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## SURGICAL MANAGEMENT OF OCULAR SQUAMOUS CELL CARCINOMA IN DAIRY COWS - REPORT OF TWO CASES

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### ABSTRACT

A four-year-old and six-year-old Holstein-Friesian crossbred cows were presented to TVCC, Mannuthy with a protruding soft tissue mass from the medial canthus in the left eye. On examination, the lesion was extensively spread which impaired vision and complete loss of architecture of the ocular structures in one animal and medial canthus growth encircled the ocular structures in another animal. The conditions were surgically managed by extirpation of eye ball in one case and surgical excision of mass salvaging eye in the other case. The histopathology of the excised mass revealed the condition was ocular squamous cell carcinoma. The animals had an uneventful recovery.

**Keywords:** Bovine, ocular squamous cell carcinoma, extirpation, epithelial pearls, cell nest

### INTRODUCTION

Bovine ocular squamous cell carcinoma (BOSCC) represents the most economically important neoplasm seen in large animals. They are mainly epithelial in origin and reported to have occurred in different ocular and periocular structures like the epithelial surface of the conjunctiva, corneo-scleral junction, nictitating membrane, cornea and eyelid. The common etiological factors included genetic susceptibility, nutrition levels, age, ultraviolet radiation circumocular apigmentation and viral infection (Tsujita and Plummer, 2010). Apart from cattle, ocular squamous cell carcinoma was also reported in other animals like sheep, goats, horses and swine with lesser frequency (Priester and Mantel, 1971). Fornazari *et al.* (2017) stated that the site of the tumour mass would change according to the geographical location and aetiology in



**A** **Fig. 1** Tumour mass **B**  
(A- Animal no.1, B-Animal no.2)

bovine ocular neoplasms.

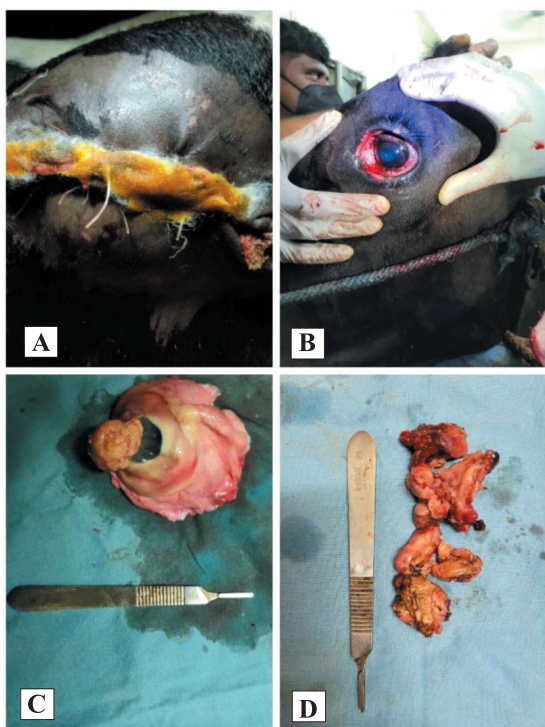
### CASE HISTORY AND OBSERVATIONS

A four-year-old and six-year-old Holstein Friesian crossbred cows were presented to Teaching Veterinary Clinical Complex, Mannuthy with extensive proliferating soft tissue mass in the left eye. The masses gradually had showed increase in size in both animals. On clinical examination, all physiological parameters were within the normal range. Detailed ocular examination revealed blepharospasm, corneal oedema, ocular discharge and lagophthalmos. In the first animal, the mass penetrated deep into the cornea and sclera with complete loss of architecture of the eye (Fig. 1). In second animal, the lesions were limited to the lower palpebral conjunctiva and third eyelid, and minimal affections were visible on the corneal and scleral surfaces. The right eye of both animals were unaffected. Due

to the extensive tumour - like appearance and irredeemable state of vision of the left eye, surgical extirpation of the eye was performed in first animal and excision of the tumour mass was done in second animal.

### TREATMENT AND DISCUSSION

The animals were sedated with a combination of butorphanol, xylazine hydrochloride and ketamine hydrochloride at a dose rate of 0.01 mg/kg, 0.02mg/kg and 0.03 mg/kg body weight respectively via intramuscular administration. The surgical site was prepared for aseptic surgery and performed a four-point retrobulbar nerve block by using 2% lignocaine hydrochloride. In second animal, an auriculo-palpebral nerve block was also performed to prevent eyelid movements during the surgical procedure. Tarsorrhaphy was performed, and a trans-palpebral incision was made around the orbit in first animal. The entire globe along with the periorbital structures were removed after blunt dissection of periorbital fat and tough connective tissue. The optic artery and veins were ligated at the base of optic stalk. The skin edges were apposed using nylon in horizontal mattress pattern after obliterating the dead space of the orbital cavity with povidone iodine impregnated gauze roll. In second animal, the tumour mass was adhered to the medial canthus with no attachment to sclera and

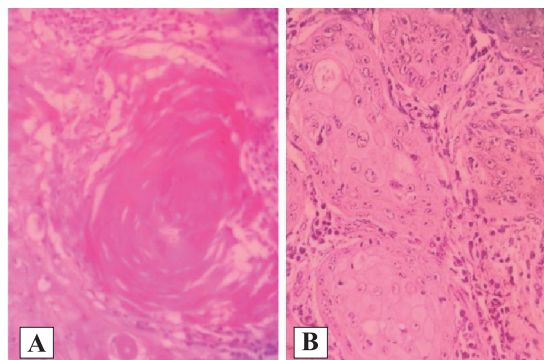


**Fig. 2**  
 A – Extirpation of left eye of animal no.1,  
 B – Excision of tumour mass in animal no. 2,  
 C – Removed left eye (animal no.1),  
 D – Excised tumour mass (animal no.2)

cornea. Hence the mass was carefully resected and sutured the conjunctiva with polyglactin 910 size 2-0 in a simple continuous manner (Fig. 2). Routine wound dressing was carried out in first animal for seven days. Post-operatively, the animals were treated with the antibiotic enrofloxacin at a dose rate of 4 mg/kg body weight intramuscularly for five days and meloxicam at a dose rate of 0.2 mg/kg body weight for three days. For second animal, a topical ocular antibiotic was also applied for seven days. Both animals had an uneventful recovery after 10 days. Recurrence of the lesions was not reported even after one year.

The histopathological examination of the tissue sample using haematoxylin and eosin staining in first animal revealed both proliferating epithelial cell nests and fully formed keratin pearls. The proportion of cells to keratin pearls was lower, indicating a slowly proliferating squamous cell carcinoma. The cells had vacuolated cytoplasm, large nucleus and prominent nucleoli. Keratin pearls were deeply eosinophilic and appeared bright pinkish in colour. In those with early stages of keratin pearl formation cell nuclei with a bluish-purple colour could also be seen along with eosinophilic keratin (Fig. 3A). In the histopathology of second animal, squamous cells were arranged in islands with mitotic figures and clear cells seen in the island. The pattern of arrangement and the cells’s characteristic features suggested that the condition was squamous cell carcinoma (Fig. 3B).

Ocular squamous cell carcinoma is also called ‘cancer of eye’ or BOSCC.



**Fig. 3** Histopathology of tumour mass 100X  
 (A – animal no.1 and B – animal no.2)

Lack of circumocular pigmentation is the major role in the susceptibility, induction and promotion of the carcinogenesis, because melanin plays a photoprotective role in epidermal and mucosal surfaces (Anderson, 1963). The most common sites for the occurrence are lateral conjunctiva and corneo-limbal junction. Other sites such as lower eyelid, nictitating membrane and medial canthus are less commonly affected (Russell *et al.*, 1956). In our study the lesions were found in the conjunctiva and third eyelid in one animal and cornea and sclera in other. Fornazari *et al.* (2017) conducted a study in ten cows with OSCC in South Brazil, among the selected animals 60% lesions occurred in third eyelid followed by limbus (20%), 10% involved the cornea and 10% were associated with the eyelids. BOSCC most commonly occur in the age group of seven to eight years and rare in younger animals (Otter *et al.*, 1995). According to Anderson, (1991) the animals of high plane of nutrition were more susceptible for the condition. Generally, the OSCC progress through three different stages like plaques, papillomas and carcinoma. Nair *et al.* (2013) reported BOSCC as an occupational hazard among working bullocks due to extensive working hours in sunlight. Late presentation of the cases as the major challenge in salvaging vision.

Diagnosis is made by clinical appearance, cytologic examination of impression smears and histological examination of biopsy specimen. The treatment of the condition includes surgical excision, cryotherapy, radiofrequency hyperthermia, immunotherapy, chemotherapy and radiation therapy. Excision is the most accepted method of treatment in which the lesions are present in the ocular surface (Mosunic *et al.*, 2004). Cryotherapy is a rapid and simple procedure and it can cause tumour cell death and necrosis through freeze- thaw damage (Farris and Fraunfelder, 1976). Regmi *et al.* (2018) stated that the squamous cell carcinomas were usually non-invasive in nature and occasionally metastasise into other organs. Philip *et al.* (2021) also used the same anaesthetic combination (butorphanol-xylazine-ketamine) with auriculo-palpebral nerve block for the surgical management of unilateral dermoid in a Holstein Friesian heifer. In our present study, recurrence of the condition was not reported in both cases.

## SUMMARY

Successful surgical management of ocular squamous cell carcinoma in two dairy cows were reported.

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