

Ophthalmic Emergencies: Glaucomas and Globe Ruptures

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Glaucoma

Elevated intraocular pressure beyond what is compatible with the health of the retina and optic nerve, resulting in ocular pain and vision loss

Determining the underlying cause and chronicity is important to guide treatment

- Primary Glaucomas

- Canine: breed-related, drainage angle abnormality (narrowing, closure, pigment sheet covering angle opening)
 - Acute onset, rapid progression to vision loss if not detected/controlled
 - Fellow eye is at-risk, prophylactic therapy extends duration until onset
- Feline: age-related, slow progression, less common

- Secondary Glaucomas

- Lens luxation
 - Breed-related zonular breakdown, chronic uveitis, advanced age, and buphthalmos are potential causes
 - Anterior luxation, subluxation more commonly cause glaucoma vs. posterior luxation
 - Emergency management consists of carbonic anhydrase inhibitors +/- β -blockers (not miotics), topical and systemic anti-inflammatory medications and referral for intracapsular lens extraction if there is vision potential
 - Prognosis for vision is guarded, depending on duration, glaucoma, retinal detachment
- Anterior uveitis
 - Usually occurring with chronic disease, but severe cases can develop acutely
 - Occlusion of the drainage angle with protein or peripheral anterior synechiae or posterior synechiae causing iris bombe
- Golden Retriever Uveitis (Pigmentary and Cystic Glaucoma)
 - Breed-related anterior chamber pigment sheets and posterior iridal cysts
 - Intraocular pressures low initially, become elevated with time (months-years)
 - Initially treated with anti-inflammatory medications; addition of glaucoma medications as needed for pressure rise
- Intraocular neoplasia:
 - Most commonly uveal melanoma/melanocytoma, usually occurring with chronicity
- Other: Chronic retinal detachment, aqueous humor misdirection syndrome (cats), pigmentary glaucoma (Cairn terriers), post-intraocular surgery

- Treatment

- Miotics/Prostaglandin Analogs: Xalatan (latanoprost), Travatan (travaprost)
 - Useful in cases where the lens is *not* anteriorly luxated and there is *not* anterior uveitis
 - Profound miosis, often rapid effect in dogs
 - Not generally used/effective in cats
- Carbonic Anhydrase Inhibitors: Trusopt (dorzolamide), Azopt (brinzolamide)
 - Useful in most glaucomas, regardless of cause
 - Potential for hypersensitivity reaction causing blepharitis
- β -Blockers: Timolol
 - Low potency alone, good as prophylactic
- Hyperosmotics: Mannitol (intravenously), Glycerin (orally)
 - Dehydrates the vitreous, most effective with intact blood-ocular barrier
 - Contraindicated with dehydration, renal disease or cardiac disease; diabetes (glycerin)
- Vision-sparing surgery is indicated if IOP cannot be controlled medically in primary glaucoma with vision potential
 - Trans-scleral laser or endolaser ciliary destruction
 - +/- Gonioshunts
- Salvage surgery is indicated when vision potential is lost, medications are not sufficient, with goal to maintain comfort
 - Enucleation- best option when histopathology needed
 - Gentocin ciliary ablation- rapid procedure; causes uveitis, cataract, retinal degeneration, potential for phthisis or insufficient ciliary destruction
 - Intraocular prosthesis- potential for future corneal ulcer, KCS, corneal greyness

Corneal Perforation

- Causes include rupture of a deep ulcer, sharp or blunt trauma
- Clinical signs include corneal defect with prolapse of iris tissue or fibrin plug, +/- dyscoria, hyphema
- Surgery often required but iris/fibrin seal, size of the rupture site, proximity to corneal vascularization, patient factors (general anesthesia risk, activity level and comfort) are factors to consider
- **Emergency management**
 - o Broad-spectrum antibiotics (topical solutions and systemic administration)
 - o +/- Atropine solution
 - o Elizabethan collar to limit self-trauma, harness and gentle handling to limit neck pressure
 - o Surgical corneal repair +/- grafting
 - Microsurgical instruments, magnification, appropriate suture size/type
- **Prognosis** depends on cause, extent and duration.
 - o Poor prognostic indicators include blunt trauma, limbal involvement, hyphema, lens rupture, intraocular infection, and chronicity
 - o Lens involvement- cataract, phacoclastic uveitis, septic implantation syndrome, post-traumatic sarcoma (cats)

Deep, Melting Corneal Ulceration

- **Goals of therapy**
 - o Identify underlying cause
 - Lagophthalmos, KCS, entropion, ectopic cilia, trichiasis, etc.
 - o Control infection
 - Topical broad-spectrum antibiotics, ideally based on culture/sensitivity
 - o Slow collagenolytic protease activity
 - Topical autologous serum/plasma
 - Topical EDTA
 - Oral doxycycline
 - o Enhance corneal epithelialization, promote replenishment of stroma
 - Time, avoid self-trauma
 - Vascularization is beneficial to healing process
 - o Control intraocular inflammation and pain
 - Oral non-steroidal anti-inflammatory drugs
 - Although uveitis may be severe, topical corticosteroids are *contraindicated* and topical NSAIDS require caution
- **Grafting surgery** when $\geq 50\%$ depth is lost or corneal melting is not responsive to medical treatment
 - o Conjunctival pedicle flap supplies vascular supply
 - o Biosynthetic material (A-cell, Biosys) provides structural support
 - o Other: amniotic membrane, corneal-conjunctival transposition, corneal lamellar graft

Globe Proptosis

- Most often traumatic; degree of trauma needed to displace the globe varies greatly and depends on orbital conformation
- **Evaluation of systemic health** (CNS injury, skull/jaw fractures, pulmonary contusions, hemoabdomen)
- **Initial ocular management**
 - Flush gross debris
 - Assess for corneal ulcer, corneal perforation, intraocular damage
 - Assess vision, light responses
 - Topical antibiotics
 - Lubrication
- **Globe replacement** to preserve vision or a cosmetic globe, if the patient is stable for anesthesia
 - Periorbital swelling is often severe
 - Lateral canthotomy helps facilitate repositioning of the globe
 - Horizontal mattress sutures, rubber/plastic stents for temporary tarsorrhaphy
 - Small opening at medial canthus to instill drops, evaluate discharge
 - Leave in place 10-14 days
 - Topical antibiotic solution, oral anti-inflammatory medications
- **Prognosis** is poor for vision but fair to good for retaining a cosmetic globe
 - Positive prognostic indicators include
 - Intact PLR to the unaffected eye
 - Evidence of vision
 - Poor prognostic indicators include
 - Meso/dolichocephalic breeds and cats
 - Corneal damage
 - Hyphema, secondary glaucoma
 - Avulsion of ≥ 2 extraocular muscles
 - Globe rupture and/or avulsion of optic nerve
 - Complications: strabismus, corneal ulcer, KCS, phthisis, glaucoma