



# Ophthalmic Emergencies 2017 Mini Series

## Session One: Traumatic Eye Injuries and Infections

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## THE ORBIT

### **GLOBE PROLAPSE (PROPTOSIS)**

A traumatic acute forward prolapse of the globe, so that the equator of the globe moves anterior to the eyelids (unlike exophthalmos where the equator remains caudal to the eyelids). It usually occurs in breeds with prominent globes, e.g. Pug, Pekingese. In breeds with non-prominent globes, severe head trauma is needed to cause proptosis.

Proptosis is a surgical emergency. Advise the owner to keep the eye moist (wet cotton wool) and seek veterinary attention as soon as possible.

#### **Treatment:**

- Stabilise the patient:
  - Analgesia
  - Intravenous fluids
  - Check for concurrent life-threatening injuries (e.g. diaphragmatic hernia, pneumothorax)
- Assess globe damage
  - Posterior segment haemorrhage? Consensual PLR? Ocular ultrasonography to check for retinal detachment, scleral rupture is suspected
  - If severe damage consider enucleation
  - If there is some prognosis for vision then globe must be repositioned under general anaesthesia:
    - Stay sutures in upper and lower lids, lubricate and ease lids over globe
    - Lateral canthotomy may aid replacement
    - Temporary tarsorrhaphy for 10-14 days post-operatively
    - Consider permanent medial canthoplasty if risk of re-prolapse

The prognosis for vision is guarded to poor.

### **EXOPHTHALMOS**

Forward protrusion of globe due to an orbital space-occupying lesion.

The equator of the globe remains caudal to eyelids, in contrast to proptosis.

#### **Causes of exophthalmos:**

- Orbital abscess or cellulitis
- Orbital foreign body
- Orbital neoplasia
- Less commonly: orbital haemorrhage, orbital cyst, zygomatic mucocoele, masticatory myositis, extraocular muscle myositis

**Signs:**

- Increased globe prominence (look from above, compare sides)
- Increased resistance to globe retropulsion (gently retropulse both globes into orbit by gentle digital pressure through the closed upper eyelid)
- Third eyelid protrusion
- Strabismus if extraconal

**Investigation of exophthalmos**

- History
- General clinical examination
  - Inc. intra-oral examination, superficial lymph nodes
  - Periocular palpation
- Ophthalmic examination
- Diagnostic imaging
  - Ultrasonography ± US-guided fine needle aspirate (care!)
  - Skull radiography if bone or dental disease suspected, or airgun pellet injury
  - Chest radiography for staging, if neoplasia suspected
  - MRI – ideal for soft tissue
  - CT ideal for bone
- Routine haematology may be of use (neutrophilia may be present in orbital infections)

**Treatment of orbital abscess:****1. Surgical drainage.**

In some cases it may be possible to drain the abscess via an incision in the buccal mucosa caudal to the last upper molar tooth. Incise the mucosa (no deeper) with a scalpel blade, then carefully pass a blunt instrument (eg closed haemostats) to try to establish drainage.

**CARE!!!** As well as the abscess, the orbit contains many structures easily damaged iatrogenically, including the maxillary artery, palatine artery, orbital vein, cranial nerves II, III, IV, ophthalmic V, and VI

**2. Systemic antibiotics.**

A 1-2 week course or longer may be required. NB often mixed (inc. anaerobic) infections so combination therapy may be indicated eg cephalexin + metronidazole.

A single one-off injection of corticosteroid (eg dexamethasone 0.05-0.1mg/kg) may help to reduce acute swelling. Otherwise systemic NSAIDs.

### Treatment of orbital neoplasia:

1. Orbitotomy and removal of tumour may be possible. This is a specialist procedure.
2. Exenteration (removal of globe and orbital contents).

## CORNEAL AND INTRAOCULAR FOREIGN BODIES

For corneal FBs, it is important to identify whether there has been full-thickness penetration. Signs include:

- Anterior uveitis
  - Miosis
  - Aqueous flare
  - Iritis
- Aqueous clot
- Fibrin reaction

Dilate the pupil (tropicamide) and carefully assess for lens or posterior segment damage. IF THERE HAS BEEN INTRAOCULAR DAMAGE, ESPECIALLY LENS TRAUMA, THEN SEEK SPECIALIST ADVICE- THIS CAN LEAD TO A SEVERE AND SIGHT-THREATENING INFLAMMATION (PHACOCLASTIC UVEITIS, PCU) WHICH MAY REQUIRE URGENT PHACOEMULSIFICATION SURGERY.

If the FB is partial thickness, then removal can be attempted. **However, ensure you have a plan of action if the FB turns out to be full-thickness and there is aqueous leakage and globe collapse following removal. This may involve urgent referral, or surgical procedure such as placement of a pedicle graft. Placement of a third eyelid flap is not recommended except as a temporary measure prior to referral, or in cases where referral or conjunctival grafting is not possible.**

Always use topical anaesthesia (proxymetacaine). Depending on the FB localisation, patient co-operation and surgeon skill, removal can be performed under topical anaesthesia, but sedation is usually advisable.

For reliable sedation, I use the following i/v protocol:

- Butorphanol 0.2mg/kg
- Followed by medetomidine 10ug/kg, diluted in 5mls sterile saline and given i/v to effect (most patients require no more than half the calculated volume of diluted medetomidine)
- Apply topical anaesthetic and position the patient's head on a deflatable vacuum pillow
- Use an eyelid speculum for optimum visualisation, and place stay sutures on the inner aspect of the third eyelid for globe stabilisation
- Using a 23-25G sterile needle, pierce the FB at right angles and slowly withdraw.
- If there is full-thickness penetration, let the FB rest in the defect for a minute prior to fully withdrawing it, to allow a fibrin clot to form

- Post-operative treatment includes topical antibiotics (eg chloramphenicol 4x daily for 5-7 days) and systemic NSAIDs. I will often apply a one-off drop of atropine, but seldom dispense this to the owner since patients dislike the bitter taste and excess salivation is a common side-effect.

## INFECTED CORNEAL ULCERS

Corneal ulcers may become infected with bacteria from the local environment. Signs of infection include a mucopurulent ocular discharge and a grey discolouration to the ulcer or the surrounding stroma. In some cases, infection may lead to 'melting' corneal ulceration (acute stromal collagenolysis or liquefactive stromal necrosis). Melting corneal ulcers may develop when an existing corneal ulcer becomes infected with a bacterium that releases proteases.

The bacterial species most commonly isolated from corneal melts are *Pseudomonas aeruginosa* and beta-haemolytic streptococcus. They release a variety of proteolytic enzymes that dissolve the corneal stroma and lead to progressive deepening of the ulcer.

Signs of an early corneal melt include:

- A corneal ulcer with an ill-defined gelatinous rim, which may be grey, white or yellow
- Increasing ocular discomfort
- Progression from serous to mucopurulent ocular discharge
- Progressive deepening of the ulcer
- Secondary uveitis (miosis and iris hyperaemia)

### *Work-up and treatment*

Melting ulcers should be classed as an emergency. Immediate referral should be considered. If not, animals should be hospitalised and carefully monitored. If this is not possible, then it is vital that the owner returns for regular (*at least* daily) check-ups, and is made aware of the risk of sudden globe rupture.

It is most important to identify whether the melt is associated with *Pseudomonas aeruginosa* and beta-haemolytic streptococcus. Luckily, these can be easily distinguished by in-house cytology.

- Apply topical anaesthetic and take a gentle scrape or swab from the edges of the ulcer
- Air dry then DiffQuik stain to look for the presence of rods (assume *Pseudomonas*) or streptococci (assume BHS)
- I also always send an additional bacterial swab for culture/ sensitivity testing, and not infrequently need to switch antibiotics depending on the sensitivity results when these are received a few days later

Medical treatment consists of:

- Autologous serum q30-60mins. This has broad-spectrum anti-protease activity to help to stop the melt
- Topical antibacterials.
  - Fluoroquinolones such as ciprofloxacin and ofloxacin are broad-spectrum, with good activity against *Pseudomonas*, *but beta-haemolytic streptococcus is resistant*
  - Chloramphenicol has reasonable activity against *beta-haemolytic streptococcus*, and
- Systemic antibacterials
  - Cephalexin or amoxicillin/clavulanic acid is effective against *beta-haemolytic streptococcus* (these are secreted in the tear film)
- Systemic NSAID's
- Other drugs that may have anti-protease activity and might be considered include topical acetylcysteine, topical EDTA, systemic tetracycline and vitamin C

Surgical intervention is often required, most commonly conjunctival grafting. Conjunctival pedicle, bridge, hood and 360° grafts may be used. Conjunctival grafts not only give physical support to the weakened cornea, but also provide a blood supply, thus allowing direct access by serum anti-collagenases and systemically administered antibacterials.

#### FURTHER READING

BSAVA Manual of canine and feline Ophthalmology, third edition, 2014. Eds David Gould and Gillian Mclellan. BSAVA Publications, UK.