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A case report of squamous cell carcinoma in buffalo

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Abstract

A local breed of buffalo, Murrah cross 4.5 years old with a tumor on its forelimb of left leg on the lateral side of metacarpal, suspected as squamous cell carcinoma is discussed in this study. As primary sign animal showed awkward gait and difficulty in movement. Initially the mass was seen as wart like structure and later on progressed to the formation of bulky mass of cancerous cells in the span of three months. The attempt to treat by chemotherapy was unsuccessful during the course. The tumor was surgically removed after fine needle aspiration cytology. Histopathological examination performed on the removed mass showed underlying acanthosis and hyperkeratosis. Thus, the case was confirmed as squamous cell carcinoma. Post-operative care was provided to the animal after the surgery. The main aim of this study was to differentiate the nature and type of tumor and to provide a way to further proceed the treatment in similar cases.

Keywords: Squamous cell carcinoma, acanthosis, hyperkeratosis, murrah cross

Introduction

Squamous cell carcinoma (SCC) is a type of epithelial malignancy that normally occurs in those organs that are covered with squamous epithelium and are pigmented (Yan, Wistuba, Emmert-Buck, & Erickson, n.d.). The skin of trunk, limbs, feet, head and neck are the major anatomic sites that are more prone to SCC (Meuten, 2017) [2]. The affected cell shows the increase in thickness due to excessive keratinization. The affected keratinocytes of the basal and spinous layer of skin shows loss of polarity, karyomegaly, nuclear hyperchromatism etc. Squamous cell carcinoma is mostly non-invasive in nature. However, in rare case it can metastasize to other organs including nerves and lymph node. In cattle the etiology of squamous cell carcinoma is mostly considered to be bovine papillomavirus (BPV) (Rutten *et al.*, 1992) [7].

In skin, the tumorous cell leads to the destruction of basement membrane leading to the formation of compact masses which ultimately invades the underlying dermal layer. Secondary bacterial infection occurs after the invasion of dermal layer resulting in the purulent exudates on the surface of the mass (Meuten, 2017) [2]. Tumor cells undergo keratinization and form round nodules with concentric, laminated layers (Klatt, 2015). It is most common neoplasm affecting the bovine eye (Tiwari *et al.*, 2016) [3] and also accounts for 5% of all cutaneous tumors in dogs. They grow slowly but aggressive in nature. This type of tumor is mainly seen in the areas of the body lacking melanin. Melanin is resistant to harmful rays of the sun (Sastri & Rao, 1983) [5]. The main factor associated with its development includes prolonged exposure to ultraviolet radiation. Other causes may be chronic exposure to cancer-causing chemicals, serious burns, persistent ulcers or sores on the skin etc. Sunlight causes mutations in the DNA genome, but fail to repair the damaged DNA (Goldschmidt & Hendrick, 2008) [4]. UV radiation mainly targets tumor suppressor gene p53 which leads to causation of SCC (Leapis *et al.*, 2004) [8]. Loss of an adhesion molecule called E-cadherin induces these damaged epithelial cells to attack surrounding tissues. The onset of malignancy is also induced by weak immune system. SCC shows epidermal hyperplasia, hyperkeratosis, parakeratosis, acanthosis, accentuation of epidermal rete and keratinocyte dysplasia. The symptom shown by SCC depends on its type. There is frequent loss of the nail with secondary infection of the nail bed in case of subungual squamous cell carcinoma.

Oral squamous cell carcinoma shows signs like drooling saliva (with or without blood), difficulty in eating, and halitosis (bad breath), loose teeth, facial swelling, abnormal salivation and oral hemorrhage etc. (Goldschmidt & Hendrick, 2008) [4].

Case report and history

4.5 years old, Murrah cross buffalo of 1st parity had a mass like growth on the lateral side of metacarpal of forelimb of left leg. It was showing awkward gait and difficulty in movement. Temperature, Pulse and Respiration (TPR) was examined and was recorded as 37.5 OC, 55 per min and 15per min respectively, which were all within normal range. The owner initially noticed a growth equal to a peanut size three months ago. The mass increased in size and was easily noticeable within two months; first attempt to treat was done thereafter. Initially the tumor like growth was treated using topical application of herbal botanicals. However, no improvement was noticed. Later allopathic treatment was done. The cancerous mass on the forelimb of left leg on the lateral side of metacarpal was 5 cm in diameter and was ovoid, irregularly shaped appeared as scaly patch of skin. On scrubbing, the mass easily bled. The case was suspected as squamous cell carcinoma.

Diagnosis

Fine needle aspiration cytology (FNAC) was performed with 18 G needle. The smears were thus prepared stained with gimsea staining. On microscopic examination the scattered malignant squamous cell with dense cytoplasm of the smears revealed. Histopathological examination was performed from the tissue sample retrieved after biopsy. The analysis showed cords or nests of proliferating neoplastic cells consisting of immature polyhedral cells at the periphery and eosinophilic lamellated keratin pearls at the center. Some segment showed by proliferating cells forming cords or nests of cells separated by thin fibrous stroma. The case was thus confirmed as SCC. Comment of slide here.

Discussion

Various changes occur in the epidermal layer initiating from erythematous lesion, edema and scaling followed by crusting and thickening of the epidermis with subsequent ulceration. The superficial and deeper part of the ulcerated tumor is infiltrated of neutrophils and plasma cell and lymphocytes respectively. Various reports have been obtained on the occurrence of SCC in different species of animals in different locations. SCC is primarily seen in muco-cutaneous junctions in case of horse and cattle, pinnae and eyelids in case of cat and on head, abdomen, forelimbs and digits in case of dogs and so on. A lesion of SCC on the skin can go unnoticed until its diameter becomes large enough to be visible because there may be no noticeable symptoms aside from its appearance. If the retrieved tissue sample gives positive result on treatment with cytokeratin, then the tumor is proved to be squamous cell carcinoma. Treatment is similar to other type of cancerous condition which either involves surgical resection or drug therapy or radiation therapy.

Chemotherapy can also be added to the therapy depending on the circumstances. Chemotherapy is generally advised on those cases in which the tumors are inoperable. Various drugs can be given alone or in combinations. For eg: bleomycin, cisplatin, carboplatin, cyclophosphamide, 5 fluorouracil etc. In the present case, the tumor is located on the forelimb of left leg on the lateral side of metacarpal. The tumor lacks

invasiveness. The tumor initially appeared as a wart like structure with smaller diameter which progresses leading to the formation of cancerous ball of tissue about 5 cm in diameter. The vital function of buffalo wasn't altered except the appearance of an awkward gait. At the margins of the tumor neutrophilic infiltration was noticed under microscopic examination.



Fig 1: Buffalo showing the location of SCC

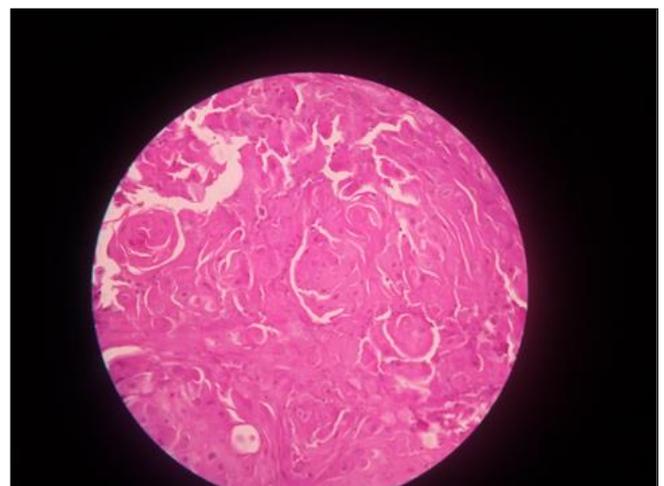


Fig 2: Histopathological slide showing irregular staining

Treatment

After chemotherapy was unsuccessful to treat the carcinoma, surgical procedure was performed. The treatment involved the standard surgical excision method. Pre-surgical treatment was performed using a local anesthetic (2% lidocaine). The maintenance dose of anesthetic was also prepared if the surgery extends for long time. The entire tumor with a border of healthy tissue was removed. The incision was closed with stitches and the tissue was sent to a laboratory for histopathological examination. Post operatively antibiotic gentamicin @ 4 mg/kg BW was administered for 5 days along with analgesics like Meloxicam @ 0.5mg/kg BW. Owner was also advised for topical application of ointment like betadin {polyvidone-iodine (poly (1-vinyl-2- pyrrolidone) iodine complex} regularly twice a day. The ointment possesses antiseptic property, insect repelling property and promotes wound healing. Stitches were removed 8 days later. The follow-up treatment was carried out for about two weeks to see the progress of healing of wound which showed satisfactory improvement.

Conclusion

Squamous cell carcinoma is a common type of skin cancer arising from epidermis. Sunlight is the main reason behind the occurrence of SCC. Occurrence of SCC can be minimized by reducing the exposure of animals to scorching sunlight. It can be done by allowing the animal to graze only during early morning and late afternoon. Young calves are at higher risk to SCC than adult animals. Animals suffering from genetic diseases like albinism are more prone to SCC. Regular examination of epidermal layer is essential to detect any abnormalities on the skin and to provide with immediate and effective treatment. New advancements are being carried out in the field of molecular genetics which will help to detect the significant abnormalities in the tissue specimen leading to the development of SCC.

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