THE COMPUTED TOMOGRAPHIC APPEARANCE OF A GIANT CELL TUMOR AFFECTING THE MANDIBLE IN A PYGMY GOAT

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Abstract

A 3-year old male neutered pygmy goat presented for evaluation of a progressive mandibular swelling and inappetence. A computed tomographic (CT) scan of the head and thorax was performed under general anaesthesia. CT revealed an extensive multiloculated, markedly expansile lesion within the right hemimandible, which involved the articular surface of the temporomandibular joint. The goat was euthanased due to a poor prognosis and postmortem examination confirmed the diagnostic imaging findings. Histopathology was strongly suggestive of a multinucleated giant cell tumor, therefore this condition should be considered in goats presenting with expansile mandibular mass lesions.

Signalment, history and clinical findings

A 19.7 kg, three year old, male neutered pygmy goat presented to the Farm Animal Clinical Centre at the Royal Veterinary College (UK) for evaluation of a bilateral mandibular swelling which had been present since the owner purchased the animal 7 months prior to presentation. At the time of purchase the goat was seen to have a mild visible swelling to the rostral aspect of the right mandible. This swelling progressively enlarged, this being most evident in the 4 weeks prior to presentation. Episodes of oral haemorrhage were reported in addition to a malodorous smell and superficial skin sores, and the animal became progressively inappetent with slight weight loss (body condition score 4/9), Antimicrobial therapy (Ceftiofur sodium, 2.2 mg/kg bwt i.m. BID, Excenel, Zoetis UK Limited, London, UK), resulted in no change in the rate of mass enlargement or improvement in appetite.

On oral examination a malodorous and well defined soft tissue mass, approximately 3cm x 4cm was present at the right rostral aspect of the mandible, and showed cutaneous erythema and crusting. Palpation of the vertical and horizontal rami of the mandibles revealed enlargement, and the goat resented palpation. There was slight right mandibular and retropharyngeal lymphadenomegaly.

Imaging, diagnosis and outcome

The patient was anaesthetised and placed in sternal recumbency on the patient table of a 16 slice multidetector CT scanner (GE Healthcare, Lightspeed Pro 16, GE Medical Systems, Berkshire, UK) using the following technical parameters; 80

kV, 160 mAs, 1.25 mm slices with an interslice gap of 1.25 mm, tube rotation of 0.8 seconds, pitch of 0.56 and a helical acquisition. The field of view was set using a scout scan at 25 cm. Images were obtained and reconstructed using a bone and soft tissue algorithm and a matrix size of 512 x 512. Intravenous contrast media was not administered in this case.

CT images identified an extensive, multiloculated and multifocal expansile soft tissue mass lesion located within the right hemimandible mandible both rostral and caudal to the cheek teeth. The right first incisor was absent and the remaining incisors were misaligned, with the mass causing destruction of the alveolus and periapical bone surrounding the right incisor teeth, though remaining teeth retained normal internal structure. The right mandible was grossly misshapen rostrally with irregular margins, and the rostral right premolar teeth were slightly displaced. The soft tissue filled cavities located predominantly rostral and caudal to the cheek teeth were homogenously attenuating (average 50HU). Caudal to the mandibular cheek teeth the medullary cavity of the right mandible was widened, with marked expansion, cortical thinning, and irregular outlines to the mandibular condyle. The lateral cortical bone of the right hemimandible was markedly thin caudal to the cheek teeth and there was a focal region of absent bone plate ventral to the right temporomandibular joint. The articular surface and subchondral bone of the right mandibular condyle was poorly defined and irregular in contour, in places appearing incomplete (Fig 1-3). There were ill-defined heterogeneous regions of bone and soft tissue attenuation within the caudal aspect of the left hemimandible, and multiple gas bubbles within this, consistent with impacted

feed material. There was a cortical bone defect along the lateral aspect of the left hemimandible, caudal to the molar teeth.

In addition there was a small volume of soft tissue attenuating material in the left tympanic cavity. There was slight symmetric enlargement of the mandibular lymph nodes and retropharyngeal nodes, measuring approximately 10 mm in maximal diameter. The thorax was considered normal.

The lesions identified fit the criteria to be categorized as an aggressive bone lesion, therefore due to the extensive and progressive nature of the lesions, the most likely differential diagnoses were considered to be neoplastic, with an infectious aetiology less likely. Additionally, due to the extensive nature of the lesions identified, and the involvement of the right temporomandibular articulation, appropriate surgical resection was not considered possible. A wedge biopsy of the lesion in the rostral mandible was obtained under sedation, which was suggestive of a multinucleated giant cell neoplasm. A poor prognosis was conferred and therefore the owners elected that the goat be humanely euthanased.

At necropsy there was an approximately 3cm x 4cm soft tissue mass located to the right of midline on the rostral aspect of the mandible with haemorrhagic surface ulcerations. On sectioning, the right rostral mandibular bone was disintegrated and replaced by soft cavitative brown tissue. A further approximately 5cm mass was confirmed within the right mandible extending dorsally into the temporomandibular joint. The mid left mandible was thickened,

firm and had green roughage impacted in a pocket caudal to the last left molar tooth. The right sub-mandibular lymph node was slightly enlarged. Necropsy findings correlated well with CT findings.

Histopathological examination of samples obtained from the right mandible revealed two predominate populations of cells; dense spindle shaped cells in a streaming pattern and numerous and bizarre multinucleated giant cells (Fig 4). The multinucleated giant cells, contained between 2 and 20 nuclei with varying numbers of nucleoli. There were very few mitoses present. Histological diagnosis was consistent with a giant cell tumour of the mandible. There was no indication of neoplastic spread to lymph node or lungs. Sections obtained from the caudal aspect of the left mandible were interestingly not suggestive of neoplastic aetiology, instead suggestive of inflammatory changes, most likely secondary to an abscess.

Discussion

Multinucleated giant cell tumors affecting the mandible are rare in all domestic species and humans[1], and to the authors' knowledge this is the first reported case of this type of lesion in the goat. The use of CT in this case enabled an accurate depiction of lesion characteristics and lesion extent, this allowing the lesions to be categorized as expansile and aggressive. The ability of CT to rule out more benign conditions for example periapical infection was critical for patient management and establishing decision criteria for euthanasia. In the goat, previously reported mandibular and maxillary neoplasia include adenocarcinoma,[2] ossifying fibroma,[3] lymphosarcoma,[4] osteoma,[5] nasal papillary

adenoma,[6] and non-ossifying fibroma,[7] conditions which must also be considered as differential diagnoses for potentially neoplastic masses in this location.

Previous reports in the human literature include the case of a giant cell lesion of the jaw in a child.[1] It is possible from the histopathological descriptions that the terms “giant cell granuloma” and “giant cell lesion” are synonymous with that described here, and may reflect a similar, if not the same pathological process. It should be noted that in the human field the aetiopathogenesis remains unclear, however it has been established that epithelioid macrophages that define a granuloma are not present in giant cell tumors. This differentiation aided in the classification of the lesion as a giant cell tumor. In people, giant cell granuloma lesions often present as unilocular lesions which subsequently develop into a multilocular structure which thus may appear similar to that described in this goat.[8] Conservative and radical surgical techniques have been applied to types of human giant cell granuloma lesions but nonetheless have been associated with recurrence, and serious facial mutilation and loss of dentition.[1]

Other conditions that have been documented to manifest within the caprine mandible include primary dental disease, actinomycosis (lumpy jaw) and fibrous osteodystrophy secondary to hyperparathyroidism.[9] In our institution, pygmy goats most frequently presenting for conditions of the head are as a result of dental disease with additional secondary pathology. This case report suggests that alternative pathological processes can occur in these species and that an additional differential diagnosis for an expansile lesion such as that depicted here should include a giant cell tumor. Advanced tomographic imaging e.g. CT,

was found to be an excellent diagnostic tool to evaluate the extent of the lesion depicted here and the authors advocate its use in such cases. The use of intravenous iodinated contrast media may have facilitated lesion characterization and could be considered in future patients.

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201

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Figure Legends

Figure 1: Dorsal plane maximum intensity projection (MIP) computed tomographic image depicting the multiloculated, markedly expansile lesion within the right mandible (white arrows).

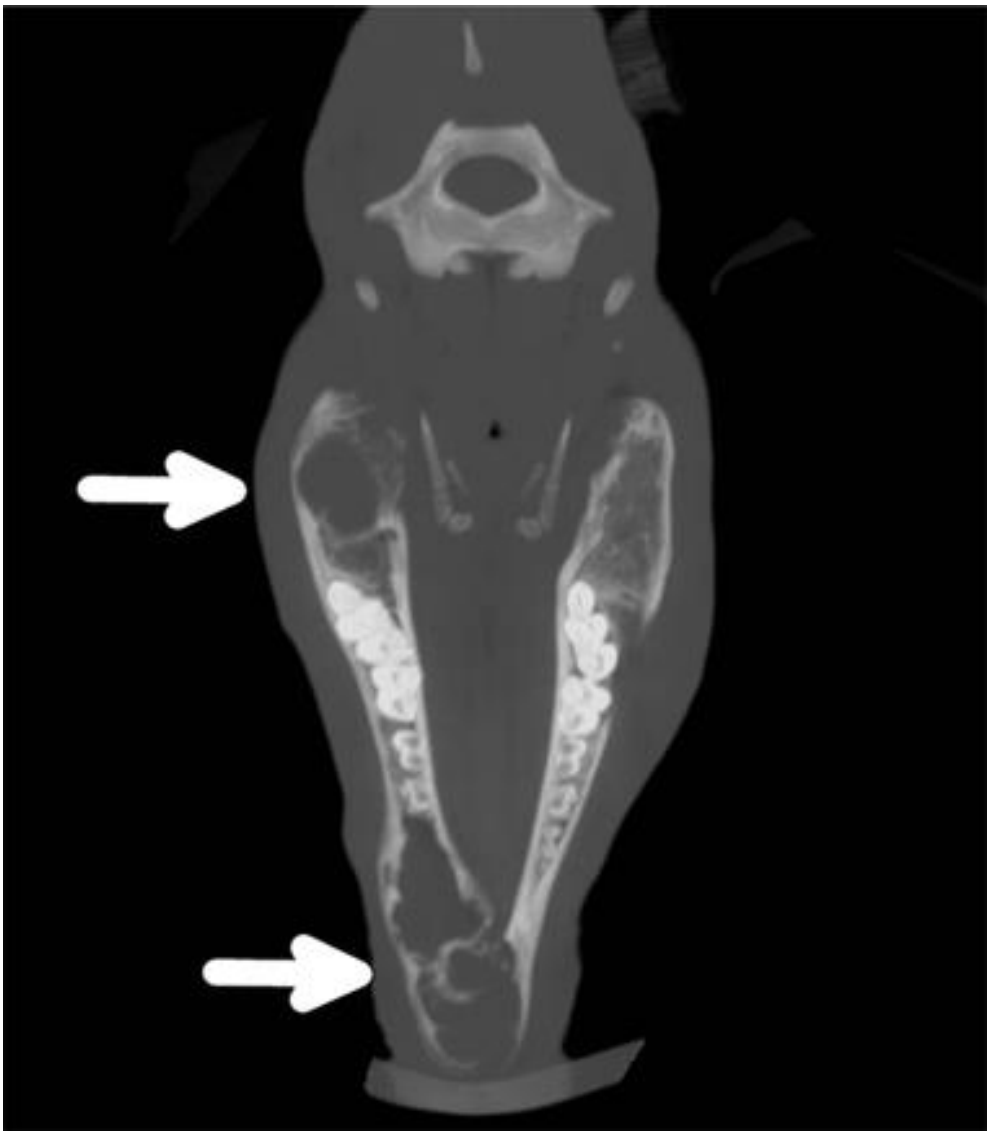

Figure 2: Transverse MIP computed tomographic image at the level of the temporomandibular joints depicting the markedly expansile lesion causing enlargement of the right mandibular ramus and lack of normal contour to the right mandibular condyle at the level of the temporomandibular joint. There is a cortical bone defect located laterally in the vertical ramus.

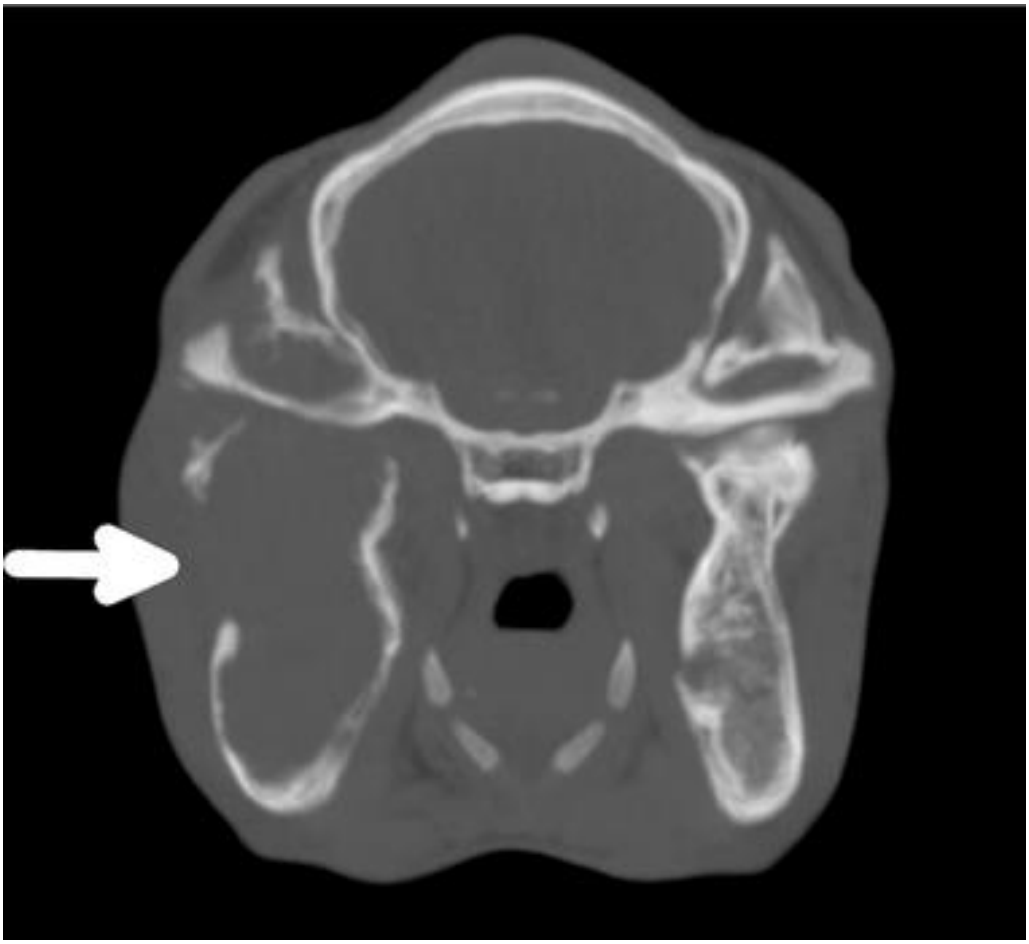

Figure 3: 3D volume rendered computed tomographic image viewed from the right depicting the skull lesions present within the rostral and caudal mandible.

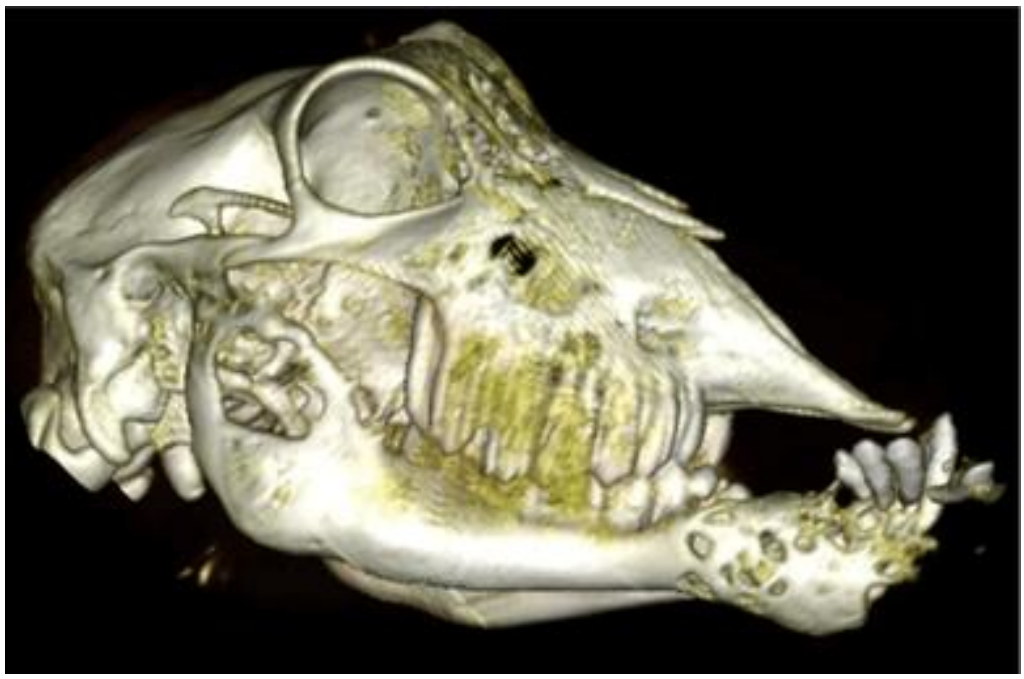

Figure 4: Histopathological section of the mandibular mass (H& E stained; x 400 magnification): moderately cellular neoplasm consisting of dense spindle shaped cells and numerous and bizarre multinucleated giant cells that are diffusely distributed throughout the mass.