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Topical Review

Lens-Related Emergencies: Not Always So Clear

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Emergencies involving the crystalline lens are not common; however, their clinical signs must be recognized quickly to begin treatment or referred immediately to improve the chances of retaining sight. The lens is a unique structure because of its immunologically privileged status and its imperative clarity for vision. Any insult to the lens capsule's integrity, its position within the globe, or to its clarity may result in undesirable sequelae.

Introduction

Lens-related emergencies are uncommon, but most require immediate attention by a veterinary ophthalmologist to address the issue and try to improve the chances of retaining sight, minimizing pain, and controlling inflammation. Causes of feline lens diseases are skewed differently than those of dogs. Cats tend to have traumatic lens damage and infectious causes of uveitis resulting in cataract and lens instability. Dogs, however, tend to develop cataracts and lens instability owing to inherited or metabolic (e.g., diabetes mellitus) diseases.

Sharp Trauma

Traumatic corneal laceration with associated lens disruption is common in adolescent dogs and in cats of any age (Fig 1). In a recent study, 45.5% of dogs with traumatic lens capsule lacerations were younger than 1 year and 34% were 5 months of age or younger, whereas, only 2 of the 10 cats in the study were adolescent. The following 3 treatment groups were evaluated for successful outcome: prophylactic lensectomy, corneal repair without prophylactic lensectomy, and medical management.[1] Success was defined as having functional sight, a normal-sized globe, positive-menace response, and a clear visual axis allowing visualization of at least 50% of the retina. Patients in the medical management group had more favorable outcomes than those undergoing either surgery. The 3 most common causes of failure were secondary glaucoma, endophthalmitis, and phthisis bulbi. Previous to this study, prophylactic lens removal had been advocated in patients with lens capsule tears of 1.5 mm or greater or if there was a substantial amount of lens cortex disruption.[2] In the more current study, lens removal along with corneal repair only had a 33% successful outcome by 18 months or longer post injury.

The use of topical nonsteroidal anti-inflammatory medications is indispensable in preventing sequelae associated with negative outcomes following traumatic lens injuries. A previous review of lens-induced uveitis by Van Der Woerdt[3] also advocated the use of cyclooxygenase inhibitors along with other appropriate therapy. Although many suspected lens capsular trauma cases are referred to an ophthalmologist, these cases benefit from starting therapy with topical and systemic NSAIDs as soon as possible. The author suggests using stronger nonsteroidal anti-inflammatory medications, such as ketorolac or nepafenac, 3 times a day. In addition, use of broad-spectrum antibiotics, such as amoxicillin/clavulanic acid or a fluoroquinolone, and topical parasympatholytic agents, such as tropicamide, 2-3 times a day, or atropine no more than twice a day, are suggested owing to the high likelihood of posterior synechiae formation and the severe degree of inflammation within the eye. If referral to a veterinary ophthalmologist is possible, immediate referral is better than waiting for sequelae to occur.

Septic Implantation Syndrome

Septic Implantation Syndrome is a type of phacoclastic uveitis wherein the penetrating trauma through the cornea or sclera implants bacteria into the lens resulting in suppurative endophthalmitis with lenticular abscess.[4,5] The time frame may be variable and ranges between 10 days and 1 year for cats and 1 week to 8 months for dogs, with a median duration of 6 weeks for cats and 5 weeks for dogs. Most cases were results of cat scratch injury and all cases reported had inflammatory exudate concentrated on the lens with lens capsule rupture, cataractogenesis, and neutrophils dissecting into the lens cortex.[4] The most commonly identified organisms were Gram-positive cocci followed by Gram-negative organisms, Gram-positive rods, and fungal hyphae. Aside from a history of trauma, the patient may have a spontaneously healed or unnoticed injury of the cornea or sclera. If lens capsule rupture is not identified, the eye may have subclinical to clinical signs of uveitis for weeks to months, and eventually may develop secondary glaucoma. Clinically, fibrinous exudate may be present on the lens capsule at the site of penetrating injury and may be present throughout the anterior and posterior or both chambers. A cataract may develop, and lens material may be seen outside of the lens at the site of injury or within the anterior chamber. Elevated intraocular pressure (IOP) is also present in most cases.

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Fig 1. Right eye of a 2-month-old puppy that sustained a cat claw injury. Temporally, there is a darkly pigmented raised lesion consistent with iris prolapse. Diffuse corneal edema surrounds the laceration. Medial to the edema, there is a curved lens capsule laceration and cataract forming. Hyphema, conjunctival hyperemia and epiphora are present.

Early referral to an ophthalmologist is ideal at initial presentation of a patient with a penetrating ocular injury. However, if this is not possible or declined by the owner, the veterinarian should treat with aggressive anti-inflammatory drops and oral medications (e.g., nonsteroidal anti-inflammatory agents), pain medications (e.g., tramadol), and oral and topical broad-spectrum antibiotics. It is important to closely monitor these patients and strongly suggest referral if initial medical therapy does not improve pain and inflammation, or if there is recurrence or worsening of the clinical signs. Alternatively, enucleation is warranted if medical therapy does not improve clinical signs and secondary glaucoma is diagnosed; once established, this syndrome is not successfully treated.

Spontaneous Lens Capsule Rupture

Spontaneous lens capsule rupture can occur in patients with rapidly progressive cataracts that become intumescent. In these cases, the lens is typically ruptured at the equator (Fig 2), though rupture through the posterior capsule also occurs.[6] Clinical signs will include active anterior uveitis (e.g., corneal edema, aqueous flare, conjunctival hyperemia, and variable discomfort) and the anterior chamber may be more shallow typically in the ventral aspect if the rupture is equatorial.[6] Lens capsule rupture is most common in diabetic patients with uncontrolled glucose regulation.[6] Diabetic cataracts in uncontrolled canine patients had a relatively short onset following diagnosis of diabetes of 123 days. These patients are in the minority as 50% of the general diabetic canine population are diagnosed with cataracts by 170 days and 80% by 470 days after diagnosis of diabetes.[7] When cataracts progress very quickly or intumescence and a shallow anterior chamber is noted, rapid referral for cataract evaluation is ideal. It is important to initiate aggressive anti-inflammatory therapy followed by rapid surgical intervention (phacoemulsification) in these cases to avoid blinding sequelae. Even if control of the diabetes is not ideal, surgical success is improved with

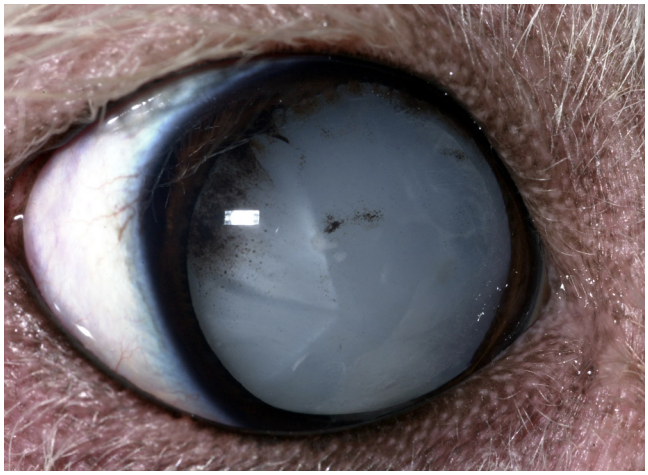

Fig 2. Right eye of a dog with a peripheral lens capsule rupture owing to rapid onset of cataractogenesis and resulting intumescence. The rupture is located superotemporally and there is both intralenticular and anterior capsular pigment present. The cataract has shifted within the lens capsule.

aggressive and, most likely, long-term anti-inflammatory therapy. Periodic rechecks with an ophthalmologist are necessary to maintain control of inflammation and address IOP elevations, should they occur, and are vital to achieving the best long-term outcome.

Cataractogenesis in diabetic patients, without lens capsule rupture, can also cause severe complications requiring aggressive therapy. Undiagnosed lens-induced uveitis can result in aqueous flare (Fig 3), lipid flare (Fig 4), posterior synechia, corneal edema, keratic precipitates (Fig 5), incomplete pharmacologic mydriasis, hyperpigmentation of the iris (Fig 6), and secondary glaucoma. If lens-induced uveitis is not addressed, the patient may become unsuitable for cataract surgery.

Many diabetic patients also have elevated triglycerides or cholesterol or both and the first obvious sign of inflammation may be lipid flare. Regardless of the stage of the cataract, lens-induced uveitis may be clinically apparent or subclinical.[8] It is important that lens-induced uveitis be addressed with anti-inflammatory medications, even if mild or subclinical. Therefore, referral to an ophthalmologist, even at initial diagnosis of diabetes

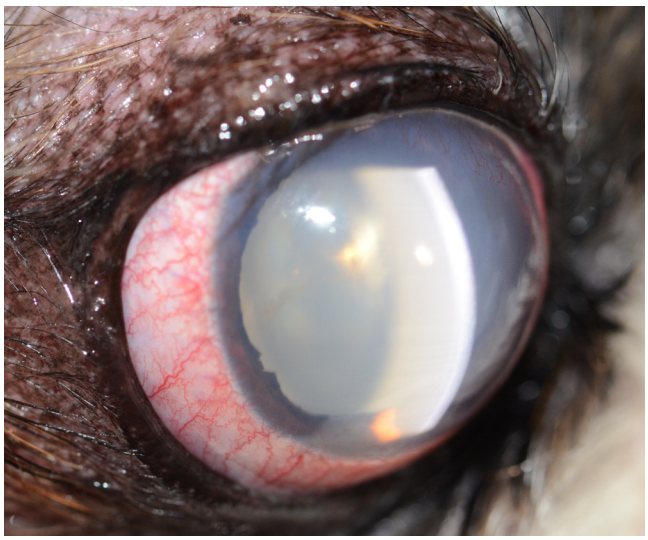

Fig 3. Right eye of a dog with conjunctival hyperemia, diffuse corneal edema, corneal vascularization, a mydriatic pupil with irregular pupil margins, 4+ aqueous flare, and a mature cataract.