Marginal Resection of Ocular Squamous Cell Carcinoma in a Hereford Cattle

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Abstract

A well-differentiated invasive ocular squamous cell carcinoma (OSCC) localized in the conjunctiva and medial peribulbar region, including the third eyelid, was diagnosed in the left eye of a 5-year-old Holstein cow causing ocular pain. Marginal resection of the neoplastic mass was performed with retrobulbar anesthesia following sedation and auriculopalpebral nerve block. On the 3rd postoperative day, 20% decreased milk yield reached normal levels. This case was found worth presenting in terms of performing a standing surgery of an OSCC located at the medial peribulbar region under sedation with retrobulbar anesthesia and regional nerve block, by applying the principles of ophthalmic surgery and inserting a penrose drain.

Keywords: Cattle, ocular neoplasia, squamous cell carcinoma

Introduction

Ocular squamous cell carcinoma (OSCC) is the most common neoplasm that causes a decline in milk production and serious economic losses in cattle. Race, age, nutrition, UV rays, and eyelid pigmentation are reported to be among the etiological factors (Fornazari et al., 2017; Tsujita and Plummer, 2010). OSCC is a primary neoplasm that may occur in different ocular and periocular tissues, including the palpebral skin, epithelial surfaces of the cornea, conjunctiva, third eyelid, and limbus (Fazili et al., 2001; Pearce and Moore, 2014; Tiwari et al., 2016; Tsujita and Plummer, 2010). To the best of the authors’ knowledge, this is the first case of a well-differentiated invasive OSCC invading the medial conjunctiva and periorbital space including the third eyelid of a Holstein dairy cow reported in Northern Cyprus treated with standing surgery.

Case Presentation

A 5-year-old Holstein cow was diagnosed with a conjunctival neoplastic mass in the left eye involving the third eyelid, causing ocular pain (Figure 1).

After sedation was achieved with 0.5 mL per 100 kg body weight xylazine (Xylazine HCl 2%), regional block was performed with lidocaine HCl (Jetocain ampoule), and the operation was performed in the standing position. Retrobulbar anesthesia with motor and sensory block of the orbit and surrounding tissues and additional auriculopalpebral nerve desensitization were achieved by administering 10 mL and 5 mL local anesthetic solution, respectively (Figure 2, Figure 3).

The tumor was removed by deep conjunctival and medial peribulbar resection including the third eyelid at 180 degrees medial angle and 06–12 o’clock position. During the operation, a penrose drain was inserted into the medial peribulbar region after peribulbar excision and the conjunctiva was closed with absorbable 4/0 suture materials and the eye was covered with a dressing (Figure 4, Figure 5). Removed tumoral tissue was fixed in formalin, put through routine processes for sectioning, and sections were stained with hematoxylin-eosin (HE) for pathological examination and inspected with a light microscope. The histopathological examination revealed a well-differentiated...
squamous cell carcinoma (SCC) (Figure 6). It was observed that normal vision and no recurrence was encountered during a 2-year follow-up period (Figure 7).

**Figure 1.** Preoperative appearance of the conjunctival tumoral mass invading the third eyelid of the left eye

**Figure 2.** Retrobulbar anesthesia

**Figure 3.** Auriculopalpebral anesthesia

**Figure 4.** Penrose drain in the medial peribulbar area
Discussion

Common sites for OSCC include the lower eyelid, the third eyelid, and the corneoscleral junction of the globe (Cordy, 1990; Farris and Fraunfelder, 1976; Prasath et al., 2018; Tsujita and Plummer, 2010). According to Fornazari et al. (2017), OSCC sites were the third eyelid (60%) followed by the corneo-conjunctival junction (limbus) (20%), cornea (10%), and eyelids (10%). Gharagozlou et al. (2007) found 70% of OSCC in the third eyelid and adjacent conjunctiva in dairy cattle. However, SCC has been reported in the lateral canthal conjunctiva in a 7.5-years-old crossbred cow (Gautam et al., 2016). In this case, OSCC was observed in one eye on the medial conjunctiva, including the third eyelid and periorbital region, which has not been reported before.

Although OSCC is observed in all breeds, it is known to affect mainly Hereford, Hereford crossbreds, and Holstein cattle, especially white-faced Herefords with a hereditary tendency to facial hypopigmentation (Tsujita and Plummer, 2010).

The mean age at incidence is 8 years, but in a newly published study, it is reported to be 3 years (Cordy, 1990; Fornazari et al., 2017). Our case is important as the animal was a 5-year-old Holstein cow, the eyelid skin was pigmented, and the lesion was...
observed in the conjunctiva covering the third eyelid extending to the medial periorbital space.

Due to complications of general anesthesia, surgical procedures in cattle are mostly performed in the standing position with regional anesthesia. Sensation of the lower eyelid arises from the ophthalmic, maxillary, and mandibular branches of the trigeminal nerve, which emerge from the foramen orbitotomy within the orbit and exit along the lower bony rim to innervate the skin of the lower lid. If desensitization of the lower eyelid is inadequate after retrobulbar or modified Peterson blocks or if desensitization of the lower eyelid alone is desired, infiltration of a local anesthetic along the bony rim in a line block may be performed. Akinesia of the eyelids, which facilitates surgery in the standing animal, is accomplished by selectively desensitizing the auriculopalpebral nerve (Gautam et al., 2016; Gelatt, 2011; Skarda and Tranquilli, 2015). For this purpose, retrobulbar anesthesia was achieved by entering through the medial conjunctiva. Eyelid movement was prevented by blocking the auriculopalpebral nerve, which is the branch of the facial nerve, through the dorsal zygomatic arch, and the surgery was easily performed in the conjunctival fornix under retrobulbar anesthesia and the inhibition of eyelid motor functions (Tsujita and Plummer, 2010).

Neoplastic masses are reported to be generally cauliflower-like, erythematous, ulcerated, crisp, and malodorous (Kuma and Sharif, 2018; Prasath et al., 2018). In the present case, the neoplastic mass was treated at an advanced stage and similar macroscopic findings were observed.

Besides treatment protocols, such as cryosurgery, radiation, immunotherapy, and hyperthermia, it is generally known that neoplastic tissue dissection is sufficient (Kuma and Sharif, 2018; Tsujita and Plummer, 2010). In our case, it was observed that marginal resection prevented recurrence and milk production, which had decreased to 20%, returned to a normal level on the 3rd day postoperatively.

Histopathological evaluation of our case showed that it was a well differentiated and invasive type of SCC. OSCC has also been reported widely in Europe, Asia, Africa, Australia, South America, and around the world (Fornazari et al., 2017; García et al., 2018; Kuma and Sharif, 2018; Misdorp, 1967; Murray, 1968; Naghshineh et al., 1991; Pearce and Moore, 2014; Priester and Mantel, 1971; Schulz and Anderson 2010; Spadbrow and Hoffmann, 1980; Tsujita and Plummer, 2010).

Based on this case presentation, it was observed that ocular surgery in standing position can be performed easily under sedation with retrobulbar nerve block and auricular nerve motor dysfunction in cattle. Insertion of a penrose drain following removal of the neoplastic mass extending to the periorbital cavity positively contributed to wound healing. Marginal resection of the tumor mass with medial periorbital tissues and conjunctiva, including third eyelid, elicited a successful treatment of an invasive type OSCC in a dairy cow without tumor recurrence in the long term.

**Peer-review:** Externally peer-reviewed.

**Author Contributions:** Concept – GÇA, AÇ, GU, FEO; Design – GÇA, GU; Supervision – FEO; Resources – GÇA, GU, FEO; Materials – FEO; Data Collection and/or Processing – GÇA, AÇ, FEO; Analysis and/or Interpretation – GÇA, AÇ, GU, FEO; Literature Search – GÇA, AÇ, GU, FEO; Writing Manuscript – GÇA, AÇ, GU, FEO; Critical Review – GÇA, AÇ, GU, FEO; Other – GÇA, AÇ, GU, FEO.

**Conflict of Interest:** The authors have no conflicts of interest to declare.

**Financial Disclosure:** The authors declared that this study has received no financial support.

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