

OPHTHALMIC DISEASE AND EXENTERATION IN CATTLE

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Introduction: Ocular disease and injury remain a common occurrence in cattle. In many instances medical management is sufficient for resolution and amelioration of clinical signs. In selected cases, surgical intervention is required. Fortunately, field surgery remains a viable option for most cases of bovine ocular disease. While the surgical techniques are not new, thorough physical examination, proper preparation of the patient, appropriate perioperative management and good surgical technique will assure the best results possible.

Anesthesia: Sedation: Appropriate sedation as described previously may be warranted in certain cattle. The author most often uses xylazine (0.05 mg/kg body weight IV) and butorphenol (0.02 mg/kg IV) for standing restraint. Addition of dissociative doses of ketamine (0.1 mg/kg IV) aids in management of fractious patients and these three drugs in combination have been referred to as a "Ket-Stun" technique.

Auriculopalpebral Nerve Block: Surgical manipulation of the eye is facilitated by nerve blockade of the eyelids. Auriculopalpebral nerve block can be placed to reduce upper eyelid movement prior to performing a Peterson or retrobulbar block. The auriculopalpebral nerve can be palpated as it crosses the zygomatic arch, roughly 5-6 centimeters behind the supraorbital process. Inject 5 milliliters of 2% lidocaine HCl subcutaneously on the dorsal aspect of the zygomatic arch at this location.

Peterson Nerve Block: After performing a small local skin block over the intended site of puncture, a 3.8-cm long 14 gauge needle is inserted through the skin as a cannula for introduction of an 18-gauge 9-cm long needle for the nerve block. The cannula is inserted caudal to the junction of the supraorbital process and zygomatic arch and is introduced through the skin. Then, the 18-gauge, 9-cm long needle is introduced through the cannula needle and is directed in a horizontal and slightly dorsal direction until the coronoid process is encountered. The needle is "walked off" the rostral aspect of the coronoid process and advanced in a ventromedial direction along the caudal aspect of the orbit until the needle encounters the bony plate encasing the foramen orbitotundum. Once the needle is advanced to the foramen, it is advised that the needle be drawn back a few millimeters to reduce the risk of intrameningeal injection. After aspirating to assure the needle is not in the internal maxillary artery, 10-15 milliliters of lidocaine (2%) is deposited, with an additional 5 milliliters of lidocaine deposited as the needle is slowly withdrawn. Mydriasis indicates a successful block.

4 Point Retrobulbar Nerve Block: The 4-point retrobulbar block is technically easier and can be done more rapidly as compared with the Peterson eye block. In this technique, an 18 gauge, 9-cm long needle is introduced through the skin on the dorsal, lateral, ventral and medial aspects of the eye, at 12, 3, 6, and 9 o'clock positions, respectively. Introduction of the needle through the conjunctiva should be avoided to reduce the occurrence of ocular contamination. The needle is directed behind the globe using the bony orbit as a guide. When the needle is introduced into retrobulbar sheath, the eye will move slightly with the tug of the needle. After this location is reached and aspiration is performed to assure that the needle is not in a vessel, 5-10 milliliters of lidocaine (2%) is deposited at each site. Mydriasis indicates a successful block.

Retrobulbar block: An alternative to the 4-point retrobulbar block is the single retrobulbar block (Figure 2). In this technique, the 9-cm long 18-gauge needle is bent into a ½ circle. The needle is inserted immediately ventral to the dorsal orbital rim and directed such that the needle impacts into the bone of the orbit. Then the needle is advanced as it is rotated ventrally in a progressive manner such that the needle remains in close proximity to the bone. After the needle is inserted to the caudal aspect of the eye, 20 ml of 2% lidocaine HCl is administered after aspiration to ensure that the needle is not positioned in a vessel or other fluid structure. Successful deposition of lidocaine causes mild proptosis of the globe.

Ring Block: Additional local anesthesia of the eyelids is recommended as the Peterson and retrobulbar blocks typically result in incomplete analgesia of the eyelids. Five to ten milliliters lidocaine (2%) is infiltrated subcutaneously 2.5 centimeters from the eyelid margins as a ring block.

Lidocaine Toxicity: Particular care should be taken in young calves not to exceed the toxic dose of lidocaine (10 mg/kg). This calculates out to 50 milliliters of 2% lidocaine per 100 kilograms of body weight (50 ml per 220 lbs body weight). Dilution of 2% lidocaine in saline can facilitate ease of distribution when restricted amounts are necessary.

Peri-operative management: Anti-inflammatory / Analgesic Therapy: The disease process and degree of invasiveness will determine the degree of anti-inflammatory therapy required. Flunixin meglumine (1 mg/kg IV) immediately before surgical excision usually is adequate for enucleation procedures, however further anti-inflammatory management may be warranted depending on the disease process and extent of excision.

Antibiotic Therapy: Due to the typical field conditions present during enucleation procedures, broad spectrum systemic antibiotic therapy is indicated. The disease process will dictate the duration of antibiotic therapy. Although there have been no publications regarding the placement of intraorbital suspensions or boluses, clinical observation of abscess with drainage after this practice cautions against the use of any material that may act as a future nidus of infection or that may cause inflammation or exacerbation of pain due to caustic or chemical effects. Systemic antibiotics combined with general surgical asepsis are likely to be the most efficacious therapeutic option.

Surgical site preparation: Infection of the surgical site is one of the most common complications of ocular surgery if done when done in field settings. Care must be taken to reduce the risk of contamination to the planned surgical site. The hair should be clipped, the skin disinfected with solutions such as betadine or chlorhexadine, the ear should be draped and the lateral portion of the halter covered to decrease contamination to the surgical site. Saline rinse rather than alcohol should be used between the disinfectant scrubs to prevent irritation and damage to the cornea. An ophthalmic ointment should be placed on the cornea prior to aseptic preparation to further protect the cornea from damage in cases other than enucleation.

Surgical Technique: Suture: Absorbable sutures (e.g. polyglecaprone N° 0) should be utilized for any ligation or subcutaneous procedure. Skin should be closed with an appropriately sized nonabsorbable suture (e.g. nylon N° 3 or polymerized caprolactam N° 6) placed in a Ford-interlocking suture pattern or tension relieving suture patterns (e.g. cruciate pattern).

Enucleation: A transpalpebral ablation technique is utilized to remove the eye. The upper and lower eyelids are sutured closed or alternatively, eyelids can be closed using multiple towel clamps (figure 3). A circumferential skin incision is made approximately 1 centimeter from the edges of the eyelids (figure 4). Using a combination of blunt and sharp dissection, Mayo scissors are used to dissect through the orbicularis oculi muscle, fascia, and subcutaneous tissue surrounding the eye. The interior of the bony orbit is used as a guide. The medial and lateral canthal ligaments are sharply transected to allow access to the caudal aspect of the orbit. As there is a large vessel associated with the medial canthus, transection of the medial canthal ligaments is best left until necessary. Complete excision of orbital tissue is necessary in most cases of eye removal. The retrobulbar musculature and the optic nerve sheath should be transected as far caudally as feasible (figure 5). A vascular clamp can aid in hemostasis while additional excision of remaining orbital tissue is undertaken. In cases where neoplastic infiltration of the bony orbit has occurred, affected areas of ocular periosteum should be thoroughly excised. An orbitotomy may be necessary to remove affected areas of orbital bone; however radical resection of orbital bone and associated lymph nodes is an extensive procedure not recommended except in tertiary care setting⁷.

The skin incision can be closed in a variety of patterns with a nonabsorbable suture such as No. 3 nylon. Common patterns include the Ford interlocking, cruciate or simple continuous (figure 6). An interrupted suture should be placed in the medial canthal portion of the skin closure to allow for facilitation of drainage if necessary. If a cosmetic result is desired, a "trampoline" suture can be employed to reduce the hollow appearance of the orbit. However it is not recommended in cases where there is periorbital infection or neoplasia present. Placement of a trampoline suture is done by grasping the periosteum on the dorsal and ventral rim of the orbit using a simple continuous pattern with N° 2 polypropylene or equivalent nonabsorbable suture. The sutures are tightened to allow for support of the overlying ocular skin. The skin is subsequently sutured using a Ford interlocking, cruciate, or simple continuous pattern and No. 2 or No. 3 nylon suture. The skin sutures are removed routinely in 14 to 21 days, leaving the underlying trampoline sutures in place as a permanent support.

Post-operative Care: The animal should be kept in a confined area for several days after surgery to allow for appropriate hemostasis to occur. Daily observation of the surgical site and assessment of general well being is recommended until suture removal. Sutures should be removed in 14 to 21 days to allow for complete healing of the skin.

Postoperative Complications: Postoperative complications can include simple incisional infection, orbital infections, dehiscence of the suture, significant infections of the periorbital tissue, or progression of neoplasia into bone or regional lymph nodes. Cattle often demonstrate pruritis after surgery which can lead to incisional dehiscence due to head rubbing. If purulent drainage is noted during the course of healing in an enucleation procedure, the medial interrupted suture may be removed and the cavity flushed with a dilute disinfectant solution daily until resolution of the orbital infection. Antibiotic therapy is recommended if systemic signs of infection are noted.

Key words: ophthalmic, bovine, eye, exenteration, nerve block.

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