



Case Report

Orbital Exenteration Following Traumatic Proptosis in a 4-Year-Old Yankasa Ewe: A Case Report

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ABSTRACT

Introduction: Proptosis refers to the abnormal protrusion or forward displacement of the eyeball from the orbit, commonly seen in small ruminants following head trauma. Exenteration is generally regarded as a salvage procedure, performed in response to severe or non-manageable orbital conditions such as advanced proptosis. The present study aimed to describe a successful orbital exenteration performed on a Yankasa ewe due to traumatic proptosis.

Case report: A 4-year-old Yankasa ewe weighing 40 kg was referred to the small animal unit of the veterinary teaching hospital at Usmanu Danfodiyo university, Sokoto (Nigeria), due to proptosis in the left eye. The animal was referred after a week of unsuccessful treatment. The proptosis was likely caused by a blow from a ram's horn. Examination showed severe left-eye protraction with marked swelling, and the exposed globe was ulcerated, nonviable, and desiccated, with corneal necrosis, purulent discharge, and keratitis. The lack of a menace response confirmed blindness, though the animal remained alert and continued eating normally. The temperature, pulse rate, and respiratory rate were 38.4°C, 88 beats/minute, and 28 cycles/minute, respectively. The capillary refill time was less than 2 seconds. Exenteration was performed to prevent secondary infection, relieve pain, and improve the animal's comfort. The ewe recovered uneventfully, showing appropriate postoperative adaptation and wound healing at the two-week follow-up.

Conclusion: In emergencies, after unsuccessful attempts to salvage the globe due to extended exposure and tissue necrosis, the exenteration of the affected orbit is the most appropriate course of action, and the findings of the current study support this conclusion.

1. Introduction

Proptosis, also known as exophthalmos, is the abnormal protraction or forward displacement of the eyeball from the orbit, causing the dorsal and ventral eyelids to be posterior to the globe¹. It can also be described as a partial or complete displacement of the globe (eyeball) from its orbit, often accompanied by associated soft tissue trauma and possible damage to the optic nerve or extraocular muscles². This condition can affect both humans and animals and may be unilateral or bilateral, depending on the underlying cause. In veterinary medicine, proptosis is most commonly observed in brachycephalic dog breeds, such as Pekingese, Shih Tzu, and Pugs, due to their shallow orbits and prominent globes, as well as in cats³. Generally, this can occur in other species, such as cats, sheep, and goats, after trauma or orbital disease⁴. Proptosis is less common in ruminants compared to other species, such as

dogs, cats, and rabbits. This rarity is attributed to sheep having deeper orbits, which provide better protection. However, head-butting injuries can cause orbital trauma in ruminants⁵.

Although traumatic proptosis is rare in ruminants due to the complete orbital rim, it has been previously reported⁵⁻⁸. Proptosis of the eye, can have several underlying causes, including trauma (which is most common in animals), orbital tumors (neoplasia), inflammatory or infectious conditions, such as orbital cellulitis, abscesses, glaucoma, retrobulbar hemorrhage or mass, and congenital malformations. Prompt diagnosis and treatment are essential to preserve vision and prevent complications, such as exposure keratitis, corneal ulceration, and optic nerve damage². Clinical evaluation includes a physical examination and the use of imaging modalities, such as ocular ultrasound, radiography, and, in some

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cases, computed tomography or magnetic resonance imaging, which can be used to visualize the internal structures⁹.

Unless the optic nerve has been transected or the eye has a severe corneal or scleral laceration, a proptosed eye should often be surgically replaced immediately. After a proptosis is surgically replaced, the chances of having a functional, visual eye are poor. Prognostic indicators encompass the duration since injury, retinal vascular perfusion, number of extraocular muscles injured, hyphema, type of injury, amount of periocular damage, degree of intraocular inflammation, and discharge¹⁰. Treatment options vary from manual repositioning and temporary tarsorrhaphy to more severe interventions like enucleation or exenteration in irreversible cases. Exenteration is the complete surgical removal of the eyeball along with all orbital contents, including the ocular muscles, fascia, fat, and in some cases, portions of the eyelids¹¹. This procedure is more comprehensive than enucleation, which only involves the removal of the eyeball itself⁸. Exenteration is usually regarded as a salvage procedure for severe or uncontrollable orbital diseases. Ocular emergencies can be challenging and must be stabilized properly before professional management². Recovery typically depends on the presence of a pupillary light response, the time elapsed from trauma to therapy, and the extent of damage or viability of injured ocular and extraocular tissues. Early management is crucial for preserving vision by preventing further desiccation and damage to the cornea and interior of the eyeball⁵. The present case report aimed to describe a surgical management of a chronic proptosis case presented, and also contributes documentation of a rare occurrence of proptosis in an ewe.

2. Case report

In June 2025, a client from the Makera Asada area of Sokoto (Nigeria) brought a case of a four-year-old Yankasa ewe weighing 40kg to the large animal unit of veterinary teaching hospital, Usmanu Danfodiyo University, Sokoto, Nigeria. The ewe was presented with a complaint of an injury and a protruding left eyeball. The injury was likely caused by a ram hitting the ewe's head, which led to a protruding eyeball, observed a month before presentation. History further revealed that the ewe was referred to the veterinary clinic, Aliyu Jodi (Sokoto, Nigeria), where it was initially treated with an undisclosed analgesic and other medications. The ewe had been purchased five months ago for breeding purposes. The ewe was managed semi-intensively along with 4 others (2 rams and 2 ewes). The animals were fed bran, bean husk, and hay. There was no history of vaccination and antiworm treatments.

2.1. Physical examination and clinical findings

Significant swelling around the left eye was noted, with unilateral bulging of the eye, redness in the conjunctiva, and areas of exposed keratin. The corneal surface was found to be opaque, ulcerated, edematous, and partially dried out with purulent discharge present. No evidence of globe rupture was

found, and the extraocular muscles appeared visibly stretched. An ocular examination revealed blindness in the left eye, indicated by the absence of pupillary reflex, palpebral reflex, and menace response. The pupillary light reflex and corneal reflex were evaluated and found to be absent. The eye's non-response to the author's hand movements was noted. All tests conducted confirmed that the animal was blind. There were bilateral prescapular and submandibular lymphadenopathies. The ocular mucous membrane appeared slightly pale, and further examination revealed that the ewe was pregnant. The temperature, pulse rate, and respiratory rate were 38.4°C, 88 beats/minute, and 28 cycles/minute, respectively. The capillary refill time was less than 2 seconds. Hematological analysis indicated a normal packed cell volume (PCV) and leukocyte count.

2.2. Surgical management

Presurgical medication of 5% oxytetracycline (India), at 10 mg/kg, and 2.5% diclofenac sodium (China) at 2.5 mg/kg was administered intramuscularly for 3 days, along with a daily dressing and topical antibiotic ointment (TERRAMYCIN®, United States) about 1 cm strip every eight hours interval for 5 consecutive days to reduce the level of contamination and infection at the site before the surgery¹². The ewe was carefully restrained, and the eye was thoroughly irrigated with sterile saline solution to remove any dirt and debris. A block was achieved by local infiltration around the region to be excised using 2% lignocaine hydrochloride (India) to desensitize the orbit and provide analgesia (Figure 1A) at a dose rate of 6 mg/kg¹². This was to block the sensory and motor innervation to the eye and its surrounding tissues. The primary nerves involved are branches of the trigeminal nerve (cranial nerve V) and the oculomotor nerves (cranial nerve III, IV, VI), which are targeted using the Retrobulbar block technique⁸. The animal was positioned in lateral recumbency with the affected side facing up. The periocular region was clipped and prepared aseptically. The eyelids were sutured closed (tarsorrhaphy) using a simple continuous pattern to facilitate handling. Exenteration was performed following a method adopted by Thiry et al.⁸ A semicircular incision was made around the eyelid margins at the mucocutaneous junction, including both upper and lower eyelids, dissecting through the skin and subcutaneous tissues to access the orbital rim. Dissection and tissue removal were performed using both blunt and sharp dissection to separate the globe from the surrounding soft tissues (Figure 1B). The extraocular muscles, lacrimal gland, and connective tissue attachments were transected. Careful exposure and ligation of the optic nerve and ophthalmic vessels were performed deep within the orbit to prevent hemorrhage. All orbital contents, including fat, fascia, and periorbital structures, were removed (Figure 1C). Then thoroughly irrigated with sterile saline. The orbital cavity was closed primarily with absorbable sutures (chromic), while the skin was closed with non-absorbable suture material (nylon size 2; Figure 1D).

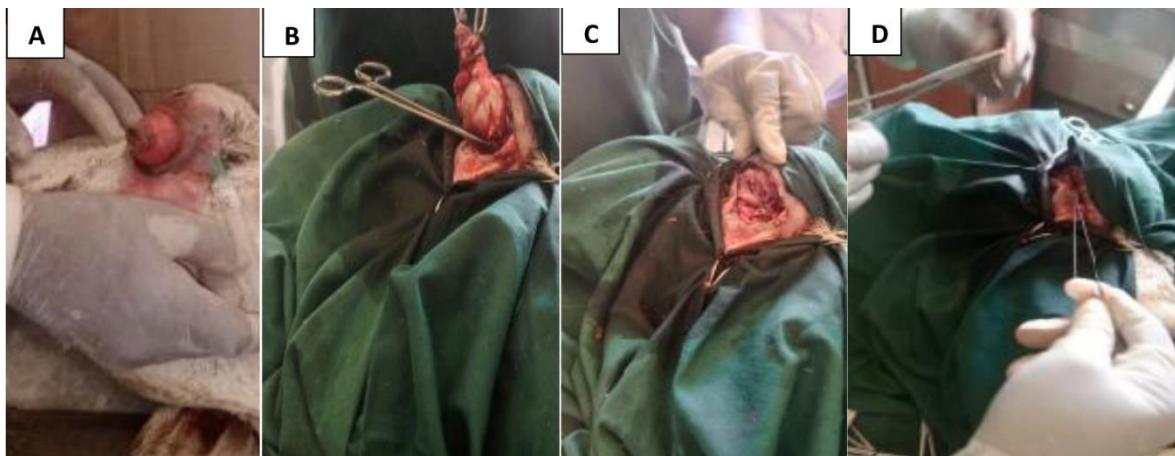


Figure 1. Orbital exenteration following traumatic proptosis in a 4-year-old Yankasa ewe. **A:** Aseptic preparation and administration of local anesthetic agent, **B:** Blunt dissection to separate the globe from the surrounding soft tissues, **C:** Removal of orbital contents, **D:** Closure of the skin.

2.3. Post-operative procedure

Postoperative care was achieved by administering short-acting oxytetracycline (10 mg/kg, IM) for 7 days and 2.5% diclofenac (2.5 mg/kg, IM) for 3 days, along with a postoperative dressing after 24 hours¹². The site was observed for swelling, discharge, or signs of systemic illness.

Daily wound cleaning with diluted povidone-iodine was conducted throughout the recovery period. Mild swelling was observed during the first 48 hours after surgery, but this gradually subsided. Complete wound healing occurred by day 12, with no signs of infection, suture breakdown, or discharge. The haematological evaluation conducted after the surgery and on the seventh day to assess the ewe's systemic response and recovery revealed a normal PCV of 32% and a total leukocyte count (TLC) of $8.5 \times 10^9/L$, both of which are within the normal physiological range for sheep (PCV: 27-45%; TLC: 4-12 $\times 10^9/L$)⁸. After clinical evaluation, a diagnosis of traumatic proptosis with secondary blindness of the left eye was made. Due to the severity of the ocular damage and necrosis of the periocular tissues, surgical intervention through exenteration was indicated to prevent further complications. A follow-up was conducted for 12 days after the surgery; during which the ewe was re-examined daily to evaluate healing and postoperative recovery. The surgical site showed proper wound contraction with healthy granulation tissue formation and no sign of infection or discharge. The sutures remained intact, and there was no swelling after 48 hours postoperative or foul odour around the orbit. All vital parameters, such as the temperature, pulse, and respiratory rate, remained within normal physiological limits for the species. The ewe exhibited a normal appetite, remained alert, and had a general body condition score of 3 out of 5. No postoperative complications were observed, and the wound continued to heal well (Figure 2). The overall prognosis for complete recovery of the orbital area was positive, however, permanent vision loss in the affected eye occurred due to the nature of the injury and the exenteration procedure after two week follow up.



Figure 2. Progress of healing on day 7 post-operative in a four-year-old Yankasa ewe.

3. Discussion

Traumatic proptosis is a serious eye injury, often caused by trauma from fighting, accidents, or external factors. The issue in this case was caused by blunt force trauma, from a ram head-butting on the farm. The condition rapidly progressed to exposure keratitis, corneal ulceration, and eventual blindness. This is in line with the findings by Sharma et al.⁵, which stated that proptosis primarily occurs due to severe blunt trauma to the head near the orbit.

Clinical assessment confirmed the globe's displacement, and an assessment of the extent of tissue damage, ocular integrity, and the possibility of salvage was performed. In this case, the severity of the injury was irreparable, the globes were considered non-viable, and there was no chance of vision recovery. These findings were in line with study by Marzok et al.¹³ and in contrast with Kumar's¹ findings, which reported acute traumatic proptosis with a viable globe due to timely presentation and minimal necrosis. The duration of time before presentation, in this case, compromised venous return which worsened swelling, and resulted in ischemia and necrosis of ocular tissues. These factors led to the irreversible vision loss observed in this case. Early intervention is essential for preventing vision further desiccation and damage to the cornea and inner structures of the eyeball, as also reported by Sharma et al.⁵.

Immediate intervention is crucial in cases of ocular proptosis. In this case, the prolonged exposure of the eye and the presence of necrotic corneal tissue made the eye irreparable, requiring enucleation. This contrasts with the findings of Jibril et al.¹⁰, who reported successful prompt management of acute traumatic proptosis in a dog with a viable eye, using tasorrhaphy. Their outcome aligns with previous studies that indicated blindness is often a common result of untreated proptosis and that exenteration or enucleation is the only option^{1,12}.

Complete removal of the affected tissues prevented further complications, such as orbital abscesses or cellulitis. Proper post-operative care facilitated wound healing, allowing the ewe to recover well with few complications².

4. Conclusion

Traumatic proptosis in ewes, while uncommon, can result in permanent blindness if not treated quickly. This report emphasized the importance of swift intervention in ocular emergencies to enhance the likelihood of preserving vision. Additionally, it highlighted the need for effective farm management practices to prevent such trauma. The globe was damaged, as the animal was blind from that eye, and exenteration was the only way to save the life of the animal in this case. The exenteration was a safe and effective option for treating severe traumatic proptosis in livestock. Further studies need to conduct in different eye conditions and different surgeries technique.

Declarations

Availability of data and materials

The data of current study are available upon reasonable requests.

Ethical considerations

The authors declared that this article is based on an original study and has not been submitted before, in part or in full, for publication or assessment elsewhere. All sources of information and data used in the present study have been duly acknowledged and referenced according to accepted academic standards. The authors confirmed that no AI was used during conducting this study.

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Authors' contributions

Ekaete Ime Oviawe and Salisu Buhari collected the clinical data

and performed the surgery. Ekaete Ime Oviawe, Nura Abubakar, and Hassan Bodinga Abubakar drafted the manuscript. Umar Salihu Ahmad assisted with postoperative management, and Abubakar Sadiq Yakubu supervised the study. All authors reviewed and approved the final edition of the manuscript.

Competing interests

The authors declared that there is no conflict of interest regarding the publication of the present study.

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