

# **Complications associated with retrobulbar regional anaesthesia in bovine:**

## **Case report**

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### **Author**

Dr. Willy Mwangi Edwin

### **Supervisor**

Dr. James Nguhiu Mwangi

## **Summary**

Eye enucleation was performed in a 2 years old Ayrshire male cow at the University of Nairobi, large animal clinic. Anaesthesia was provided by use of retrobulbar regional anaesthesia. The onset of analgesia was 10 minutes while duration of analgesia was 90 minutes. Complication noted during anaesthesia included recumbency that lead to bloat and cardiopulmonary depression.

## **Introduction**

Enucleation is one of the most common orbital surgical procedures performed in cattle (Vermunt 1984). Enucleation is technically simple, alleviates painful ophthalmic pathologies, and can halt the progression of neoplasias such as ocular squamous cell carcinoma.

The important consideration for eye surgery includes maintenance of a central eye position, an immobilised eye and avoidance of increased intraocular pressure (Collins et al. 1995). While this consideration can be achieved by a deep plane of anaesthesia, General anaesthesia in bovine is not recommended due to potential risk of hypoventilation, hypotension, myopathies, prolonged or traumatic recoveries from anaesthesia as well as implicated cost.

Neuromuscular blocking agents, such as atracurium, may be administered to provide immobilization of the eye and adnexa and avoiding the necessity of a deep plane of anaesthesia (Hildebrand et al. 1989). Retrobulbar nerve block with lignocaine has been recommended to abolish reflexes during ocular surgery (Raffe et al. 1986).

Anticholinergic drugs are commonly used in small animals to prevent bradycardia associated with vagus nerve stimulation from traction on the globe (the oculocardiac reflex) (Ludders 1994). There are several complications associated with local anesthesia this include: orbital hemorrhage, penetration of the globe, optic nerve injury, and acute death following injection into

the optic nerve meninges. Accidental injection of anesthetic into the ethmoid turbinates has also been observed during performance of the Peterson eye block (Pearce et al, 2003).

### **Local block procedure**

The patient was restrained in a crush and a halter used to provide further physical restraint. The periorbital area was prepared for aseptic technique by clipping the hair, scrubbing with chlorhexidine and applying surgical spirit.

Analgesia for the eye was provided by administration of local anesthetic, lidocaine hydrochloride (Lidocaine, Mac Pharmaceuticals Limited, Nairobi-kenya), around the lower and upper eyelids with a line block, and with a 4 point block along the dorsal, medial, ventral, and lateral aspects of the orbital rim. Each eyelid was blocked with 10.0 mL of lidocaine. This was achieved by inserting a 23 gauge, 2.5-cm long needle at the lateral canthus and advancing it along the eyelid to the medial canthus. Lidocaine was then injected as the needle was being retracted.

An 18 gauge, 8.75-cm spinal needle was used for the 4-point block. The needle was placed at the midline of the dorsal orbital rim and then guided along the orbital rim until the needle hit the floor of the orbit; the needle was then slightly retracted, aspiration done and a total of 10 ml of anesthetic injected at this location as the needle was being removed. This procedure was repeated at the midline of the ventral orbital rim and at the medial and lateral canthi, with 10.0 mL of lidocaine being injected at each site.

As lidocaine was being injected during the second block at the medial canthus, the patient collapsed and went on left lateral recumbency. As an immediate response, 10 mg of Dexamethasone disodium phosphate (Dexamethasone, Eagle vet. Tech Co. Ltd) was administered intravenously through the jugular vein. In addition, 60mg of Tripelannamine Hydrchloride (Bimahistamine<sup>R</sup> Bimeda, Broomhill road, Dublin 24, Ireland) was administered

intramuscularly in the gluteus muscles. About 10 minutes into lateral recumbency, bloat started to develop. Bloat was accompanied by drop in respiratory rate and heart rate. Respiration dropped from, 28 breaths/minute to 12 breaths/minute while heart rate dropped from 44 beats/minute to 38 beats/minute. Attempts were therefore made to support the animal on sternal recumbency so as to minimize build up of bloat that was compromising the cardiovascular system.

Upon return to normal cardiovascular functions (as judged by stabilized heart rate and respiratory rate), the remaining orbital rim local block were completed. The onset of analgesia took about 10 minutes from the last anaesthetic block and was indicated by loss of pain response upon pricking by the needle, exophthalmos, aptosis (drooped eyelid), reduced pupil size and lack of response to the touch of the cornea.

Analgesia was maintained during the entire surgery that took 55 minutes and duration of analgesia was about 90 minutes. Other complications that were noted included minimal response to surgical manipulation, swollen eyelids and hypersalivation.

## **Discussion**

Enucleation involves the removal of the globe with removal of paraorbital structures as dictated by the specific disease process and desired outcome. Indications for enucleation include chronic endophthalmitis or panophthalmitis leading to blindness in the affected eye, chronic glaucoma leading to buphthalmia and associated retinal and optic nerve damage, intraocular neoplasms where intraocular surgery is not feasible, trauma or proptosis of the globe leading to irreversible damage of the eye and intraocular contents (Bistner et al, 1977). In this report, enucleation was done for learning purposes.

In cattle, the course of therapy for severe ocular pathology is dictated not only by the disease entity present but also by the intended purpose and value of the animal as well as the cost, frequency, and efficacy of the chosen treatment (Vermunt, 1984). If the underlying disease allows for salvage of an eye with retention of vision, efforts should be made to preserve the eye if practical. Cattle having had a ruptured globe due to horn trauma have been described as being at increased risk for contra-lateral eye trauma after removal of the injured eye (Helbig and Iseli, 2002). In cases where salvage of the eye is not feasible, enucleation offers the potential for complete removal of diseased tissue and a rapid return to function.

Ophthalmic surgery in large animals is performed under topical, regional or general anesthesia. In cattle, regional and general anesthesia are the most frequently used. In many instances, regional anaesthesia is done in standing but sedated patients (Fubini and Ducharme, 2004). Sedatives that can be used in bovine include alpha-2 adrenoceptor agonist especially xylazine hydrochloride and detomidine (Thurmon et al, 1996). In this report, the patient was not sedated because he was manageable and there were proper restraint structures. Another factor that might be of importance when considering sedation in bovine is the cost implication as the bill might be high for farmers. However the use of anxiolytic agents for sedation especially xylazine might be beneficial in terms of providing pre and intra-operative analgesia (Thurmon et al, 1996). It is advisable to optimize facilities, train personnel and use sedation when performing local anaesthetic techniques so as to minimize injuries in cows (Fubini and Ducharme, 2004). Radial nerve paralysis has been reported as one of the complication that occurred when a fractious cow underwent eye enucleation using sedation and local anesthesia (Kara and Anderson, 2010)

General anaesthesia is indicated when a cow is fractious. However in ruminants, general anaesthesia may result in adverse effects that include ruminal stasis leading to bloat,

hypoventilation, hypotension, myopathies, prolonged or traumatic recoveries from anaesthesia as well as implicated cost (Kara and Anderson, 2010).

Regional anesthesia of the eyeball can be achieved by use of two techniques: Peterson block and retrobulbar block (Pearce et al, 2003). In this report retrobulbar block was used to produce sensory and motor blockade of the orbit and surrounding tissues. Retrobulbar and auriculopalpebral nerve block has previously been used before to produce analgesia during enucleation in cows (Kara and Anderson, 2010). In this report, in addition to orbital block, 10ml of lidocaine was injected in each eyelid so as to selectively desensitize the auriculopalpebral branch of facial nerve that supplies the eyelid causing analgesia and facilitate incision that was to be made about 1.0cm from the margins of the eyelid. Just as it has been reported by Thurmon et al, (1996), the onset of analgesia following last lidocaine injection was 10 minutes while the duration of analgesia was 90 minutes.

There are several complications associated with local anesthesia. Retrobulbar anesthesia has been associated with orbital hemorrhage, penetration of the globe, optic nerve injury, and acute death following injection into the optic nerve meninges (Thurmon et al, 1996). Accidental injection of anesthetic into the ethmoid turbinates has been observed during performance of the Peterson eye block (Pearce et al, 2003). Severe central nervous system toxicity have been reported following penetration of the turbinates and injection of local anaesthetic solution into optic nerve menegies and nasopharynx (Gelatt, 1999). The clinical signs of local anaesthetic CNS toxicity include hyperexcitability, lateral recumbency, opisthotonus, convulsion, respiratory and cardiac arrest and death (Thurmon et al, 1996). Although not all clinical signs that were exhibited in this case, the patient went on lateral recumbency and this was accompanied by low heart rate and respiratory rate. Depressed cardiopulmonary system might have occurred due to

bloat that developed when the patient was on lateral recumbency or due to depressant effects of lidocaine on cardiopulmonary center in the brain.

Hypersalivation might have been due to stimulation of vagus nerve during surgery and this can be minimized by administration of anticholinergic drugs. In addition to minimizing hypersalivation anticholinergic drugs will also prevent brachycardia that might result due to vagus stimulation.

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