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Study of Ocular and Periocular Tumors in HF Crossbred Cows

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A B S T R A C T

Present study report includes 58 cases of ocular and periocular tumours in Holstein Friesian crossbred cows presented during 2011-17 with growth in various parts of eye globe *viz.* whole eye globe, palpebral conjunctiva and upper eyelid, bulbar conjunctiva and lower eyelid, adnexa, cornea, sclera, limbus, 3rd eyelid, upper eyelid, both eyelids, lower eyelid. They were removed by appropriate surgical management. The growth samples were sent for histopathological examination and most of the cases revealed squamous cell carcinoma of eye.

Introduction

Among the various neoplasms in cattle, ocular and periocular squamous cell carcinomas are most common (Ceylan *et al.*, 2012; Gami *et al.*, 2017). It occurs in various part *viz.* palpebral and bulbar conjunctiva, 3rd eyelid, upper and lower eyelid and globe itself (Panchabhai *et al.*, 1987; Davidson and Pickett, 2008; Muste *et al.*, 2012; Reddy *et al.*, 2017). Holstein Friesian, Holstein Friesian crosses and Hereford are mostly affected with ocular squamous cell carcinoma -OSCC (Ceylan *et al.*, 2012; Fornazari *et al.*, 2017; Gami *et al.*, 2017). The predisposing causes for OSCC are multifactorial like genetic, phenotypic (non pigmented eyelid and conjunctiva), environment (high altitude, temperature), chronic exposure to solar radiation or actinic rays of sun, trauma, mechanical and chemical irritation and viral infection (Ceylan *et al.*, 2012; Rebhun, 1998; Sastry and Rao, 2005; Muste *et al.*, 2012; Fornazari *et al.*, 2017). OSCC is a pathologic condition having four common development stages *viz.* plaques, keratomas, papillomas and carcinomas which start from non neoplastic dysplasia and progress into neoplastic masses when neglected or affected with predisposing causes (Rebhun, 1998). Ocular tumours other than squamous cell carcinoma are lymphosarcoma and haemangio-endothelioma

has been reported (Gharagozlou *et al.,* 2007). Solid skin like masses on various ocular structures other than tumours is called dermoid (Barkyoumb and Leipold, 1984). For the treatment of OSCC, growth resection and eyeball extirpation or exenteration are only options to manage (Schulz and Anderson, 2010). Early diagnosis of OSCC and suitable treatments/managements were believed to increase success rate (Tas *et al.,* 2009). Present study includes the surgical management and histopathology of various ocular and periocular tumours in HF crossbred cows.

Materials and Methods

Present study was conducted on 58 HF crossbred dairy cows having unilateral ocular and periocular growth during 2011-17 of North Gujarat region presented at Department of Veterinary Surgery and Radiology, Deesa, S.D.A.U. (Table 1 and Fig. 1). Anamnesis in all the cases revealed ocular growth with gradual increased in size since 2 months approximately with epiphora and blepharospasm. The gross nature of growth and locations were recorded. The vision in affected eye was evaluated using naked eye examination, cotton ball test and menace reflex. Total 38 cases were surgically operated on the basis of extension of growth within globe and vision. In which 28 cases were managed with eyeball extirpation or exenteration while 10 cases were treated by resection of external growth only. For the eyeball extirpation or exenteration, preoperative fasting and withholding from water was done for 24 hours. The surgical site was prepared aseptically and surgical intervention was done under xylazine sedation (@ 0.03 mg/kg bd wt) and Peterson's or retrobulbar nerve blocks by using 2% lignocaine HCL in lateral recumbency with keeping affected eye on upper site. For the surgical dissection, first tarsorrhaphy was done and then elliptical skin incision was made around suture line and transpalpebral dissection was done to remove eye ball with tumourous mass. In severe infiltrative growth, exenteration was done to remove growth along with eye globe (Schulz and Anderson, 2010). Ligation of optic vessel was done to control hemorrhage along with packing of orbital cavity with pressure gauge of compound benzoine. In the animals, still had vision with periocular growth was managed by resection of growth under Auriculo palpebral nerve block with local infiltration using 2% lignocaine HCL. Horizontal mattress sutures were taken at the base of the growth by using Vicryl # 2-0 and growth was excised. All the surgically treated cases were managed by antibiotic, analgesic and antihistaminic up to five post operative days. Daily antiseptic dressing was advised till complete healing. All the removed tissues were sent for histopathological examination.

Results and Discussion

OSCC recognized since the 19th century is an epithelial cell originated tumour in different parts of eye which is leading cause of eye ball removal (Fornazari *et al.,* 2017).

The complete clinical examination of eye revealed 44 (75.86%) cows were blind with severe corneal opacity and damaged eye ball by growth while rest of cows still had vision with little growth. Most of cases were found to have nodular cauliflower like extensive fragile growth with necrotic tissue with pus and heamorrhage which was found by Sharda *et al.,* (1995), Radhakrishnan *et al.,* (1999) and Gami *et al.,* (2017).

In present study higher incidence of eye tumours was found in female while Bhume *et al.,* (1991) had reported higher incidence in male. Present study has reported higher incidence of tumour in left eye while Gami *et*

al., (2017) have reported more in right eye and Ghargozlou *et al.,* (2007) had reported equally in both eyes. Here we report higher incidence in summer which also had been reported by Sloss *et al.,* (1986) but Gami *et al.,* (2017) have found higher incidence in winter.

In present study, eyeball removal performed under Peterson's or retrobulbar nerve blocks (Schulz and Anderson, 2010) while growth extirpation under auriculo palpebral nerve block with local aneasthetic infiltration (Majie *et al.,* 2016) at the site was performed.

Histopathologically, total 34 (89.47%) cases out of 38 operated cases were found positive for squamous cell carcinomas which were found similar with other authors (Gharagozlou *et al.,* 2007, Prasad and Samatha, 2013, Soujanya and kharde, 2016, Tiwari *et al.,* 2016,). Rest of 4 (10.53%) cases was diagnosed as lipoma, meibomian carcinoma, sebaceous carcinoma and pyogranulomatous inflammation histopathologically.

Histologically, squamous cell carcinoma was unencapsulated, neoplasm composed of large round to polygonal cells arranged in islands, cords, and trabeculae supported by fibrovascular stroma with variable infiltration of inflammatory cells (Fig. 2). Neoplastic cells had distinct cell borders, abundant eosinophilic granular cytoplasm, occasionally prominent intercellular bridge (desmosomes) and one round to oval, vesiculate nucleus with finely-stippled chromatin and one to two distinct, magenta nucleoli. Mitotic figures average were range from 1 to 5 per 10 high power fields in different cases. Multifocally, in many cases, neoplastic cells surrounded variably sized concentric, lamellated eosinophilic material (keratin pearls) (Fig. 3). In most cases, diffusely, stromas were markedly infiltrated with viable and non-viable neutrophils, eosinophils, lymphocytes and plasma cells.

Table.1

No. of cases with location of growth		**Month wise distribution of cases**		**Age wise distribution of cases**	
Location of growth	No. Of cases	Month	No. of cases	Age	No. of cases
Whole eye globe	24(41.38%)	January	5(8.62%)	3 months	1(1.72%)
Palpebral conjunctiva, Upper eyelid	2(3.45%)	February	4(6.9%)	8 months	1(1.72%)
Bulbar conjunctiva, Lower eyelid, adnexa	10(17.24%)	March	4(6.9%)	1.5 years	1(1.72%)
Cornea, sclera, limbus	6(10.35%)	April	8(13.79%)	3 years	1(1.72%)
3rd eyelid	9(15.51%)	May	8(13.79%)	4 years	4(6.9%)
Upper eyelid	2(3.45%)	June	4(6.9%)	5 years	9(15.51%)
Both eyelids	2(3.45%)	July	6(10.35%)	6 years	15(25.87%)
Lower eyelid	3(5.17%)	August	4(6.9%)	7 years	12(20.70%)
Total	58	September	2(3.45%)	8 years	7(12.07%)

Fig.1

Fig.2 Squamous cell carcinoma, poorly-differentiated: Neoplastic epithelium cells showing a variable degree of keratin tonofibers, anisocytosis, poikilocytosis, and more number of mitotic figures. H&E 200 X

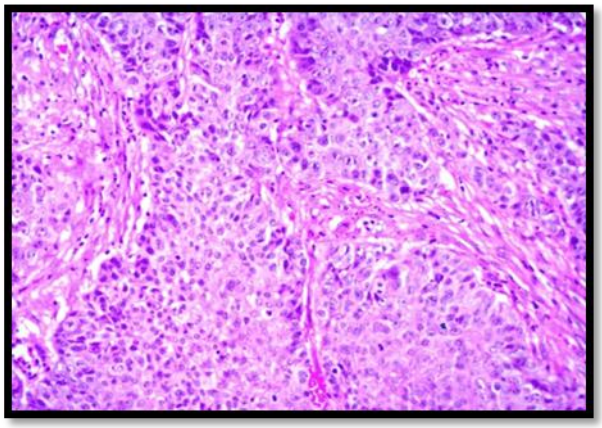
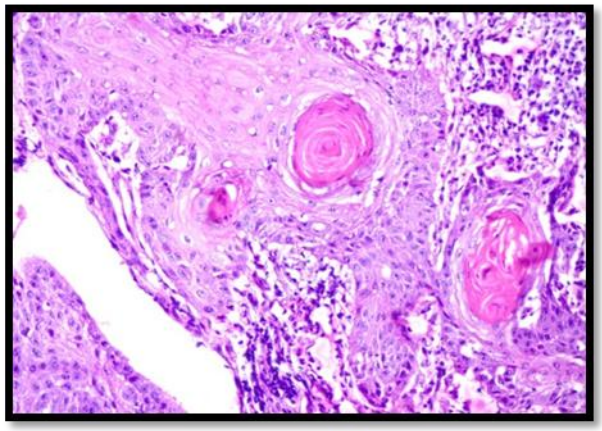


Fig.3 Squamous cell carcinoma, well-differentiated: Neoplasm showing islands and cords of neoplastic epithelial cells forming distinct keratin "pearls" and marked inflammation in supporting stroma. H & E 200 X



Post operative follow up of all operated cases revealed that out of 28 cases of exenteration of eyeball, in 18(47.37%) cases reoccurrence of growth was observed up to 5 months post surgery. Recurrence of growth was also reported by Gami *et al.,* (2017), Pandey *et al.,* (1989), Kamalakar *et al.,* (2014). Others complications like suppurative inflammation and continuous bloody discharge were also observed post operatively in ten cases of growth removal in immediate post operative period. Extirpation of eye ball is only option when eye damaged/globe was ruptured with or without large tumourous mass development. It is feasible, inexpensive option of treatment with minimal complications (Reddy *et al.,* 2017) but in present study recurrence was a common complication. SCC are aggressive tumor with a tendency of regrowth even after surgical excision. In large growth needing exenteration of eyeball reoccurrence might have occurred due to remnant neoplastic cells.

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