Study on occurrence of ocular tumors in cattle

Priyanka N, Nagaraja BN, Nagaraju N, Manjunath DR and BR Balapannavar

Abstract

Study includes 51 cases affected with ocular tumor out of 1629 cases presented to Veterinary College Hospital, Veterinary College, Hassan for a period from July 2019 to June 2020. Tumors were studied on age, breed, sex, involvement of eye. The ocular tumors involving third eyelid, lower eyelid, limbus, cornea and involving the whole eye. Ocular tumors diagnosed based on history, clinical symptoms, gross examination and histopathological examination. Histopathological examination revealed most of the tumors are squamous cell carcinoma. Ocular tumors treated with surgical excision.

Keywords: Cattle, ocular tumors, squamous cell carcinoma

1. Introduction

Ocular squamous cell carcinoma (OSCC or “cancer eye”) has been recognized as a primary neoplasm of epithelial origin that may occur in different ocular and periocular tissues including the palpebral skin, epithelial surfaces of the cornea and conjunctiva, third eyelid, and limbus (Tsujita and Plummer, 2010) [26]. European breeds of cattle, mainly “taurine” (Bos taurus), cattle and their crossbred particularly those with unpigmented skin on the face commonly develop OSCC (Sculz and Anderson, 2010) [24]. Hereford is mostly affected with ocular squamous cell carcinoma OSCC (Fornazari et al., 2017) [7]. The aetiology and predisposition of the disease is multifactorial, includes genetic susceptibility, breeds with circumocular apigmentation, age, ultraviolet radiation, viruses (BPV and BHV) (Ceylan et al., 2012) [1]. OSCC is a pathologic condition having four common development stages viz. plaques, keratomas, papillomas and carcinomas (Tsujita and Plummer, 2010) [26]. Surgical excision of the tumor is selected as a primary treatment. Various successful treatment options surgical excision in combination with cryotherapy, hyperthermia, radiotherapy, chemotherapy and photodynamic therapy in horse (Taylor and Haldorson, 2013) [23]. Study includes the ocular tumours involving different sites of eye and histopathological examination.

2. Materials and Methods

Study includes 51 cases affected with ocular tumor out of 1629 cases presented to Veterinary College Hospital, Veterinary College, Hassan for a period from July 2019 to June 2020. The diagnosis of ocular tumor based on history of breed, age, sex, initial size. Clinical examination of cattle with the eye cancer was conducted for symptoms like ocular discharge, tumor location, shape, consistency, progression, odour, type of lesion and extent of loss of vision of the eye. The loss of vision was evaluated using naked eye examination, cotton ball test and menace reflex. The ocular tumor involving the whole eye with loss of vision treated with extirpation or exenteration of eyeball. Patients were withheld food for 24 hours and water for 12 hours prior to surgery. Blood was collected for haematological and biochemical studies. Inj Streptopenicillin @ 10,000 IU/kg BW and inj. Meloxicam @ 0.2 mg/kg BW was administered I/M as pre-operative antibiotic and analgesic respectively. Area around the affected eye was shaved and flushed with normal saline to remove the discharges. The animals were operated under standing sedation by administering inj Xylazine hydrochloride @ 0.01 mg/kg BW, inj Butorphanol @ 0.02 mg/kg BW and inj Ketamine @ 0.04 mg/kg BW intramuscularly. Analgesia of eye was achieved by employing auriculopalpebral, supraorbital and peterson nerve blocks and local infiltration around the growth using inj 2% Lignocaine hydrochloride to desensitize the eyeball and orbit. The elliptical skin incision was made around suture line and transpalpebral dissection was done to remove eye ball with tumorous mass. In severe infiltrative growth, exenteration was done to remove growth along with eye globe. Ligation of optic vessel was done to control hemorrhage along with packing of orbital cavity with pressure...
gauge of compound benzoin. Skin incision was apposed with apposition suture pattern. In the animals, still had vision with periocular growth was managed by resection of growth.

3. Results and Discussion
Total of 1629 cattle were presented to Veterinary College Hospital, Veterinary College, Hassan for a period from July 2019 to June 2020. Out of 1629 cases, 51 were affected with ocular cancer. The occurrence of the eye cancer was about 3.13%. This was in accordance with Cleaver et al. (1972) [3] who, observed about 0.8 to 1.6% of eye cancer in cattle population in United States. Panchbhai et al. (1987) [18] reported the incidence as 2-8% in some parts of Maharashtra. Cordy (1990) [4] observed the incidence rate varied from 0.8 to 5% among cattle herds. Prasanna (2020) [19] found incidence of eye cancer in cattle as 1.12%. Cattle were divided into four categories based on age i.e., 0 to 5, 6 to 10, 11 to 15 and above 15 years. The highest occurrence was observed in the age group of 6 to 10 years and it was 66.7% (n = 34), followed by 0 to 5 years age group, where the occurrence was 25.5% (n = 13), in 11 to 15 years and above 15 years age group, the occurrence was 3.9% (n = 2). This observation was in accordance with the study of Kleinschuster et al. (1977) [14], who recorded the occurrence of bovine ocular squamous cell carcinoma between the age group of 6-12 years with peak occurrence at the age of eight years. Jennings et al. (1979) [15] reported that the occurrence of ocular squamous cell carcinoma in cattle was higher in the age group of 5-8 years. Klein et al. (1982) [16] and Misdorp et al. (1985) [17] observed higher occurrence of bovine ocular cancer in 4-13 years of age group. The study of breed-wise occurrence of ocular tumors in cattle revealed highest number in HF crossbred cattle which was 62.7% (n = 32) followed by crossbred Jersey cattle accounted for 13.7% (n = 07), non-descript cattle accounted for 11.8% (n = 06). Sindhi breed of cattle represented 7.8% (n = 04) and Hallikar breed of cattle accounted for 4% (n = 02). The occurrence of ocular tumor in female cattle was found to be 94.1% (n = 48) and male cattle accounted for 5.9% (n = 3). Similar findings were also observed by Kleinschuster et al. (1977) [14], Jennings et al. (1979) [15], Heeney and Valli (1985) [10], Carvalho et al. (2005) [2] and Gharagozlou et al. (2007) [8] who reported that HF crossbred cows were highly affected with ocular tumors. The reason for highest incidence of ocular tumors in females may be because the cows are maintained the herd for breeding purpose as long as they remain productive and healthy for the economic reasons, but the male animals are kept for meat purpose and slaughtered at a very young age (Dugan et al., 1991) [6]. In the present study, ocular tumor in cattle, higher occurrence was observed in the right eye which was found to be 49% (n = 25), followed by 41.2% (n = 21) in left eye and involvement of both the eye was observed in 9.8% of cattle (n = 5). Fornazari et al. (2017) [7], Islam et al. (2017) [11], Gautam (2016) [9] and Maan et al. (2019) [16] recorded highest ocular tumors in right eye while Radhakrishna et al. (1999) [21] and Kalirajan and Senthilkumar (2016) [13] recorded highest numbers in left eye.

The cattle were presented with the ocular tumors involving the whole eye accounted for 29.4% (n = 15) followed by third eyelid tumor, which was 21.6% (n = 11), lower eyelid tumor, upper eyelid tumor and traumatic injury to the eye was found to be 7.8% each (n = 4 each), tumor on the limbal region of eye was 6% (n = 3), atrophy of the eyeball and corneal ulcer accounted for 3.9% each (n = 2 each), both third eyelid tumor and chemosis accounted for 3.9% (n = 2), two cattle were affected with tumor on limbal region and third eyelid involving both the eyes, which accounted for 3.9% (n = 2), one cattle was affected with both lower and upper eyelid tumor found to be 2% (n = 1) and one cattle was affected with growth on the cornea accounted for 2% (n = 1). This was in correlation with Russell et al. (1956) [22], Klein et al. (1982) [15], Radhakrishnan et al. (1999) [21], Carvalho et al. (2005) [2], Pugliese et al. (2014) [20] and Prasanna (2020) [19]. In present study, eyeball removal performed under Peterson’s or retrobulbar nerve blocks this is in correlation with Scheck (2005) [23], Dilipkumar and Patil (2016) [5], Gautam et al. (2016) [9] who also opted surgical excision as a treatment of ocular squamous cell carcinoma in cattle.

The ocular cancer was diagnosed as squamous cell carcinoma based on histopathological findings diagnosed as ocular squamous cell carcinomas in most of the cases characterized by presence of large polyhedral cells with large nucleolus arranged in cords with intercellular bridges forming epithelial cell nests and containing concentric laminations of keratin in the form of “Keratin pearls” This is in accordance with Gharagozlou et al. (2007) [8], Carvalho et al. (2005) [2], Maan et al. (2019) [8] and Prasanna (2020) [19].
Fig 1: Keratin pearls

Fig 2: Overall occurrence of the ocular tumors in cattle

Fig 3: Age-wise occurrence of the ocular tumors in cattle

Fig 4: Breed-wise occurrence of the ocular tumors in cattle

Fig 5: Sex-wise occurrence of the ocular tumors in cattle

Fig 6: Eye affected with ocular tumors in cattle
4. Conclusion
The ocular tumors are most commonly found in HF cattle due to predisposition of the disease is multifactorial, includes genetic susceptibility, breeds with circumoculart apigmentation, age, ultraviolet radiation, viruses (BPV and BHV). Early diagnosis of OSCC and suitable treatments will increase the success rate and to save the vision.

5. References

Fig 7: Site of occurrence of ocular tumors in cattle

---

"332"


