Head and neck radiology

Imaging of maxillomandibular ameloblastoma

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Abstract. Between 1985 and 1993, 19 cases of ameloblastoma of the jaw and mandible were studied with conventional radiography, CT, and MRI. They included 15 primary and 4 recurrent tumors, 15 in the mandible and 4 in the maxilla. Features of the lesions were studied and findings from different modalities were compared to determine the relative advantages of each. Although plain films were adequate in demonstrating the lytic and expansive nature of ameloblastomas, CT was clearly superior in showing cortical destruction and extension into the neighboring soft tissues. MRI most accurately determines the full extent of tumor invasion of the marrow spaces, postoperative fibrosis, and recurrent disease.

Keywords: Ameloblastoma - Jaw cysts - Jaw neoplasms - Odontogenic tumors

Introduction

Ameloblastoma is an aggressive epithelial neoplasm of odontogenic origin. It represents 1% of all tumors and cysts of the jaw, and 11–18% of all odontogenic tumors [1–3]. Approximately 80% occur in the mandible and 20% in the maxilla. Ameloblastomas grow as uni- or multiloculated lytic lesions that are locally aggressive, with a tendency to break through the cortex and form soft tissue masses [3–6]. Although they are usually histologically benign and slow-growing, they tend to recur after local excision and occasionally metastasize [3, 6, 7].

Plain radiographs, CT, and more recently, MRI, are used in the evaluation of mandibular and maxillary neoplasms. Plain films and CT demonstrate the lytic nature of ameloblastoma, depicting its scalloped margins and cortical expansion [3, 8], and CT effectively defines the breaking of cortical bone and eventual formation of soft-tissue mass [3, 9]. MRI is superior in demonstrating features of the walls of cystic ameloblastomas, invasion of marrow spaces, and distinction of recurrent lesions from postoperative fibrosis [3, 10–13].

The objectives of this study are: (a) to review the characters of ameloblastoma, (b) to present its imaging patterns, (c) to correlate findings from different imaging modalities, and (d) to discuss the relative advantages of each. Our data are based on 19 surgically and pathologically confirmed cases.

Materials and methods

Nineteen cases of ameloblastoma, surgically and pathologically confirmed, were collected at our hospital between 1985 and 1993. They included 15 cases of ameloblastoma of the mandible and 4 of the maxilla. There were 11 male and 8 female patients, aged 18–79 years (average 37 years). Four cases represented recurrences of surgically treated tumors.

All 19 cases were studied with plain posteroanterior and lateral skull radiographs and/or panoramic radiography. Twelve cases, 10 primary and 2 recurring, were also studied with pre- and postcontrast-enhanced CT. Three of the latter were additionally examined with MRI, including two primary and one recurring.

CT was performed with a General Electric CT 9800 QHL scanner with contiguous 5 mm-thick axial and coronal sections, before and after iodinated contrast material infusion. MRI was performed with a Siemens 0.5 T magnet system with a neck coil. Axial T1-weighted (TR 0.5/TE 30) and T2-weighted (TR 3.0/TE 90) images were obtained with Spin Echo technique, 6 mm section thickness and 256 × 256 matrix. Axial and coronal T1-weighted images were also obtained using the same technique after intravenous injection of Gadolinium-DTPA (Gd-DTPA) in postoperative cases.
Fig. 1. Clinical appearance of patient with large ameloblastoma. Massive swelling of the jaw is noted.

Fig. 2. Unilocular ameloblastoma. Lytic lesion with well-defined scalloped margins involving part of body and left ascending ramus of mandible. The lingual cortical plate is not entirely traceable (arrowheads).

Fig. 3. Multilocular bubblelike ameloblastoma. Lytic lesion with fine septations involving right angle and ascending ramus. The internal cortical plate of mandible appears discontinuous (arrow). Note unerupted molar (arrowhead).

Fig. 4. Multilocular ameloblastoma, honeycomb pattern. Small radiolucent areas with thickened septations involving right body of mandible.

Images were evaluated with regard to location and size of the lesion, multilocularity, solid and cystic components, cortex involvement, soft tissue invasion, and enhancement on CT and MRI. Conspicuity of the lesion, edge definition, and limits of disease extension were evaluated in each case.

Criteria for diagnosis of recurrence were as follows: development of a new cystic lesion, enlargement of a previously existing lesion, or soft mass appearance around the area of resection. In cases in which more than one imaging modality was used, findings were correlated and evaluated considering the advantages of each method.