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Original Research Article

Microscopic Evaluation of Bovine Horn Cancers

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A B S T R A C T

Cancer is a disease of autonomous and uncontrolled cell proliferation that first deregulate cell division *invasion* (intrusion on and destruction of adjacent tissues), and sometimes *metastasis* (spread to other locations in the body via lymph or blood). Nearly all carcinogenic agents produce cancer by inducing abnormalities in the genetic material of the cells. They affect two general classes of genes- cancer promoting oncogenes and tumor suppressor gene Cancer may affect people of all ages, even fetuses .Humans are not the only ones affected by cancer. Cancer can affect all animals. Cancer causes almost 50% of deaths in pets over the age of 10. Some common types of cancer in pets include: skin, breast, head and neck, testicular, abdominal, bone cancer, lymphoma and leukemia. The common cancers in bovine are horn cancer and eye cancer. Horn cancer affects around 1% of bullock population in India and causes heavy economic losses.Horn cancer is a sporadic, malignant cancerous disease (squamous cell carcinoma) of horn core epithelium of predominantly aged zebu bullocks (less commonly of cows, bulls and rarely of buffaloes). It is a widely prevalent and economically important disease of Indian cattle (zebu) causing huge economic losses due to reduced draught power and milk production capacity as a result of prolong morbidity and mortality of the animals.

Introduction

Tumors of the horn are generally malignant in nature and are common in aged cattle. Kaul and Kalra (1973), Pillai, *et al.*, (1981) and Wangikar (1997) found highest incidence of horn cancer in age group of 5-10 year. The high incidence might be attributed to stress in aged animals. Sunlight is probably the most important carcinogenic stimulant for these tumors and accounts for the prevalence of squamous cell carcinoma on the eyelid and conjunctiva of cattle and horses, the ear pinna of cats and sheep, and the vulva of cattle, goats, and recently sheared sheep (Ginn *et al.*, 2007 and Gharagozlou *et al.*, 2007). Animals suffering from cancers neither get an equivocal treatment like humans because of prohibitive costs, nor are mercy killed because of the social prohibitions and suffer in silence. Current methods of cancer treatment such as surgical resection, radiation therapy, and chemotherapy are responded poorly with significant side effects. Overwhelming were the advances in pathology, histology, cytology, and physiology, and although surgery had certainly become more aseptic, it remained in technique chiefly static. This study

includes the surgical removal of the horn cancer followed by its microscopic evaluation to confirm the nature of the growth.

Materials and Methods

Twenty cases of the horn cancer were involved in the study (bullock & cow). Surgical operations were performed in field condition or at college clinics. All the animals were administered atropine sulphate at the dose rate of 0.04 mg per kg body weight intramuscularly followed by Xylazine hydrochloride at the dose rate of 0.1mg to 0.2 mg per kg body weight intra muscularly and then animal were kept restrained in lateral recumbency in such a way so that the affected horn was in upward direction.

To have the desensitization of the horn cornual nerve blocked were performed. The needles were inserted midway between the base of the horn and lateral canthus of the eye. The sites were located by palpating the frontal crest where the corneal nerve passes just below the crest subcutaneously. Ten milli litre of lignocaine hydrochloride (2%) solution were deposited around the nerve. The hairs around the horn were clipped and shavings of the area were done.

The area was cleaned with soap and then antiseptic solution 3-4 times to maintained the aseptic condition. Skin incisions were made around the base of the horn and flap was prepared. After ligating the cornual vessels the horn were removed with exposing periosteum of frontal bone. The entire skin flaps were sutured by interrupted suture. Samples were fixed in 10% formalin for a maximum of 48 hours, embedded in paraffin, and 5-µm sections were stained for routine histopathologic diagnosis with hematoxylin and eosin.

Results and Discussion

The symptoms of the animals affected with first stage of horn cancer were like striking the head against hard objects, asymmetry of horn, slight slimy blood tinged discharge from affected side nostril and the base of horn was found soft, hot and painful. In second stage deviation of horn, wound at the base of horn (fig.1), foul smelling discharge from the horn, blood tinged nasal discharge of affected side; dull sound on percussion was observed. In third stage complete blending of horn (fig.2), breakage of horn from the base and appearing of cauliflower like (fig.3), cancerous growth and horn corium filled with cancerous growth was observed. Beside these generalized signs like dullness, depression and partial loss of appetite was also evident. For correction of this disease the affected horn was removed from the base of the horn after making skin flap. Then the skin flap was closed with interrupted suture. The skin stitches were removed after fourteen post-operative days without any complications on the site. The cases follow up were done for next six months and there were no reoccurrence of the disease.

Histopathology of 20 cases 14 were well differentiated tumors with several degrees of keratinization. The tumor cells mostly resembled those of normal stratum spinosum, but have vesicular nuclei with single or multiple prominent nucleoli along with occasional mitotic figures. The sheet of squamous epithelium cells circling the single or multiple hyalanized epithelium nest (fig.2) with characteristic keratinization were observed in pearl lesions at different stages of development. Lesions suggestive of early changes in the process of epithelium pearl formation and anaplastic changes characterized (fig.1) was observed in some slides by pleomorphism and increased

mitotic figures. Similar observations are reported by (Baniadam *et al.*, 2010) & (Gautam *et al.*, 2016)

Tumor masses had shown varying degrees of hyperkeratosis and ulceration. On cut section tumor mass revealed whitish to pink color. Cytology of interdigital tumor mass showed eosinophills and neutrophills.

These anastomosing growths of cords and nests are composed of cells that have a glassy eosinophilic cytoplasm and enlarged nuclei. Mitotic figures, keratin pearls, and dyskeratotic keratinocytes are variably present. On higher power, intercellular bridges were seen similar findings are reported by (Prasad *et al.*, 2016)

Histopathological findings of 2 cases were showing moderately differentiated tumors. Cells were frequently arranged in cords or nests, few whorls were presents in central mass of necrotic tissue concentric keratinization and small epithelial pearl margined by proliferating squamous epithelium cells. The lobules were separated by thin connective tissue septa and few cells were shown mitotic figures (Gharagozlou, *et al.*, 2007).

Fig.1

Fig.2

Fig.3

Fig.4

Fig.1 Characteristic keratinization (1) and multiple epithelium pearl formation (2)
Fig.2. Squamous cell carcinoma showing lobulated distribution of Squamous epithelium cells (1) with pleomorphic changes in the nuclei. Cell t nest formation is not distinct.

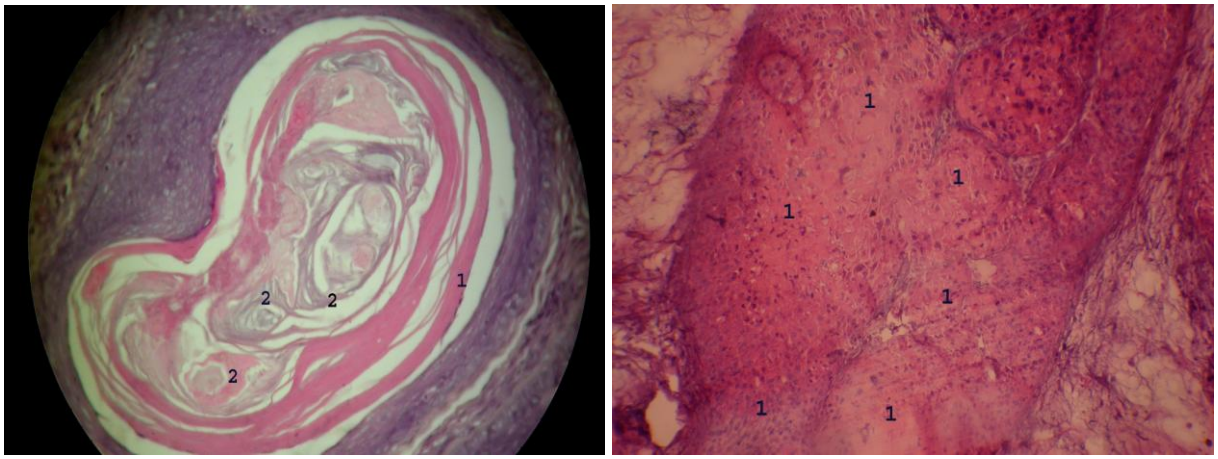
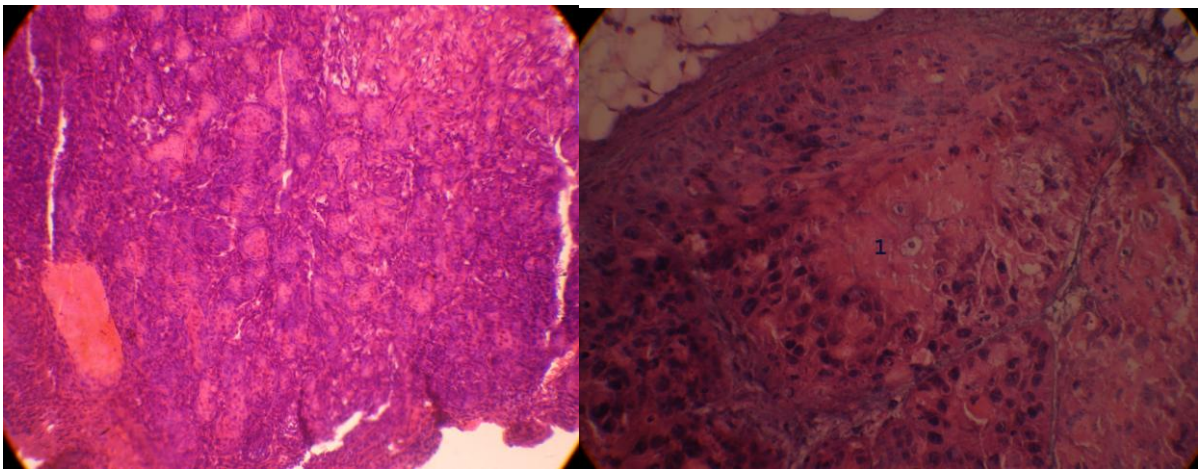


Fig.3 Squamous cell carcinoma showing predominant spartially cellular pockets of proliferating Squamous cell area aggregated
Fig.4 Central portion becoming acellular structure which start forming connective tissue nest or Pearl structure (1)



Four cases were showing poorly differentiated tumors with keratinization, cord formation and anaplastic changes characterized by pleomorphism and increased mitotic figures. squamous cell carcinoma showing early neoplastic changes characterized by lobulated distribution of squamous epithelium cells with pleomorphic changes in the nuclei and cell nest formation not distinct central portion were becoming acelluler structure which start forming connective tissue nest or pearl structure were observed in these poorly differentiated tumors. Similar findings are recorded by (Garma-Avina; 1994) & (Pugliese *et al.*, 2014).

On the above findings we may make grading of SCC which can be accomplished by cytology to save the valuable time, allowing the practitioner to initiate a therapeutic approach. In the present study, Well-

differentiated tumors: tumor cells frequently arranged in whorls (pearls) with intensely eosinophilic keratinized centers. Many intercellular bridges throughout the section, moderately differentiated tumors cells frequently arranged in cords or nests; few whorls present, a few of which contained little eosinophilic material. Cells with intercellular bridges infrequently seen and Poorly differentiated tumors with a few individual keratinizing cells and cord formation is common. Cells are generally smaller than in other subtypes of SCC.

Early recognition, diagnosis, and treatment are essential. Diagnosis of SCC relies on cytological or histologic examination of the tumor. Many treatment modalities are available, with surgical excision being the mainstay of therapy. The prognosis for patients with SCC varies. A favorable prognosis exists for patients with well-differentiated tumors that can be completely excised and without evidence of vascular or lymphatic invasion or distant metastases. Conversely, the prognosis is poor for patients with inoperable or poorly differentiated tumors or with metastatic disease. Further investigation into the tumorigenesis of SCC is warranted. The findings of these studies may lead to additional preventive measures and novel treatment modalities that improve outcomes for dogs and cats with this type of cancer.

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