

## Ameloblastic Fibro-Odontoma in a Bovine

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### ABSTRACT

**Background:** Ameloblastic fibro-odontoma is a benign tumor derived from odontogenic epithelium and mesenchymal tissue, which forms enamel and dentin. It is a rare neoplasm in all species. One of the most common sites for their occurrence is the anterior mandibles. The prevalence of this odontogenic tumor is higher in young animals and only few cases are described in cattle. The purpose of this article is describe the clinical, surgical and the histopathological characteristic of a fibro-odontoma case in a Jersey Cow.

**Case:** A 3-year-old Jersey cow was presented with a progressively growing mass in the anterior mandible displacing the incisor teeth. The mass measured approximately 12 cm diameter and there was a focal area of myiasis. The owner reported weight loss and eating difficulties. The animal was treated with antibiotics for a few weeks but the conservative treatment failed, and the heifer underwent surgical removal of the lesion. The tumor was sent for histopathological evaluation at UFPR-Palotina Pathology laboratory. Microscopically, the excised mass was poorly delimited, and was composed of tumor cells of mesenchymal and epithelial origin which infiltrated and compressed surrounding tissues. Neoplastic cells were arranged in bundles which multifocally formed dental sacs (dental follicles) of various sizes. These dental sacs were formed by neoplastic ameloblasts, and were surrounded by abundant fibrous connective tissue. The central zone of the tumor consisted of a loose, vacuolated neoplastic stellate reticulum. Mitotic figures were rare, and there was moderate anisokaryosis. In some areas, neoplastic ameloblasts surrounded the stellate reticulum. The presence of a sparse, well-organized basophilic extracellular matrix produced presumably by the tumor cells and interpreted as dentin. These microscopic characteristics led to the diagnosis of an ameloblastic fibro-odontoma. The heifer made a full recovery after surgical removal of the mandibular mass.

**Discussion:** Although rare in all mammalian species, ameloblastic fibro-odontoma is the most common odontogenic tumor in cattle. There are also reports of this neoplasm in humans, cats, horses, sheep, nonhuman primates and rats. Despite being benign these neoplasms may be infiltrative or expansile which make them difficult to be surgically removed. Similar to observed in this case the most majority of these tumors occurs in the anterior mandibles of young cattle of either sex. The ameloblastic fibro-odontoma is a variant of ameloblastic fibroma in which mineralized tissue is absent. Ameloblastic fibro-odontoma is a tumor formed by odontogenic epithelial and mesenchymal tissues which form enamel or dentin (or both). The presence of enamel helps the pathologist to diagnose an ameloblastic fibro-odontoma by histopathology in the slides. Surgical excision of the neoplasm with wide margins should be performed in order to reduce the risk of local recurrence of this tumor, and when well executed they are curative. In this animal there was no recurrence of the neoplasm after a 16-month follow-up. Ameloblastic fibro-odontoma, other odontogenic neoplasms, inflammatory lesions due to infectious agents such as bacteria and fungi, and congenital lesions should be considered in the differential diagnosis of young cattle presented with localized swelling of the maxillae or oral cavity.

**Keywords:** odontogenic epithelium, neoplasia, bovine.

## INTRODUCTION

Neoplasms originating from odontogenic tissues are rare in all domestic species. Such tumors may arise from the odontogenic epithelium or from the odontogenic mesenchymal (embryonic) tissue in the maxillary bone or gingival tissues. The histological classification of these neoplasms relies on the identification of these cell types and microscopic patterns [9]. Ameloblastic fibro-odontoma is a benign tumor derived from odontogenic epithelium and mesenchyme, with formation of enamel and/or dentin. It is rare in all species but the most common odontogenic neoplasia of cattle. Humans, cat, dog, horse, sheep, non-human primates and rat are affected by this neoplasia [4,7,13]. Affected animals are usually young, with age ranging from newborns to 2,5 years gender predilection has not being observed [3].

We report a case of ameloblastic fibro-odontoma in a 3-year-old Jersey heifer referred to the local university veterinary hospital with a small, localized mass in the mandible.

## CASE

A 3-year-old Jersey heifer referred to the local university veterinary hospital with a small, localized mass in the mandible. According to the owner, the mass was slow growing, and the heifer was losing weight due feeding difficulties. This lesion was treated with antibiotics. However, the animal did not respond to this therapy.

Two months later, the animal returned to the hospital as the condition worsened. The mandibular lesion had markedly increased in size. The tumor measured approximately 12 cm diameter, protruded through the jawbone and the gingiva, presented multifocal ulceration, firm consistency and teeth were displaced peripherally to the mass; there was a focal area of myiasis. There was bilateral involvement of the incisors (Figure 1A). The animal underwent bilateral rostral mandibulectomy, and the excised mass was submitted to the Laboratory of Veterinary Pathology at the Federal University of Paraná (UFPR), Palotina campus, in the city of Palotina, State of Paraná, south Brazil, for histopathological analysis. Grossly, this mass measured approximately 12 cm in diameter, was firm, multifocally ulcerated, and had a localized area of myiasis. The both incisor tooth was missing and the lateral incisors were displaced to the periphery of

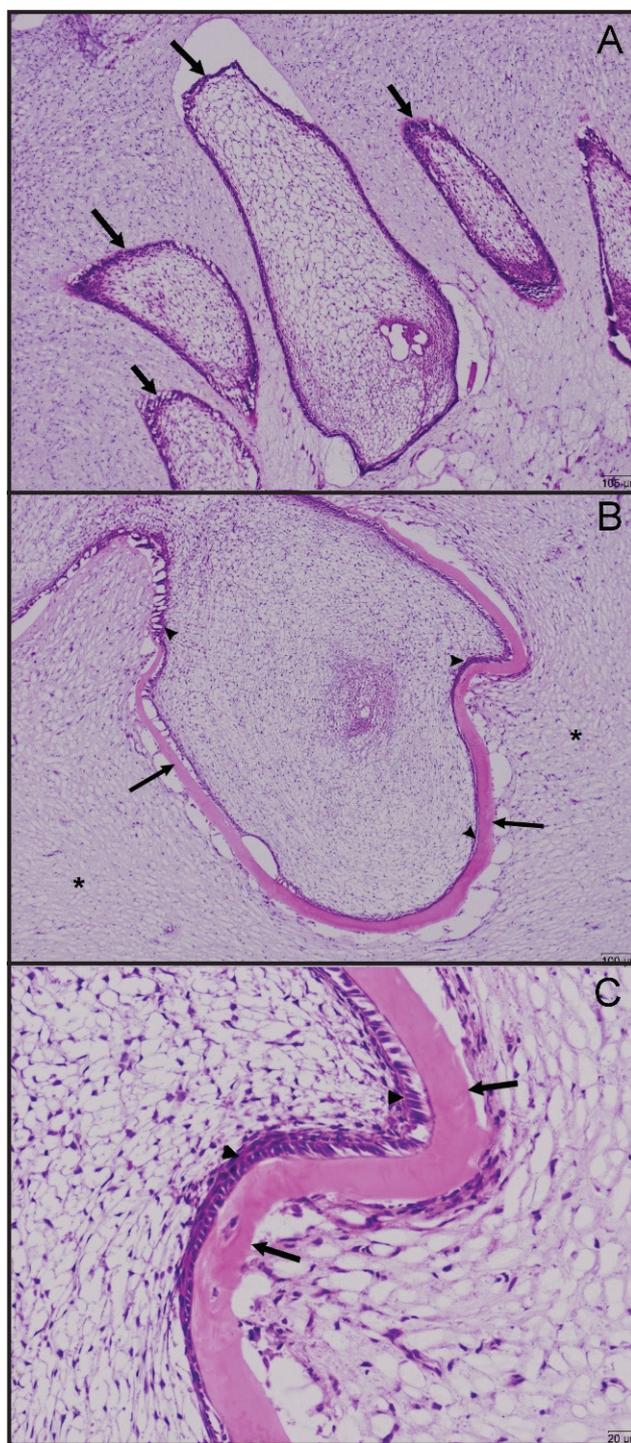
the mandibular mass. On cut surface, this mass was whitish and had multiple cystic spaces measuring between 0.5 cm and 1 cm in diameter alternating with solid, firm areas.

Samples of this mass were fixed in 10% formalin, decalcified in 10% formic acid, routinely processed for histopathological examination, and stained with hematoxylin and eosin. Microscopically, this mass consisted of neoplastic mesenchymal and epithelial cells originating from odontogenic tissues. This tumor was poorly encapsulated and infiltrative. There was compression of the adjacent bone and skeletal muscle by the tumor with architectural distortion of the alveolar bone and supporting structures. In most areas, neoplastic cells were arranged in bundles which multifocally formed irregular dental sacs (dental follicles) of various sizes (Figure 2A). Neoplastic ameloblasts formed these dental sacs which were surrounded by abundant fibrous connective tissue. A loose, vacuolated neoplastic stellate reticulum was present at the central core of the mass (Figure 2B). These stellate cells had indistinct, eosinophilic, scanty cytoplasm, and elongated, basophilic nuclei with loose or condensed chromatin and indistinct nucleoli. Mitotic figures were rare, and tumor cells displayed moderate anisokaryosis. Spindle-shaped neoplastic ameloblasts were arranged in a palisade. These tumor cells had moderate, eosinophilic, slightly granular cytoplasm and elongated nuclei with condensed chromatin, mild anisokaryosis, and moderate anisocytosis.

Sparse, well-organized basophilic matrix similar to enamel accumulated in some areas of the tumor. This extracellular material was presumptively



**Figure 1.** Ameloblastic fibro-odontoma in a 3-year-old Jersey heifer. Large, localized nodular mass is present in the mandible. There is displacement of the teeth to the periphery of the swelling, and multifocal ulceration of the mass.



**Figure 2.** Ameloblastic fibro-odontoma in a 3-year-old Jersey heifer. A- Multiple neoplastic dental sacs are seen in this area of the tumor. Dentin and enamel are not found (arrows). B- In other areas of the neoplasm, a neoplastic dental sac is present which is surrounded by abundant fibrous connective tissue (\*). Fibrous connective tissue consists of mineralized matrix similar to dentin (arrows) which is lined internally by neoplastic ameloblasts (arrowhead). At the center of this structure reticular connective tissue similar to normal dental pulp is noted. C- Multiple neoplastic ameloblasts are arranged in a palisade (arrowhead). The eosinophilic matrix similar to dentin (arrows) is presumably secreted by these tumor cells. These cells have moderately eosinophilic and slightly granular cytoplasm. The nuclei are elongated, with condensed chromatin. Small amounts of enamel are present in the junction between the dentin and ameloblast layer.

secreted by neoplastic ameloblasts, and was intimately associated with an intensely acellular, eosinophilic dentin (Figure 2C). Enamel and dentin were lacking in some dental sacs while in others foci of dentin were associated with small amounts of neofomed enamel. Multifocally, the adjacent alveolar bone was replaced by dense fibrous connective tissue. Additional microscopic findings included areas of osteonecrosis and bone resorption, fibrin accumulation, and presence of abundant necrotic tissue.

The heifer made a full recovery after surgical removal of the mandibular mass. The animal resumed its normal feeding habits and usual diet gradually. There was no recurrence of the neoplasm after a 16-month follow-up. This finding suggests that surgery is curative and the prognosis favorable in cases of dental neoplasms in which the tumor is completely excised.

## DISCUSSION

All tumors originating from odontogenic tissues are benign. However, these neoplasms may be infiltrative or expansile which make them difficult to be surgically removed. Depending on its location, an odontogenic tumor can cause bone lysis and tooth displacement [14] as observed in the present report. Ameloblastic fibro-odontoma is a benign tumor formed by odontogenic epithelial and mesenchymal tissues which form enamel or dentin (or both) [1]. It is a variant of ameloblastic fibroma in which mineralized tissue is absent.

Although rare in all mammalian species, ameloblastic fibro-odontoma is the most common odontogenic tumor in cattle. It usually involves the rostral aspect of the mandible, and affects animals less than 2 years of age more often. This unusual odontogenic neoplasm has been occasionally described in humans, cats, horses, sheep, nonhuman primates, and rats [1,4,7].

Ameloblastic fibro-odontomas rarely metastasize. Surgical excision of the neoplasm with wide margins should be performed in order to reduce the risk of local recurrence of this tumor [7].

Ameloblastic fibro-odontoma, other odontogenic neoplasms, inflammatory lesions due to infectious agents such as bacteria and fungi, and congenital lesions should be considered in the differential diagnosis of cattle presented with localized swelling of the maxillae or oral cavity. Neoplasms that occur in the oral

cavity of cattle include ameloblastoma, ameloblastic fibroma, ameloblastic fibro-odontoma, odontoma, and papilloma. With the exception of papillomas, all the other tumors listed above have an odontogenic origin. Squamous cell carcinomas and melanomas may also be found in the bovine mouth but are rare neoplasms in comparison with those that arise from the odontogenic epithelium or mesenchyme [14].

The different microscopic patterns of each of these dental neoplasms should be highlighted as the recognition of these patterns is important for the histological diagnosis of these tumors. Ameloblastic fibromas are formed by loose ectomesenchymal tissue whereas ameloblastomas are composed of abundant

dense fibrous stroma and a prominent epithelial component. Odontomas are organized in such a way that they resemble normal dental tissues. However, the histological differentiation between odontomas and ameloblastic fibro-odontomas is not always possible. In these challenging cases, the age of the animal may help the pathologist to reach a final diagnosis. Odontomas arise during odontogenesis whereas ameloblastic fibro-odontomas occurs after odontogenesis is complete [10].

Odontogenic neoplasms are rare in cattle. Nonetheless, they should be considered in the differential diagnosis of localized facial swellings or focal nodular lesions involving the maxillae or oral cavity.

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