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## Pathological studies and therapeutic management by vincristine sulphate for oral tumours in bovine

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### Abstract

Oral tumour may arise at different sites of the oral cavity with diverse predisposing factors, prevalence and treatment outcomes. Tumours of odontogenic origin in domestic animals are rare but interesting tumours that present several challenges to accurate diagnosis. The present study was carried out on eight cattle and buffaloes had tumorous growth in oral cavity. Radiographic examination was helpful to observe the invasiveness of tumour, osteolytic changes, teeth displacement, calcification or any other changes. Histopathological examination revealed oral tumours in bovine were benign in nature and fibroma was the most common tumour. Vincristine sulphate was used at the dose rate of 0.75mg/m<sup>2</sup> body surface area intravenously at weekly interval for 4 to 6 times for treatment of these oral tumours. Supportive therapy included administration of liver tonics, vitamin C and B-complex in routine doses. Only two animals showed recovery which had small size tumorous growths of fibroma origin. The results showed that vincristine sulphate alone as a chemotherapeutic agent may give promising result in small size tumorous growth from fibroma origin but large tumorous growth should be debulked by surgery before chemotherapy.

**Keywords:** Bovine oral tumour, vincristine sulphate, fibroma and ameloblastoma

### Introduction

Tumours of odontogenic origin in domestic animals are rare and difficult for accurate diagnosis; though rare in all species, they are the common neoplasms in cattle [1]. Ameloblastoma is the most frequently encountered odontogenic tumour that exhibits different histologic patterns. It is known for its local invasiveness and a high tendency to recur. On the contrary, adenomatoid odontogenic tumour, a relatively rare tumour is a benign, nonaggressive tumour with a limited growth and no tendency to recur [2]. Monotherapy with vincristine sulphate is considered to be effective for tumours, but treatment time until complete clinical remission may vary [3]. Mechanism of action of vincristine sulphate has been related to the inhibition of microtubule formation in mitotic spindle, resulting in an arrest of dividing cells at the metaphase stage [4]. Side effects of vincristine sulphate are mainly hypersensitivity, nausea, constipation, vomiting, sensory impairment, polyuria and dysuria [5]. Surgical intervention along with vincristine sulphate gave better result in fibroblastic and malignant form of sarcoids in equine [6]. Hence the present study was designed to observe the efficacy of vincristine sulphate in bovine oral tumours.

### Materials and Methods

The present study was conducted on eight cattle and buffaloes had tumours of different origin in oral cavity presented to Veterinary Clinical Complex, LUVAS, Hisar. For radiological examination large animal X-ray machine having maximum mA of 600 and KVP of 150 was used. Radiographic examination was helpful to observe the invasiveness of tumours, osteolytic changes, teeth displacement, calcification or any other changes. The animals were treated by administering vincristine sulphate at the dose rate of 0.75mg/m<sup>2</sup> body surface area intravenously at weekly interval for 4 to 6 times. Supportive therapy was also included with administration of liver tonics, vitamin C and B-complex at routine doses. The cases were followed during the entire course of the treatment and it was observed whether cases respond completely or not. The representative tissue samples were collected and fixed in 10% buffered formalin for immunohistochemical studies. After proper fixation the samples were subjected to routine histopathological examination by conventional procedure [7].

**Results**

The details regarding age, sex, site of tumour and histopathological findings of the animals are described in Table 1. The results revealed that the age of affected animals with oral tumourous growth between three to nine years. All the affected animals were female except one male. Clinically, tumourous growths were present at different regions of the

oral cavity in bovine (Fig. 1). Radiographic examination revealed osteolytic changes in four animals, tooth displacement in two animals, calcification in four animals and soft tissue swelling in seven animals. In one animal there was prolapsed of dental pulp as a continuation of growth and the tooth was much enlarged in size with osteolytic changes (Fig 2).

**Table 1:** Description of cases of bovine oral tumours

Sr. No.	Animal species	Age (Years)	Sex	Site of growth	Diagnosis based on histopathological finding
1	Buffalo	3.5	F	Rostral mandible	Fibromyxoma
2	Buffalo	6	F	Right mandibular gingiva	Ameloblastoma
3	Buffalo	6	F	Left maxillary gingiva	Ameloblastoma with myxoma
4	Cow	3.5	F	Rostral mandible	Fibroma with actinomycotic granuloma
5	Bullock	6	M	Left mandibular gingiva	Ameloblastoma
6	Cow	9	F	Left mandibular gingiva	Fibroma tendency toward fibrosarcoma
7	Buffalo	4	F	Right and left cheek	Fibroma
8	Cow	3	F	Rostral mandible	Fibroma tendency toward fibrosarcoma



**Fig 1 (A-B):** Gross picture of tumourous growth in oral cavity of cattle and buffalo.



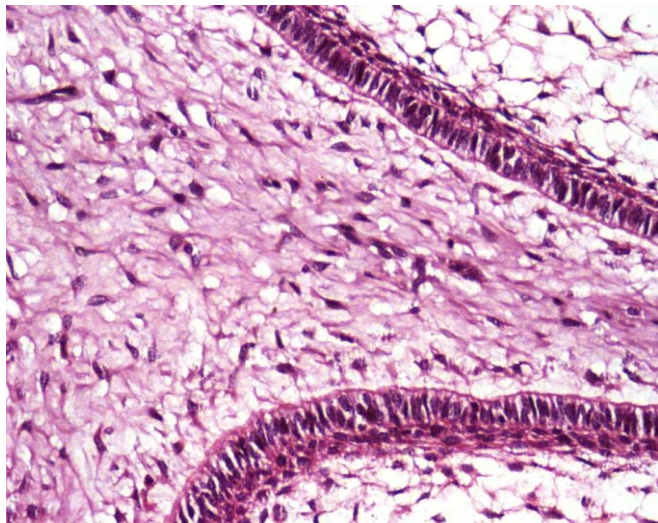
**Fig 2:** Radiograph showing prolapsed of dental pulp in enlarged incisor tooth along with osteolytic changes with tooth displacement in the rostral mandible

Histopathological examination revealed that fibroma, ameloblastoma and myxoma are the most common tumours in bovine oral cavity. Some of the tumours were mixed in origin like fibromyxoma.

**Ameloblastoma**

Microscopically, ameloblastoma revealed islands of odontogenic epithelium surrounded by a fibrous connective tissue stroma. Neoplastic cells were lined up in a palisade

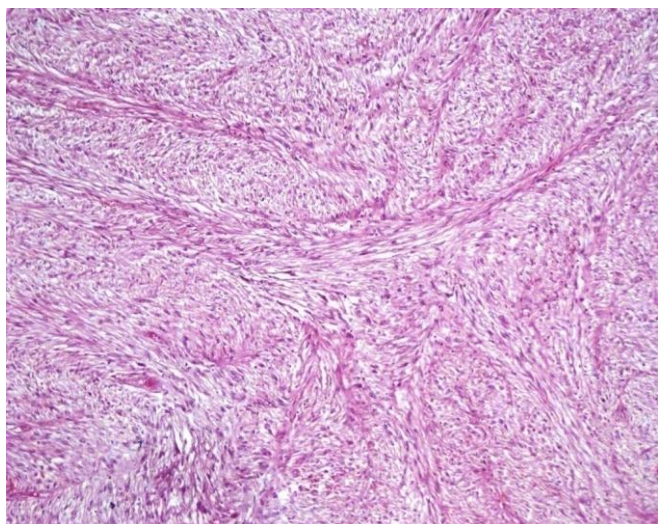
fashion while inside cells were arranged in different directions. Tumour cells were columnar in shape having elongated hyperchromatic nuclei with indistinct cytoplasmic outlines (Fig 3).



**Fig 3:** Oral cavity tumour growth showing peripheral layer of columnar cell with elongated nuclei enclosing multiple cells resembling stellate reticulum of the enamel organ characteristics of ameloblastoma (H&E 400X)

#### Fibroma

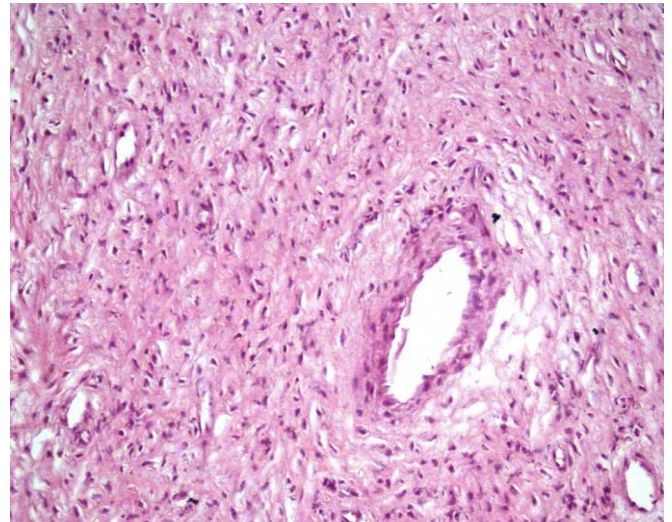
Microscopically, fibroma was characterized by interlacing bundles of fibrocytes accompanied with collagen fibres. At places fibres were arranged in whorl like structures. Neoplastic cells were spindle shaped with ovoid to elongated nuclei (Fig 4).



**Fig 4:** Oral cavity tumour growth showing whorls and interlacing bundles of fibroblasts and collagen fibres characteristics of fibroma (H&E 100X)

#### Myxoma

Microscopically, the tumour section was poorly cellular and had abundant light blue stained amorphous ground substance. Neoplastic cells were either large stellate triangular or rounded fibroblasts with prominent vesicular nuclei and small nucleoli. These cells were characterized by presence of prominent cytoplasmic processes forming a meshwork (Fig 5).



**Fig 5:** Oral cavity tumour growth showing stellate cells dispersed in abundant mucoid ground substance characteristic of myxoma (H&E 200X)

#### Therapeutic efficacy

Animals were treated by administering vincristine sulphate, at the dose rate of 0.75mg/m<sup>2</sup> of body surface area intravenously for 4 to 6 times at interval of one week. Supportive therapy included administration of liver tonics; vitamin C and B-complex. Out of these eight animals, two animals recovered completely and five cases shown no or partial recovery while one case died during the course of treatment. Death occurred mainly because of anorexia. Inappetence to anorexia condition was seen in all the animals. Two animals who recovered had tumours of small size fibroma origin. Other mixed tumours, ameloblastoma and fibroma tendency toward fibrosarcoma showed no or partial recovery.

#### Discussion

In the present study, radiographic examination revealed tooth displacement in 25%, osteolytic changes in 50% and calcification in 50% oral tumourous growth. Displacement of neighbouring teeth due to tumour expansion is much more common than root resorptions in oral tumours and peripheral lesions may show some erosions of the adjacent cortical bone [8]. Radiographic findings in metastatic tumours to the jaw may range from the absence of any manifestation to a lytic or opaque lesion with ill-defined margins [9]. Calcified deposits are seen in approximately 78% of adenomatid odontogenic tumour [10]. Fibroma was the most common tumour observed in oral cavity of bovine followed by ameloblastoma and myxoma. Fibroma was the most common tumour of the oral cavity of bovine in a retrospective study of bovine tumours in between 2004-14 in Haryana state [11]. In the present study small size fibroma shows respond to vincristine sulphate treatment and there was no recovery in mixed tumours, ameloblastoma, myxoma and fibroma tendency toward fibrosarcoma. Intralesional vincristine sulphate and prednisalone injections were found effective for the treatment of squamous cell carcinoma in a puma [12]. Chemotherapy drugs can be administered as a sole treatment to small size of tumour, but it is recommended that larger lesions are surgically debulked prior to drug treatment [13, 14]. Therefore, wide resection of the jaw in accordance with the treatment of malignant tumours is usually recommended for ameloblastoma.

The present study concluded that most of the oral tumours in cattle and buffaloes are benign in nature and fibroma is the most common tumour. Vincristine sulphate alone as a chemotherapeutic agent may give promising result in small size tumourous growth but for large tumourous growth surgical intervention is required.

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