Cone beam computed tomography findings in a case of plexiform ameloblastoma

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Ameloblastoma is a fairly common and highly aggressive odontogenic tumor of epithelial origin. It is primarily seen in adults in the third to fifth decade of life. Radiographically, it appears as an expansile lucency with thinned and perforated cortices. It is known to cause root resorption. Because it shares common radiographic features with other lesions, definitive diagnosis is made through histopathologic analysis. This case demonstrates the use of cone beam computed tomography in the differential diagnosis of a large plexiform ameloblastoma in a 29-year-old man. The extent of the lesion and the effect on adjacent structures can be discerned from the images. Additional features seen on these images can aid in the diagnosis. This imaging modality is also useful in surgical planning.
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Ameloblastoma is a fairly common and highly aggressive odontogenic tumor of epithelial origin. Its typical radiographic appearance places it in the differential diagnosis for many cysts and other benign tumors of the jaws. Diagnosis is usually confirmed through radiographic appearance, clinical behavior, and, most definitively, biopsy of the lesion. Ameloblastoma affects males and females similarly.[1]

According to Dunfee et al, a small percentage of ameloblastomas in the mandible demonstrate a potential for malignant transformation, the capacity of which may be indicated by features such as solid components, destruction of cortical borders, and extension of the lesion beyond the bone.[2]

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"Ameloblastoma arises from the enamel-forming cells of the odontogenic epithelium that have failed to regress during embryonic development."[2] The radiographic appearance of these lesions varies from the characteristic soap bubble loculations, to unicystic and multicystic radiolucencies, to subtle appearances such as expanded follicles of erupting teeth and small lesions within the wall of dentigerous cysts. The most common location is the posterior mandible, associated with impacted third molars and follicular cysts.[2] However, ameloblastomas can be found elsewhere in tooth-bearing regions. It has been observed that in blacks, ameloblastomas occur more frequently in the anterior regions of the jaws.[3] Anterior lesions may cross the mandibular midline. The ratio of mandibular to maxillary lesions is 5:1.[3] Ameloblastomas of the mandible are detected, on average, 12 years earlier than those found in the maxilla.[3] There are several subtypes of ameloblastomas. These must be distinguished by biopsy, as the radiographic appearances cannot be differentiated.[2] Most cases of ameloblastoma occur in the third to fifth decade of life. However, it is not uncommon to see ameloblastomas at any age from the second decade onward.

Fig 1 Lateral view of the patient at time of presentation showing the fullness of the lower face.

Fig 2 Intraoral view of the lesion.

The availability of cone beam computed tomography (CBCT) allows clinicians to appreciate the 3-dimensional architecture of the lesion to a greater extent than plain-film imaging such as panoramic, lateral cephalometric, and anteroposterior projections. CBCT can provide only hard tissue findings. To identify soft tissue spread of the lesion beyond the bony structures, magnetic resonance imaging (MRI) and medical CT with contrast and viewed in soft tissue windows may be indicated.[2] CBCT may be useful in distinguishing the subtype of desmoplastic ameloblastoma, because it contains coarse internal calcifications, as well as destruction of the surrounding cortices.[2] A case of a multilocular ameloblastoma in a 29-year-old man is reported.

CASE REPORT

The patient presented to the Columbia University College of Dental Medicine with the chief complaint of swelling of the anterior region over a 3-year period (Figs 1 and 2). An initial panoramic radiograph demonstrated a lesion in the patient's mandible extending from the left molar region to the right premolar area (Fig 3). A CBCT examination was performed using an I-CAT CBCT machine (Imaging Sciences International). The CBCT panoramic reconstruction demonstrated expansion and thinning of the mandibular cortex inferiorly (Fig 4). Superiorly, the cortex was unevenly expanded. The teeth in the region of the lesion were displaced, and more notably, the roots had resorbed to a great extent. The lamina dura of these teeth was effaced. Anteriorly and posteriorly, the borders were generally smooth, well-defined, and partially corticated. Internally, the lesion was uniformly low attenuating, consistent with soft tissue density. The axial views demonstrated incomplete septae (see Fig 4). The axial, sagittal, and lateral cephalometric maximum intensity projection views (Figs 5 to 7) demonstrated the expansile nature of the lesion, with thin, perforated bony cortices on both the buccal and lingual aspects of the lesion.

Fig 3 Conventional panoramic view demonstrating the lesion.

Fig 4 CBCT panoramic reconstruction showing the lesion.

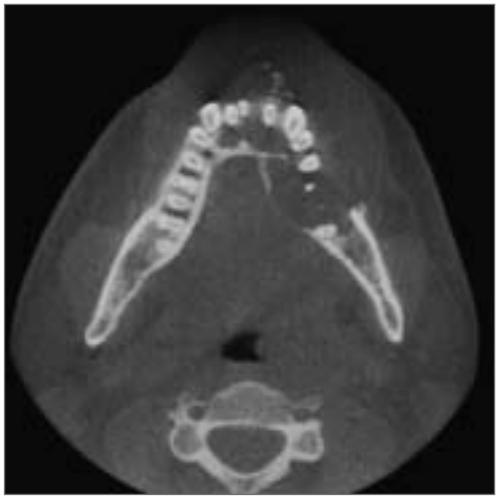

Fig 5 Axial CBCT view at the level of the mandible demonstrating expansion, thinning, and perforation of the buccal and lingual cortices, displacement of the teeth in the region, and incomplete septae.

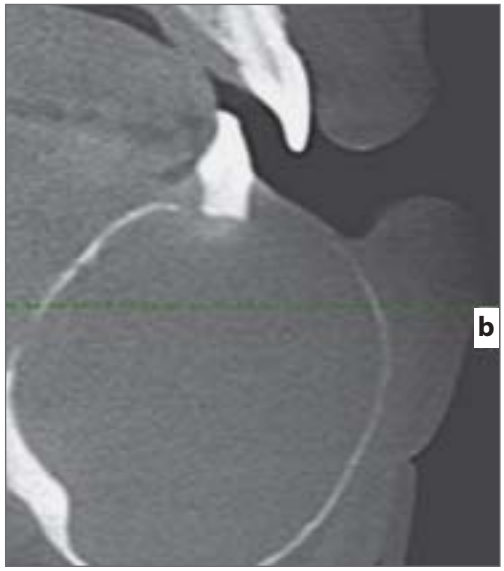

Fig 6 Sagittal cropped CBCT view anteriorly demonstrating thinning and expansion of the cortices, as well as resorption of the root apices (b, buccal).

Fig 7 Lateral CBCT maximum intensity projection hints at the 3-dimensional nature of the lesion and demonstrates the thinned and perforated cortical outlines.

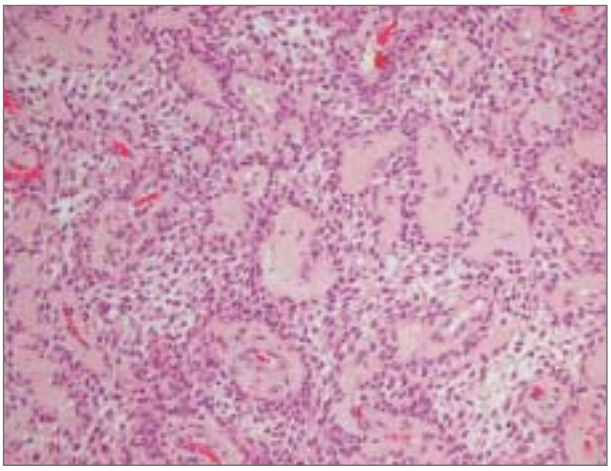

Fig 8 Photomicrograph demonstrating anastomosing sheets and cords of odontogenic epithelium displaying a stellate-reticulum-type pattern (original magnification ×20).

Histologic appearance of the lesion was consistent with plexiform ameloblastoma. (Fig 8). Microscopic evaluation revealed a tumor composed of anastomosing sheets and cords of odontogenic epithelium. The epithelium displayed a stellate-reticulum–like appearance. The bordering cells were columnar in shape, and reversed polarity was focally seen.

A wide margin excision and reconstruction was planned. Follow-up clinical and radiographic examinations are essential, as ameloblastoma has a high recurrence rate. Three-dimensional imaging permits the clinicnian to view the extent of the lesion, as well as its effects on adjacent structures Advanced imaging has the potential to provide improved diagnosis and superior surgical treatment planning.

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