture. The most common findings include the presence of echogenic material in the vitreous chamber followed by echogenic material in the anterior and posterior chambers, posterior lens luxation, retinal detachment, and the presence of variable amounts of retrobulbar or periocular echogenic material.¹

a. Philips iU22 ultrasound system, Royal Philips Electronics, Amsterdam, The Netherlands.

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