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Case report

Surgical correction of the ocular squamous cell carcinoma in crossbred cattle: A case report

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ABSTRACT

Bovine ocular squamous cell carcinoma, also known as "bovine cancer eye," is one of the most common tumors in cattle. It has a high rate of occurrence and causes great economic loss. Among many treatment protocols, radical surgery of tumor mass is viable and suitable treatment in benign cases. A three-year-old Holstein-Friesian crossbred cow was presented at SAQ Teaching Veterinary Hospital, Chattogram Veterinary and Animal Sciences University, Bangladesh with complaints of a swollen mass on the right lower eyelid, lacrimation, and loss of appetite. Clinical examination revealed a cauliflower-like ulcerated mass protruding from the conjunctival margin of the lower eyelid including the third eyelid with normal vision having no corneal involvement. Based on clinical signs, it was tentatively diagnosed as an ocular squamous cell carcinoma. A surgical conjunctivectomy technique opted for immediate relief using sedation with xylazine hydrochloride (@0.01mg/kg body weight) followed by local anesthesia on standing condition. Histopathological examination revealed a dermic neoplastic growth characterized by the proliferation of invasive squamous cells arranged with a pseudo-cord appearance. Marbofloxacin 2mg/kg body weight for five days, flunixin meglumine 2.2 mg/kg body weight, and pheniramine maleate 1mg/kg body weight for three and seven days respectively were administered postoperatively. The owner was advised to use eye drops (Moxifloxacin) five drops on the affected eye three times daily for fifteen days. The patient's condition showed significant improvement with normal vision and no recurrence was observed for up to six months post-operatively. The aim of this report was to conclude that surgical excision of a squamous cell carcinoma at or near the eye or at other locations of the body appears to have a good prognosis.

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1.INTRODUCTION

Bovine ocular Squamous cell carcinoma (BOSCC) is one of the three most commonly reported neoplastic diseases affecting bovine and is regarded as the most common form of neoplasia in several countries and has great economic significance (Fornazari et al., 2017). Incidence rate of this neoplasia in Bangladesh is not known due to the unavailability of reports relevant to this tumor. Ocular squamous tumors have a high occurrence (0.8 to 5.0%) (Vibin et al., 2017) and cause significant economic loss since they shorten the animal's productive lifespan, lower its salvage value(Anderson, 1991) and may result in the carcass being unfit for consumption(Anderson, 1991). The etiology of the disease is still not completely understood. It is reported that etiological factors include age, race, nutrition, UV radiation, and pigmentation of the eyelids (Akbaş et al., 2021). Furthermore, several viral agents, including bovine papillomavirus (BPV) and bovine herpes virus types 1 and 5 (BHV-5), have been associated in the etiology of the condition in cattle (Pugliese et al., 2014). Additionally, breed predisposition could play a role in Hereford cattle(Özcan-Martz et al., 2021).It is a primary tumor of epithelial origin that can develop in the limbus, third eyelid, palpebral skin, corneal and conjunctival epithelial surfaces, and other ocular and periocular tissues (Fornazari et al., 2017). The epithelium of the eye and its surrounding lesions related to plaque and papilloma precursor lesions are usually the source of cancer. These lesions are most frequently found on the lower eyelid and at the corneoscleral junction (Heeney and Valli, 1985). Acute discomfort characterized by excessive lacrimation and purulent discharge is seen in ocular tumors (Vibin et al., 2017). The lesions ranged in size from a few millimeters to several centimeters, with a nodular or cauliflower-like appearance, sometimes ulcerated and readily bled (Al-Asadi, 2012). The characteristic clinical appearance is typically used to make the diagnosis; however, a biopsy and histopathologic study should be performed to confirm it (Vibin et al., 2017). Surgical excision, cryotherapy, radiation therapy, hyperthermia, local chemotherapy, immunotherapy, or frequently a combination of these treatments can all be used to treat squamous cell carcinomas in animals. Surgical excision for invasive squamous cell carcinoma (SCC) may be necessary, particularly in cases when prompt patient management is required, the patient has dexterity issues that prevent them from placing therapeutic eye drop, or compliance is a worry. In such instances, the "no touch" method of total surgical excision of SCC is used (Rao and Shields, 2019).

In this study, the surgical conjunctivectomy technique was described to correct the ocular squamous cell carcinoma involving conjunctiva and nictating membrane in cattle. This technique aims to excise the ocular tumor involving, offering the patient prompt alleviation of discomfort and potentially enabling further therapeutic measures.

2.CASE PRESENTATION

Patient information: A three-year-old female Holstein Friesian crossbred was presented at SAQ Teaching Veterinary Hospital (SAQTVH), Chattogram Veterinary and Animal Sciences University (CVASU) with complaints of a protruding red mass on the lower lid of the right eye, showing lacrimation and decreased appetite. According to the owner's statement, this mass increased in size gradually over the last 15 days.

Clinical observations and Diagnosis: Physical examination revealed a whitish to red, firm cauliflower-like growth (approximately 5.6cm long × 3.8cm wide × 2.1 cm thick) protruding from the palpebral conjunctiva of the right lower eyelid involving the third eyelid (Figure 1) without corneal involvement. Profuse lacrimation, blepharospasm, and pruritis were also seen. The mass was ulcerated and hemorrhagic. All clinical signs indicated possible squamous cell carcinoma in the affected eye. The patient showed positive menace reflex and pupillary light reflex in both eyes thus, confirmed normal vision of the affected eye.So, surgical excision of the tumor was done to provide immediate relief to the patient.

Cytology: Fine needle aspiration cytology (FNAC) was done to confirm the diagnosis. FNAC result revealed squamous cell carcinoma and therefore, the confirmative diagnosis was

completed. The test showed neoplastic squamous cells (Figure2) having anisocytosis, pyknotic nuclei, high nucleus and cytoplasm ratio. Inflammatory neutrophils were observed surrounding neoplastic cells.

Figure 1. Ulcerated, nodular, cauliflower like neoplasia protruding from lower palpebral conjunctiva in a cow.

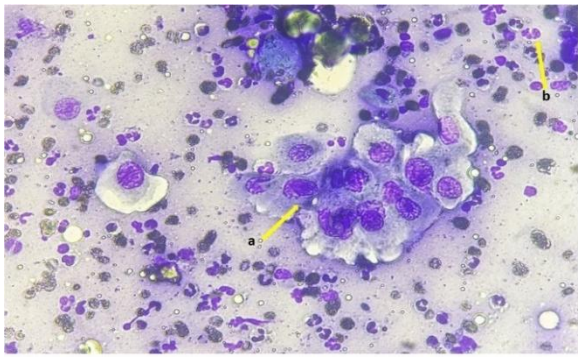

Figure 2. A small sheet neoplastic squamous epithelial cells (a) showing anisocytosis, keratinized cytoplasm with high nucleus and cytoplasm ratio, and tadpole cells with inflammatory neutrophils.

Surgical procedure

Preoperative management: The periocular area of the affected eye was scrubbed using 10% povidone-iodine solution and then the eye was washed with 0.9% normal saline solution to remove excess dirt, debris, and hair. Intravenous cannulation was performed in the ear vein to have secured access to the blood vessel and for intraoperative fluid administration.

Anaesthetic procedure: Xylazine hydrochloride (Xylazine®, Indian Immunologicals Ltd., India) was used at the tranquilizing dose of 0.01mg/kg body weight intravenously to facilitate the surgery in standing condition. A Peterson block (Figure3) was done using 2% lidocaine hydrochloride (Jasocaine 2%®, Jayson Pharmaceuticals Ltd.). In the notch that was bounded by the coronoid process, zygomatic arch, and supraorbital process, an 18-gauge needle was inserted in the direction of the pterygopalatine fossa. After confirming no blood vessel was penetrated, thirty milliliters of 2% lidocaine were administered in a fan-shaped. Lidocaine was also instilled in the affected eye and on the neoplastic mass. The area around the eye was covered with a sterile surgical drape, and the patient was ready to get operated on.

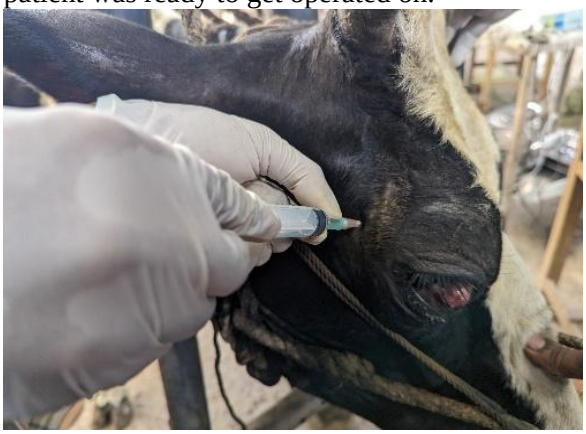

Figure 3. Peterson nerve block of the affected eye was performed to anesthetize the eyeball followed by auriculopalpebral nerve block before surgery

Correction technique: Palpebral conjunctivectomy was performed to remove the neoplastic growth from the lower eyelid. The mass arising from the palpebral conjunctiva of the lower eyelid was exposed using Allie's tissue forceps. Then it was excised using electrocautery (EickTron Electrosurgical Unit, Eickemeyer) with an elliptical incision around the base of the mass (Figure 4) to excise. Capillary bleeding was subsequently managed using electrocautery. Large blood vessels were ligated using 3-0 chromic catgut (Healthium®, Healthium Medtech Limited), absorbable suture material to control severe bleeding. Normal saline was used to irrigate the eye after hemostasis was achieved. Then a simple continuous suture was given at the conjunctiva using absorbable suture material 3-0 vicryle (Ethicon®, Johnson & Johnson Private Ltd., India) connecting the two edges of the incisions after complete excision of the tumor. Throughout the process, 0.9% normal saline

(Normalin®, Popular Pharmaceuticals Ltd., Bangladesh) was administered at 5ml/kg body weight to replace the intraoperative fluid loss.

a)

b)

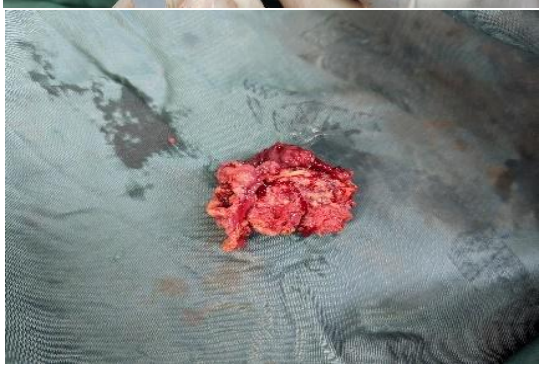

Figure 4. (a) The neoplastic mass was removed using electrocautery; (b) neoplastic tissue after excision from the palpebral conjunctiva of a cow

Postoperative management: Postoperatively, antibiotic prophylaxis was prescribed. Marbofloxacin (Marbovet®, Eskayef Pharmaceuticals Limited, Bangladesh) 2mg/kg body weight 24 hours intervals for 5 days i.m, flunixin meglumine 2.2 mg/kg body weight and pheniramine maleate 1mg/kg body weight for 3 and 7 days respectively were administered. The owner was advised to use and continue the eye drops (Eyemox 0.5%, Acme Laboratories Ltd.) 5 drops at the affected eye three times daily for fifteen days.

3. RESULTS

After resecting the neoplastic mass, the affected eye became normal in size and shape (Figure 5).

Histopathology: After surgery, the histo-pathological study of the excised tumor mass was completed using hematoxylin and eosin stain, and the tissue was examined under different magnifications. Under 100x magnification, malignant neoplastic cells and small keratin pearls (Figure 6 and 7) were visible under a microscope in the tumor mass. Certain pleomorphic neoplastic cells had prominent nucleoli (Figure 7) in their nuclei, and these cells had mitotic figures. The diagnosis of squamous cell carcinoma was validated by microscopic observation of the lesions.

a)

b)

Figure 5. Before (a: red, nodular mass) and after (b: normal appearance) surgical correction

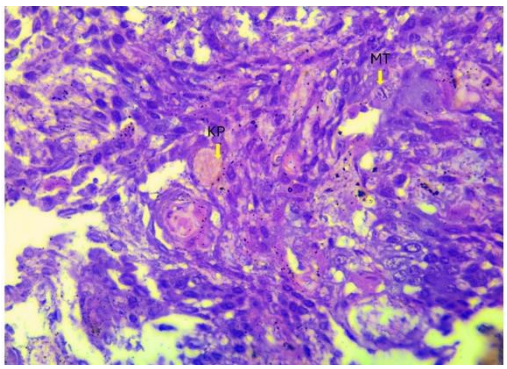

Figure 6. Under H&E 100x, visible abnormal mitotic cell division (MT), small keratin pearls (KP)

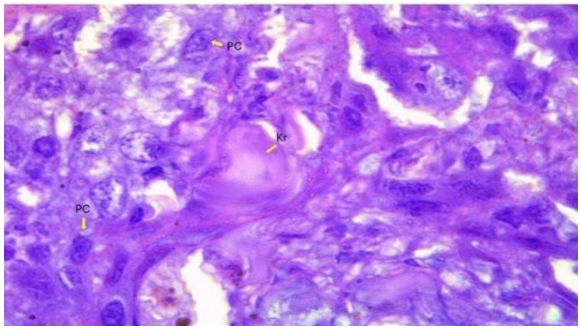

Figure 7. Under H&E 100x, distinct abnormal cells with large amorphous nuclei-pleomorphic cells (PC), keratinization (Kr)

Follow-up: After a successful surgical correction of the neoplastic lesion, remarkable progress in the patient's condition and normal vision were observed without recurrence during 6-month follow-up periods.

4. DISCUSSION

The most common tumor sites were the lateral (66.7%) and medial (16.5%)corneo-scleral junctions (Russel et al., 1976). Distribution of Bovine ocular cell carcinomas between right (40%) and left (37.5%) eyes was approximately equal, while in 21.9% of cows with neoplasms, both eyes were affected (Gharagozlou et al., 2007).

In our study, the lesion was observed at the right eye involving the lower eyelid, conjunctiva, and peri-orbital tissue therefore, surgical excision was selected as the method of correction based on the patient's condition and clinical findings. In this report, surgery was done on standing condition and Peterson's nerve block was used as a regional anesthesia. According to Gharagozlou et al. (2007), the distribution of bovine ocular cell carcinomas was nearly identical between the right (40%) and left (37.5%) eyes, although both eyes were afflicted in 21.9% of cows with neoplasms.Kleinschuster et al. (1977), who noted that the incidence of bovine ocular squamous cell carcinoma peaked at age eight and occurred in the age range of six to twelve years. Jennings et al. (1979), found bovine ocular squamous cell carcinoma was more likely to be five to eight years. In the present case report, the patient was only three years old, which is not similar to the previously addressed reports but this was per the report of Al-Asadi, (2012), where they found a variable number of cases around the age range from three to twelve years. The affected eye of the patient contained erythematous, ulcerated, and cauliflower-like neoplastic growth that protruded from the conjunctiva or third eyelid. On the common sites of tumor occurrence, Russell et al. (1976), recorded the medial corneo-scleral junction (16.5%) and lateral corneo-scleral junction (66.7%) were the most commonly affected tumor locations and,Fornazari et al. (2017) reported that the third eyelid accounted for 60% of OSCC locations, with the limbus (corner-conjunctival junction) coming in second at 20%, the cornea at 10%, and the eyelids at 10%.

Gharagozlou et al. (2007); Kainer, (1984); Russell et al. (1976)reported regardless of the ocular site, rapidly growing carcinomas easily become ulcerated, necrotic, friable, and bleed support our clinical findings and our FNAC results also corroborate their diagnosis of squamous cell carcinoma, which was consistent with the cells of amorphous shapes and sizes with big hyperchromatic nuclei including huge clumps of chromatin and conspicuous nucleoli. The histopathology confirmed the diagnosis of squamous cell carcinoma by observing pleomorphic neoplastic cells, abnormal mitotic figures, and several small keratin pearls in the tumor mass under 100x magnification, and these results showed similarities with Akbaş et al. (2021); Al-Asadi (2012);Gharagozlou et al. (2007).Gautam et al. (2016), also opted for surgical excision to treat cattle with ocular squamous cell cancer. In the case of a large, well-circumscribed tumor that invaded orbit, Rao and Shields (2019) suggested choosing incisional surgery and possible exenteration. As in our situation, the patient's vision was unaltered, and surgical excision was chosen as the corrective technique rather than exenteration. Akbaş et al. (2021), highlighted the marginal resection of the mass with peri-orbital tissue, conjunctiva, and nictitans membrane as a successful method for the correction of invasive squamous cell carcinoma. Neoplastic tissue dissection is generally considered to be sufficient alongside other treatment procedures, which include radiation, immunotherapy, cryosurgery, and hyperthermia (Kuma and Sharif, 2018; Tsujita and Plummer, 2010).

5. CONCLUSION

The present case report suggests that the surgical excision of tumorous growth of the eye that involves palpebral conjunctiva and/or third eyelid is a very simple and economical procedure that can be implemented in the field condition of Bangladesh for the successful correction of bovine eye cancer.

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