

Mandibular brown tumor in renal osteodystrophy

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ABSTRACT

Brown tumor is a histologically benign lesion that is a serious complication of renal osteodystrophy because it may result in severe deformity and discomfort. We report a case of brown tumor, which occurred in a 35-year-old woman with chronic renal failure, who had been treated with hemodialysis for 14 years. The lesion was found on the lingual side of the mandible. Standard panoramic radiograph showed generally decreased bone mineral density, loss of lamina dura, and thin cortical plates. Computed tomography (CT) revealed multilocular expansile lesions with heterogeneous attenuation in the anterior mandible, as well as generalized trabecular alteration with homogeneous sclerosis, and thinning or obliteration of cortical plates. Excision of the mandibular lesion and curettage of the affected bone were performed. (*Korean J Oral Maxillofac Radiol 2008; 38 : 229-31*)

KEY WORDS : Brown Tumor; Renal Osteodystrophy; Mandible

Brown tumors are bony lesions caused by rapid osteoclastic activity and peritrabecular fibrosis due to hyperparathyroidism (HPT) resulting in a locally destructive phenomenon. Actually they represent a reparative cellular process rather than a true neoplasia.^{1,2} They are known to occur only in the setting of HPT, and are considered the most pathognomonic skeletal changes that accompany this disease.¹

Primary HPT is associated with two major sites of potential complication: the bones and the kidneys. At skeletal sites excess parathyroid hormone can lead to a condition called osteitis fibrosa cystica. Osteitis fibrosa cystica is a diffuse resorptive process of the bone resulting from both primary and secondary hyperparathyroidism. Long standing excessive levels of parathyroid hormone initiates both fibrous and osteoclastic reactions in the skeleton. An imbalance of osteoclastic and osteoblastic activity causes bone resorption with fibrous replacement of the marrow and thinning of the cortex. Subperiosteal bone resorption in the phalangeal tufts, absence of the lamina dura of the teeth, focal areas of demineralization in the skull and the generalized osteoporosis are the most prominent features of this entity. Brown tumors are focal lesions found with-

in these areas of bone resorption.³

The term 'renal osteodystrophy (ROD)' is often used in a generic sense to include skeletal disorders of patients with chronic renal failure: osteitis fibrosa, osteomalacia, osteosclerosis and osteoporosis.⁴ Histopathologic evidence of renal osteodystrophy can be found in over 50% of patients with secondary HPT, and its recognition is of major prognostic significance as it is associated with high morbidity.⁵ Diffuse involvement of the jaws occurs with significant frequency and radiographic alterations of the facial skeleton may represent one of the earliest signs of the disease.⁶ In some patients marked jaw enlargement and malocclusion may occur.⁷

Here we present a patient with a brown tumor of the mandible, and we describe the radiological findings.

Case report

A 35-year-old woman was referred to Seoul National University Dental Hospital concerning a progressive mandibular swelling of 3-month duration. She had been treated with hemodialysis for 14 years. She denied any other regional symptoms. Upon initial examination, a non-tender hard mass (3.0 × 1.5 cm) was found on the lingual side of the mandible, from the left central incisor to second premolar. Lower lip sensory was normal.

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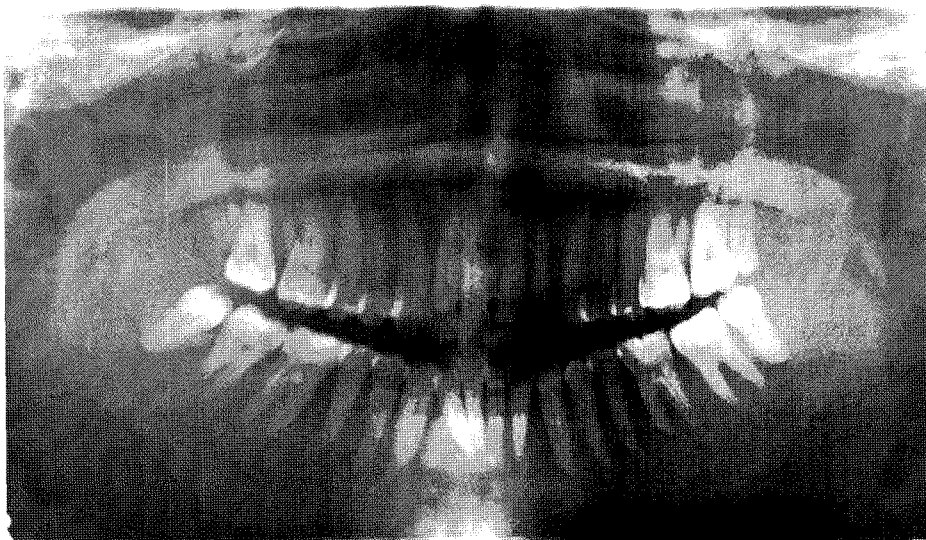


Fig. 1. Standard panoramic view shows generally decreased bone mineral density, loss of lamina dura, and thin cortical plates, but no evidence of a circumscribed radiolucency, indicating the brown tumor, is noted.

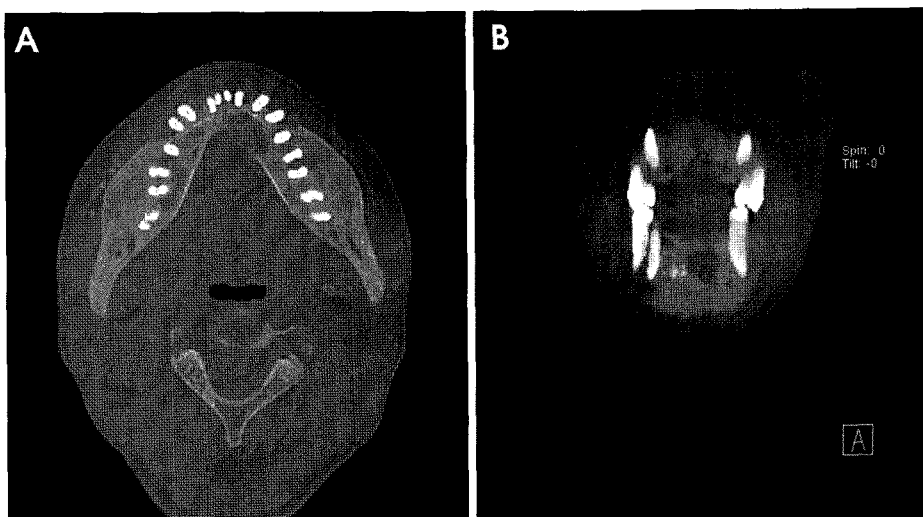


Fig. 2. Axial (A) and coronal (B) CT scans show a multilocular expansile lesion in the anterior mandible. Note the generalized trabecular alteration with homogeneous sclerosis, and thinning or obliteration of cortical plates.

A standard panoramic radiograph showed generally decreased bone mineral density, loss of lamina dura, and thin cortical plates. There was no evidence of a circumscribed radiolucency consistent with giant-cell lesions of the skull or jaws (Fig. 1).

Computed tomography (CT) scans revealed a multilocular, expansile lesion with heterogeneous attenuation in the anterior mandible, as well as generalized trabecular alteration with homogeneous sclerosis, and thinning or obliteration of cortical plates (Fig. 2A, B).

The tentative diagnosis was a brown tumor of the anterior mandible, and surgical treatment was done. Excision of the mandibular lesion and curettage of the affected bone lesion were performed, and the excised mass was sent for biopsy.

Biopsy from the lesion demonstrated the central giant cell lesion. The most significant histological features were the presence of numerous giant cells and microfoci of hemosiderin

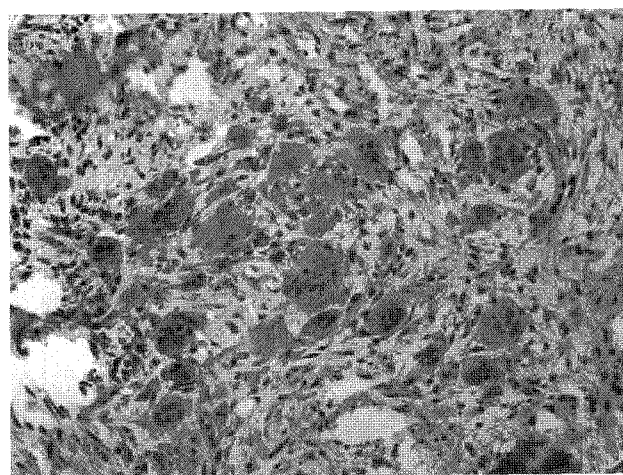


Fig. 3. Histological specimen shows the multinucleated giant cell lesion in the fibrous stroma (hematoxylin-eosin, original magnification $\times 200$).

deposition. Between the giant cells were sheets of plump fibroblasts and a rich vascular network (Fig. 3). The microscopic appearance of the lesion confirmed the diagnosis of brown tumor.

Discussion

Brown tumors can occur as solitary or multiple lesions in any bone, most often in the pelvis, ribs, clavicle, mandible and the extremities.^{1,5,8} These tumors are usually soft, painless, minimally tender, and appear elastic on palpation.⁹ Symptoms result from the considerable dimensions of the tumor and its localization, but in most cases maxillary tumor is not painful.¹ Radiographically, they appear as well-demarcated monolocular or multilocular osteolytic lesions. In the mandible, the cortical bone is expanded and thinned. Brown tumors of the jaws occasionally result in root resorption and loss of the lamina dura and may present as a space-occupying mass in the sinus.^{8,10} When a brown tumor involves the face and has progressive growth, it may cause severe deformities, discomfort, alteration of the masticatory apparatus, and difficulty to breathe through the nose or to eat.¹¹

Jaw radiographic findings in renal osteodystrophy include bone resorption with loss of cortical bone, lamina dura, and other anatomical landmarks, and condensation of trabecular architecture producing a ground-glass appearance closely resembling fibrous dysplasia. Generalized involvement is in accordance with the diffuse swelling of the jaws reported in most cases.¹²

Conventional radiograph is usually informative, but it has been reported that CT is a more useful for evaluating progress in the early stages of renal osteodystrophy (ROD) and brown tumor. Further, with its superior soft tissue contrast and multiplanar facilities, MR imaging is useful for the analysis of the internal structure of the lesions. Asaumi et al.¹³ compared conventional radiograph, CT and MRI in ROD, but they reported that CT and MRI did not add any more information. In the present case, we found generally decreased bone mineral density, loss of lamina dura, and thin cortical plates on the standard panoramic radiograph, but no evidence of a circumscribed radiolucency, indicating the brown tumor, was found. Only CT revealed a multilocular expansile lesion with heterogeneous attenuation in the anterior mandible, as well as generalized trabecular alteration with homogeneous sclerosis, and thinning or obliteration of cortical plates. We think that CT and MRI might reveal early changes in the jaws caused by ROD which were difficult to detect on conventional radiography.

Triantafillidou et al.⁸ reported 5 patients of the brown tumors

of the jaws (4 cases involved in the mandible and 1 case involved in the maxilla) and Leal et al.¹ reported a patient with brown tumor in the maxilla. The present case is the brown tumor in the mandible.

In conclusion, the brown tumor can show a multilocular expansile lesion with generalized trabecular alteration and thinned cortical plates. In this report, we had conventional radiograph and CT. Conventional radiograph depicted the general characteristics of ROD, but showed no evidence of a circumscribed radiolucency of the brown tumor. Only CT allowed further visualization of the characteristics of the brown tumor. A periodic imaging examination including CT is recommended to detect the possibility of brown tumor in renal osteodystrophy patients.

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