Ophthalmic Surgery for the General Practitioner: Tips and Tricks

Enucleation

Enucleation is the most common orbital surgery performed in animals. Removal of the globe is indicated in any case involving blind, painful eyes, including end stage glaucoma, proptosis, endophthalmitis, severe ocular trauma, and severe corneal ruptures. Additionally, it is indicated for treatment of intraocular tumors not amendable to other treatments.

Transpalpebral Approach

Prior to surgery surgical clipping and prepping should be performed in an aseptic manner using dilute betadine, not forgetting to rinse the conjunctival sac and anterior and posterior surfaces of the third eyelid. Two approaches for enucleation can be chosen. Transpalpebral enucleation is the safest approach to prevent exposure of the orbit to contamination of the ocular surface as well as reducing the chance of leaving parts of the gland of the third eyelid because the two structures (globe and third eyelid) are removed en-bloc. It does, however, remove more tissue making closure of the periorbita more difficult to get complete apposition of the periorbita edges. It is also more likely to have depression of the skin over the orbit, reducing long-term cosmesis.

For the transpalpebral approach, the eyelids are sutured together in a continuous pattern. An alternative would be to use several towel clamps (in cases where bacterial contamination is not a concern) to clamp the eyelids closed. These can be used as a handle for traction and manipulation. An elliptical incision is made encircling the eyelids that join at the lateral and medial canthus. It is imperative that the medial caruncle is removed in its entirety. I often use a #15 blade to cut the tissue anchoring the medial caruncle to the bone to make sure I remove it cleanly. The lateral canthus is also transected using any dissection scissors. Deep dissection of the remaining tissue under the incision will identify the bulbar conjunctiva. Care should be taken to prevent transection of the angularis oculi vein in the dorso-medial orbit. Blunt dissection back to the sclera will help visualization of the extraocular muscles. Running a curved scissor under the thin extraocular muscles (thin, pink tissue near the equator), you can isolate the extraocular muscles at their attachments. This will allow transection of these muscles at the ligamentous attachments, resulting in less hemorrhage during surgery. The medial muscle is most often the most difficult to isolate. This is the tightest of all the extraocular muscles, thus it is easiest to leave this muscle for last. Take care not to use too much traction during dissection of the globe to prevent damage to the contralateral optic nerve. This is especially true in cats, due to a short globe to optic chiasma distance.

Transconjunctival Approach

Alternatively, the transconjunctival approach can be performed. It is often quicker and easier and often minimizes depression of the skin over the orbit in patients without orbital implant placement. However, it is also easier to leave gland of the third eyelid with transconjunctival
enucleation due to both being removed individually from the globe and not en-bloc as in the transpalpebral approach.

For the transconjunctival approach, an elliptical incision is made 5mm posterior to the eyelid margins, joining at the medial and lateral canthus. A lateral canthotomy can be made to facilitate easier removal of the eyelids. Removal of the third eyelid and its gland with thorough inspection to ensure the gland is resected in its entirety is important. Both removal of the eyelids and third eyelid can be performed at the beginning or end of the procedure, but historically they are removed at the end. A #15 blade is then used to transect the attachment of the medial caruncle from the bone of the orbit (lacrimal bone). An eyelid speculum can be used if needed. The conjunctiva is incised 5mm posterior to the limbus starting at the dorsal conjunctival fornix. The remaining fascia and tenon’s capsule are then dissected from the globe. The extraocular muscles are isolated and transected close to their attachment at the equator. The medial muscle is the tightest and most difficult to isolate.

**Removal of the Globe and Closure**

After dissection of the globe from the surrounding tissues, medial rotation of the globe will expose the optic nerve. The nerve is clamped and transected ~5mm posterior to the globe. Enucleation scissors are intensely curved mayo-type scissors that can also greatly improve the ease from which dissection of the globe and transection of the optic nerve are performed. Hemaclips can be used for easy hemostasis of the vessels surrounding the optic nerve (ophthalmic artery and vein). Alternatively, GelFoam and packing the orbit with gauze can also be used to control hemorrhage. If the globe is buphthalmic, you may remove a small amount of fluid (aqueous or vitreous) to facilitate removal of a difficult globe. Take care to not damage intraocular tissues if histopathology is to be performed.

Once the globe is removed from the orbit, if it is to be sent for histopathology, the eyelids and surrounding tissues should be removed from the globe prior to placement in formalin to improve fixation. A small amount of formalin (0.1mL) can also be injected into the vitreous near the optic nerve to further improve fixation of the intraocular tissues. If cosmesis is important, a Jardon orbital silicone implant can be placed to prevent depression of the skin within the orbit after surgery. With this implant there is no cosmetic difference between transconjunctival and transpalpebral approaches in regards to cosmesis. Jardon implants should be sterilized and rinsed of lint and debris with sterile saline prior to placement within the orbit. The periorbital/deep fascial tissues are sutures closed with 4-0 absorbable suture in a continuous pattern. The skin is closed with simple interrupted 4-0 or 5-0 non-absorbable monofilament suture.
**Complications of Enucleation**

The most common post-operative complication is hemorrhage within the first few hours after surgery. Cold compresses, pressure bandages and sedation are usually sufficient to control hemorrhage. Warm compresses can also help control swelling after surgery. It is not uncommon to have serosanquinous fluid exit the ipsilateral nare the first 24 hours after surgery. Pain control is needed post-operatively. In some cases, a lidocaine line block to the eyelids at closure can also be helpful for pain control.

Draining fistulas from the orbit result from incomplete removal of the medial caruncle or gland of the third eyelid. Orbital emphysema can occur in brachycephalic breeds from air following the nasolacrimal duct retrograde. Post-operative orbital infections are rare. Additionally, in rare cases orbital prosthesis rejections has been reported. This is more commonly seen in cats than in dogs.

**Eyelid Mass Removal**

**Wedge Resection**

Wedge resection is a simple form of eyelid reconstruction to repair eyelid defects associated with removal of eyelid neoplasms, ectropion correction, and eyelid laceration repair. The maximum size of the eyelid defect should be less than 25-30% of the entire eyelid length to use this technique. Larger defects result in eyelids that are too tight upon repair and can lead to entropion and poor cosmesis.

For a wedge resection, the eyelid is stabilized using a chalazion clamp or Jeager eyelid plate. These are especially useful as they provide a hard surface to make your first incisions. Very small neoplasms/defect can be removed with a simple V-shaped incision. Larger defects/masses should be removed with a house-shaped incision. This is performed by making two parallel incisions ~1 meibomian gland (or 1mm) on either size of the defect/mass with a #15 blade. The first incisions are then joined distally with a full thickness V-shaped wedge incision. The chalazion clamp or Jeager plate is then removed.

**Eyelid Closure**

Closure of the eyelid margin can be made using one or two layer closure. The deeper tarsoconjunctival layer can be apposed by simple continuous 6-0 to 8-0 absorbable sutures; however, the knots should be buried. The distal tip of the eyelid margin skin incision is the most critical and should be closed using a “Figure 8” or “U” suture pattern to prevent rubbing of the suture on the cornea. Using non-absorbable 4-0 to 5-0 monofilament suture in a “Figure 8” suture pattern, the first throw is placed ~5mm from the eyelid margin at the haired/non-haired junction horizontally through in cut incision. It is then passed diagonally through the opposite cut incision through the meibomian gland opening. Alternatively you may pass through the
extreme tip of the incision at the mucocutaneous junction allowing less suture to be exposed at the eyelid margin. The needle is then passed through the opposite side of the incision an equal distance from the edge as the opposite side. It is again placed horizontally at the haired/non-haired junction an equal distance from the opposite side and then tied off. Another option for the eyelid margin is the “U-Shaped” suture pattern. It is slightly more difficult to perform but entails making a first deep partial thickness throw, then an equal deep partial thickness throw on the opposite side. Then a shallow partial thickness throw is performed closer to the incision margin and another shallow partial thickness throw placed on the opposite side and then it is tied off. Simple interrupted suture patterns can then be used to close the remaining skin. If the tails of each knot are left long, the last suture furthest from the eyelid margin can be used to anchor the tails of the knots away from the eyelid margin and cornea. Temporary tarsorrhaphy sutures can be placed around the wedge resection to reduce tension and movement of the incision during healing.

Complications of Wedge Resection

The most common complication of wedge resection would be rubbing of the sutures on the cornea, resulting in corneal ulceration. Additionally, if care is not taken to ensure lid alignment, a notch of eyelid could rub on the cornea resulting in ulceration. Other complications would include infection or dehiscence. Topical antibiotics are often prescribed after surgery for this reason. Additionally, if the resulting eyelid is too tight, a lateral canthotomy can be helpful to release tension. An Elizabethan collar should be placed in all ophthalmic surgical procedures.