



## Ocular emergencies

**Ocular emergencies can be daunting as they require rapid assessment, diagnosis and treatment, writes Natasha Mitchell MVB DVOphthal MRCVS, recognised specialist in veterinary ophthalmology, Eye Vet, Limerick**

Treatment needs to be timely, appropriate and often aggressive to provide relief of pain and potentially save vision and the globe. Knowing how to recognise and treat the more common ophthalmic emergencies can lead to positive outcomes for all involved.

### **GLOBE PROPTOSIS**

Proptosis is forward displacement of the globe beyond the orbital rim. Spasm of the eyelids prevents spontaneous return of the globe into the orbit. Trauma of this nature is most often caused by road traffic accidents or dog attacks. It is much more common in brachycephalic breeds, as they have shallow orbits. The eye needs to be kept moist from the beginning, even with tap water. Once the patient has been treated for shock and head injuries, and stabilised, the extent of ocular damage can be assessed. Negative prognostic indicators

include rupture of three or more extraocular muscles, globe rupture, extensive hyphaema, a negative dazzle reflex and a negative consensual pupillary light reflex. However, globes that are intact may still be repositioned, and reassessed later to determine if there is comfort and vision.

Prompt treatment is essential if the patient is stable otherwise. Under general anaesthesia, a lateral canthotomy is done to facilitate globe replacement. The eyelids may be grasped and pulled outwards with Allis tissue forceps, and the globe is gently but firmly pushed back into the orbit. The lateral canthotomy is repaired and a lateral temporary tarsorrhaphy is performed. This protects the cornea from desiccation and the globe from further proptosis until the orbital soft tissue swelling subsides. Topical broad spectrum antibiotics and atropine may be applied through a gap at the medial canthus. Systemic nonsteroidal anti-inflammatory

drugs (NSAIDs) and antibiotics are also prescribed. The sutures are left in place for at least two weeks, at which time the globe can be reassessed. If the outcome is undesirable, enucleation may be indicated. Premature removal of sutures can result in corneal ulceration, as lagophthalmos may still be present and tear production may be suboptimal. Sutures could be retied if the palpebral reflex is still weak. On-going monitoring of tear production using the Schirmer tear test is recommended, and supplementation with artificial tears is usually required for months. Referral could be considered because a medial canthoplasty surgery is useful, particularly in brachycephalic breeds. For the post-proptosis eye, it reduces the size of the palpebral aperture, improving the blink, reducing corneal exposure and making repeat proptosis less likely. The unaffected eye could also have a medial canthoplasty surgery to reduce the size of the palpebral aperture and make the globe less vulnerable to proptosis.

### EYELID LACERATIONS

Traumatic laceration to the eyelids usually results from fights or cat scratches. Prevention of self-trauma and protection of the cornea with topical lubrication are important. An ocular examination will determine if any other structures are involved, such as the cornea, sclera or nasolacrimal apparatus, and hyphaema or uveitis could be present. The eyelids are very well vascularised and thus usually heal well in the absence of infection. Most traumatic injuries involve the eyelid margin, and this needs to be repaired precisely in order to re-establish the smooth architecture without any notch defects that could result in trichiasis, conjunctivitis, keratitis or corneal ulceration.

Rapid repair results in the best outcome, but the patient needs to be stable and suitable for general anaesthesia. If surgery cannot be done promptly (within 24 hours), the wound is treated with antimicrobials and anti-inflammatories until such time as anaesthesia and surgery are possible. During surgery, resection of eyelid tissue is kept to a minimum. The sutures, and particularly the knots, need to be kept away from the cornea, and this is achieved using a two-layer closure with a figure-of-eight suture at the eyelid margin. Absorbable 6/0 suture material on a reverse-cutting or spatulate needle is appropriate. Standard post-operative treatment includes an Elizabethan collar, topical antibiotic ointment, systemic antibiotics and NSAIDs, and good wound hygiene.

### CORNEAL LACERATION

Corneal lacerations usually result from cat claw injuries. Full thickness (penetrating) injuries may be associated with hyphaema, iris prolapse, fibrinous uveitis, hypopyon, anterior chamber collapse and lens rupture. Careful examination is required to assess the depth of penetration, the limits of the laceration (i.e. does it extend beyond the limbus?) and the presence of any lens involvement. Fluorescein should be applied to assess corneal integrity by way of the Seidel test. Extension of the laceration beyond the limbus and into the sclera may be associated with damage to the underlying

ciliary body, which can lead to retinal detachment. Rupture of the anterior lens capsule can result in severe and progressive phacoclastic uveitis that requires urgent and aggressive treatment in order to save the eye. Intraocular bacterial infection can also result in delayed septic implantation endophthalmitis. If the lens has been damaged, prompt referral should be recommended, as surgical lensectomy may be required.

Superficial corneal lacerations are treated similarly to an uncomplicated ulcer, and tend to heal well. If there is a loose flap of epithelium and anterior stroma, this can be sharply resected to aid healing. Deeper lacerations that result in gaping of the wound edges resulting in poor corneal apposition require corneal suturing with 8/0 or 9/0 absorbable suture.

### DESCEMETOCOELE/IRIS PROLAPSE

A deep stromal corneal ulcer becomes a descemetocoele when the overlying stroma and epithelium are completely lost, exposing Descemet's membrane. The lesion does not stain with fluorescein, as there is no stroma present to uptake it. A descemetocoele is an emergency because Descemet's membrane can easily rupture. In that case, the iris may be visible as it prolapses through the perforation. The anterior chamber can become contaminated at this point.

Medical treatment is similar to the treatment given to melting

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corneal ulcers. Unless infection or melting are present, topical treatment does not need to be given as frequently – usually six times daily. Surgical repair is the treatment of choice, whether the cornea has perforated or not. A graft such as a sliding corneo-conjunctival transposition provides tectonic support and can give good results with good vision afterwards. A conjunctival pedicle graft may be sufficient in the case of a small descemetocoele, but conjunctiva is thin and may not provide sufficient structural support. Technical expertise, microsurgical instrumentation and magnification, preferably with an operating microscope, are required for these procedures. Enucleation could be considered if there is intraocular infection, a negative dazzle reflex or a negative consensual pupillary light reflex. A third eyelid flap isn't recommended for a descemetocoele as it can trap infection, put pressure on a fragile globe and reduce penetration of essential topical medications. A grid keratotomy is contraindicated.

### MELTING CORNEAL ULCERS

Liquefactive corneal necrosis, or corneal 'melting' is a very serious potential complication of all forms of corneal ulceration. It occurs following liberation of collagenase enzymes from invading microorganisms, white blood cells or keratocytes, which cause rapidly collagenolysis and loss of corneal structure. The cornea appears white and soft, with an altered globe contour. Rapid progression to corneal perforation can occur and they require prompt and intensive treatment. Treatment should include:

- Topical antibiotics frequently (every one to two hours), preferably based on examination of cytological specimens;
- Systemic antibiotics. Doxycycline (Ronaxan, Merial) is a good choice as it also inhibits matrix metalloproteinases (MMPs) that can cause melting;
- Anticollagenase medication is also essential in the case of melting ulcers, and autologous serum is most commonly used; initially every one to two hours until stabilisation is achieved.

Secondary uveitis is always present, so topical treatment with atropine 1% is used (unless contraindications of keratoconjunctivitis sicca (KCS) or glaucoma), usually once daily for about three days; and Systemic NSAIDs are useful to reduce ocular pain and help to stabilize the blood-ocular barrier.

Frequent re-examination will be essential during the early stages of medical treatment to ensure the ulcer does not become deeper, get infected, or that the globe does not rupture. Surgery may also be required for melting ulcers, to remove necrotic corneal tissue and stabilise the cornea. Sometimes a graft, such as a conjunctival pedicle graft, is appropriate.

### GLAUCOMA

Glaucoma is a large, diverse group of painful and blinding disorders. They share the common feature that the intraocular pressure (IOP) is too high to permit the optic nerve and retina to function normally. Clinical signs of acute glaucoma

often include episcleral congestion, corneal oedema and mydriasis, along with vision deficits. Chronic glaucoma is not an emergency, and may present with peripheral deep corneal vascularisation, an enlarged globe and retinal degeneration. Sustained IOP over 25mmHg occurs with glaucoma.

Primary glaucomas are due to a structural or physiological abnormality within the aqueous outflow pathways. Secondary glaucomas are more common, and are caused by a different ocular or systemic disorder that impairs aqueous humor outflow. Examples include uveitis, lens luxation or neoplasia. Treatment depends on the type/cause and stage of glaucoma in order to provide appropriate and timely reduction in IOP with the goals to alleviate pain and to preserve as much as vision as is possible. Emergency medical treatment includes: Pain relief. Systemic opioids and NSAIDs are used until the IOP is controlled.

Prostaglandin analogues, eg. latanoprost (Xalatan, Pfizer), or travoprost (Travatan, Alcon). Topical treatment increases uveoscleral outflow. They result in potent miosis and they are pro-inflammatory, and so exacerbate uveitis. They are contraindicated with anterior lens luxation and uveitis.

Carbonic anhydrase inhibitors, eg. brinzolamide (Azopt, Alcon) or dorzolamide (Trusopt, MSD). Topical treatment reduces aqueous production. They can be used even when there is lens luxation and uveitis;

Osmotic agents. Mannitol 20% can be administered intravenously at a dose rate of 1-2g/kg over 20-30 minutes and rapidly causes reduction in IOP through dehydration of the vitreous and aqueous. It can be repeated after six hours if necessary. They shouldn't be used in cases of congestive heart failure, pulmonary oedema or anuric renal failure; Aqueocentesis may be required if these emergency methods fail, usually performed by an ophthalmologist.

### ANTERIOR LENS LUXATION

Anterior lens luxation is the displacement of the lens from its normal position into the anterior chamber. Dislocation of the lens may be due to primary inherited defect in the ciliary zonules in certain breeds, including many terrier breeds; or secondary to chronic glaucoma, blunt trauma or intraocular neoplasia. The lens will be visualised sitting in the anterior chamber if it is anteriorly luxated, and the eye will be sore. The other eye should be examined as it can be a bilateral condition. Primary acute lens luxation is a true emergency and a dog presenting with a sudden onset lens luxation is ideally referred to an ophthalmologist urgently, where surgical removal of the lens, along with treatment of the fellow eye, can be discussed. Pain relief is required. Topical prostaglandin analogues need to be avoided as they would cause pupil block, but topical carbonic anhydrase inhibitors are appropriate. Trans-corneal reduction (couching) of anterior lens luxation in dogs with lens instability has been reported (Montgomery et al, 2014). With secondary lens luxation, if there is no potential for vision, enucleation is recommended.

*This is a brief overview and introduction to a two-part series which will be published in the later part of this year.*