SHORT PAPER

Ameloblastic Fibrosarcoma in a Bull


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Summary

This report describes a malignant odontogenic neoplasm in a 7-year-old bull. The mass, involving the right mandible, was locally invasive and destructive. Histologically, it consisted of islands and cords of benign odontogenic epithelium, entrapped in a population of malignant mesenchymal cells. These morphological features are characteristic of ameloblastic fibrosarcoma in man, an odontogenic tumour not previously described in animals.

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Odontogenic tumours occur with a much higher frequency in man than in other species. Histological classification of these tumours in veterinary medicine has been based largely on the original systems developed for human odontogenic neoplasms. Classification schemes for human odontogenic tumours have changed substantially with advances in human dental pathology (Kramer et al., 1992), but changes in classification of veterinary odontogenic tumours have progressed more slowly. Gardner (1992) suggested that odontogenic tumours in animals be classified, on the basis of their tissue of origin, as epithelial, mesenchymal or mixed epithelial and mesenchymal, in accordance with the modified version (Hoffman et al., 1987) of the classification scheme originally developed by Thoma and Goldman (1946). The purpose of this report is to describe an unusual bovine odontogenic neoplasm of mixed epithelial and mesenchymal origin, in which the epithelial component was benign and the mesenchymal component malignant.

A 7-year-old Shorthorn bull, weighing 1011 kg, was admitted to a large animal clinic, with a history of weight loss and a progressively enlarging, firm, right-mandibular mass, first noticed approximately 3 months earlier. The mass (25 cm x 17 cm) was covered externally by intact skin. It extended into the oral cavity as a granulomatous and necrotic structure, affecting mainly the buccal mucosa. The differential diagnosis included osteomyelitis due to Actinomyces bovis, tooth root abscess, fracture, and neoplasia. Radiographs of the mass demonstrated that it involved the caudal part of the body of the right mandible and contained marked areas of osteolysis, giving it a cystic appearance.
Fig. 1. Lateral radiograph of the mandible, showing soft tissue swelling associated with an area of osteolysis, giving a cavitated appearance [arrowheads].

(Fig. 1). In addition, there was significant soft tissue swelling, with little osseous proliferation.

Samples for cytological examination were obtained by making a scraping of the mass with the edge of a clean glass slide. The material obtained was spread on another slide, air dried, and stained with Wright’s stain. Material was also obtained for biopsy, but due to the firm consistency and oral location of the mass, numerous attempts were needed to obtain adequate samples. Biopsy and subsequent post-mortem samples were fixed in 10% neutral buffered formalin, processed by routine histopathological methods, sectioned (4–5 μm) and stained with haematoxylin and eosin (HE). Selected adjacent sections were also stained with a trichrome stain.

The cells obtained from the cytological scraping were spindle-shaped with considerable variation in nuclear size. Nucleoli were prominent and multiple. The cytological diagnosis was probable fibrosarcoma. Most biopsy samples contained abundant granulation tissue and necrosis. However, some samples contained moderately to densely cellular foci of haphazardly arranged stellate and spindle-shaped mesenchymal cells, separated by a variable amount of poorly stained eosinophilic ground substance. These cells had large oval to irregularly shaped vesicular nuclei with margnated chromatin and prominent multiple nuclei. The cyttoplasm was poorly stained and had ill-defined borders. Up to six mitoses were present per × 400 field. Trichrome stain revealed a small amount of collagen production. On the basis of these findings, the lesion was interpreted as a fibrosarcoma. A poor prognosis was given and the bull was humanely killed. A complete post-mortem examination was performed.

Abnormalities found at necropsy were limited to the soft and bony tissues of the right side of the face and oropharynx. The caudal two-thirds of the
right mandibular body and ramus were destroyed and replaced by a firm mass (25 × 17 cm) which extended into the surrounding soft tissues and oropharynx. The mass bulged on cut surface, was yellowish brown in colour and contained multifocal gelatinous dark-red areas of haemorrhage and necrosis. Yellow gelatinous accumulations of serum, fibrinonecrotic tracts, and bone sequestra were scattered throughout the mass and surrounding soft tissue. Dense dermal and subcutaneous fibrous connective tissue separated the mass from the intact cutaneous surface. The submandibular, tracheobronchial, and hilar lymph nodes were moderately enlarged, with a pale tan cut surface.

Samples obtained post mortem revealed that the neoplasm consisted of two different cell populations. Rare islands and branching cords of benign epithelial cells were entrapped within a malignant mesenchymal population. The islands and cords were composed centrally of well-differentiated polygonal cells and peripherally of columnar cells bordering the mesenchymal component (Fig. 2). The latter consisted of pleomorphic, haphazardly arranged cells, as seen in the biopsy specimens (Fig. 3). The enlarged lymph nodes were hyperplastic but did not contain neoplastic cells.

Odontogenic tumours are uncommon in domestic animals. The majority occur in the dog and are benign, fibromatous epulis (peripheral odontogenic fibroma) and canine acanthomatous epulis (acanthomatous ameloblastoma) being the most common forms (Dubielzig and Thrall, 1982; Gardner and Baker, 1991, 1993). There are few reports of malignant odontogenic neoplasms in dogs and cats and only rare reports in cattle (Binnington and Adkins, 1972; Rosenberger, 1974; Walsh et al., 1987; Poulet et al., 1992). The neoplasm described in this report was diagnosed as an ameloblastic fibrosarcoma, on
Fig. 3. Ameloblastic fibrosarcoma of the mandible. Most of the neoplasm is composed of haphazardly arranged malignant mesenchymal cells. Mitotic figures are common (arrows). HE. x 163.

the basis of the histological features that characterize this rare odontogenic neoplasm in man (benign odontogenic epithelium forming islands and cords, embedded in malignant mesenchyme with the appearance of a fibrosarcoma [Muller et al., 1995]). This report is the first description of an ameloblastic fibrosarcoma in a species other than man. The invasive malignant mesenchymal portion of this neoplasm contrasts with the benign mesenchyme previously described in ameloblastic fibromas in human beings and cats, and in a calf (Gorlin et al., 1961, 1963; Dubielzig et al., 1979; Walsh et al., 1987; Kramer et al., 1992; Poulet et al., 1992). A review of human ameloblastic fibrosarcomas (Muller et al., 1995) revealed that many develop in ameloblastic fibromas and emphasized the importance of wide surgical excision and regular clinical and radiological follow-up. Malignant transformation in an ameloblastic fibroma may have occurred in the neoplasm described in the bull in the present report. However, the lesion was examined too late in the course of the neoplastic process for this to be determined. Veterinary clinicians and pathologists should be aware that malignant transformation of ameloblastic fibromas may occur in animals; they should carefully examine the borders of such lesions and plan regular follow-up examinations.

References


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