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Case Report

Clinical, Radiographic, Biochemical and Histological Findings of Central Giant Cell Granuloma: Report of a Case with 8 Years Follow-Up

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Abstract:

Central giant cell granuloma is characterized by benign osteolytic intraosseous lesion producing radiolucent radiographic appearance. The differential diagnosis includes the brown tumor of hyperparathyroidism, a multilocular lesion that can compromise the prognosis of these patients. Surgical removal is the gold standard of treatment. Longitudinal evaluations are needed in the face of possible recurrence, even with surgical removal. The purpose of this article is to present a case of central giant cell granuloma that affected a child patient, in whom surgical treatment was instituted and was followed for 8 years, with no signs of recurrence. Several characteristics of central giant cell granuloma were addressed, besides emphasizing the need to perform systemic laboratory tests on the patient in order to eliminate the possibility of the existence of the brown tumor of hyperparathyroidism.

Keywords: central giant cell granuloma; oral diagnosis; oral pathology; benign non-odontogenic tumors; pediatric dentistry

Introduction

Central giant cell granuloma is a benign lesion of the maxillary bones, with osteolytic features. The etiology has not yet been defined, although trauma causing intraosseous hemorrhage is postulated, even if not reported by the patient. Intraosseous hemorrhage is exacerbated, producing highly vascularized granulation tissue containing the multinucleated giant cells 1-11. In the past, it was called giant cell reparative granuloma. However, this term is now in disuse, because the nature of the lesion is not reparative, but can be destructive, due to the activity of stimulated osteoclasts 8,12.

Central giant cell granuloma is an uncommon lesion, representing about 7% of benign lesions of the maxillary bones[11,13-16]. It is more prevalent in the female gender and in the young population, manifesting until the 3rd decade of life; the mandible is more affected than the maxilla, particularly the anterior region and adjacent to the midline[1,6,7,9-13,17-21].

Radiographically, it is characterized as a radiolucent image, sometimes well-defined, sometimes diffuse, but with margins that are generally decorticated, uni or multilocular, and may present radiopaque images inherent to transverse bone spicules[1-7,9-11,13,17-21].

Several therapeutic modalities have been employed. However, surgical excision is the gold standard. The recurrence rate is relatively high, and is determined by failure to remove the lesion, justifying long-term clinical and radiographic follow-up[1-6,8,10,12,15,19,20].

Considering the brown tumor of hyperparathyroidism - an endocrine disorder that affects the stomatognathic system but can manifest itself systemically - among the lesions that make up the differential diagnosis, it is imperative that the patient be thoroughly evaluated, since besides the clinical, radiographic, and histological characteristics, biochemical alterations may exist in this lesion[12,22].

The purpose of this article is to present a case of central giant cell granuloma that affected a child patient, in whom surgical treatment was instituted and was followed for 8 years, with no signs of recurrence.

Case Report

An African-descendent female patient, 12-year-old, attended a private clinic complaining of localized gingival growth. Clinically, a nodule was observed on the left palatal mucosa, in the periapical region of teeth 23, 24 and 25.

Clinically, the patient presented a sessile tumor mass; asymptomatic; with an approximate diameter of 15mm; slightly erythematous, presenting, however, in permeation, a white dotted aspect due to small ulcerations; with 4 months of evolution; located in the keratinized gingiva between teeth 13 and 14 (Figure 1). The teeth were intact and with pulp vitality. There was no history of trauma, although there was spontaneous bleeding in the 2nd month of evolution.

The lesion presented a radiolucent image between teeth 13 and 14, slightly diffuse, causing divergence between the dental roots (Figure 2).

Surgical removal was recommended. The father of the child was duly informed about the surgical procedure, who agreed and signed the consent form for the procedure. After infiltrative anesthesia, an intra-sulcular incision was made from mesial of tooth 12 to distal of tooth 15, performing syndesmotomy and retracting the muco-periosteal flap until exposure of the lesion, which emerged from the bone cavity. The lesion was easily enucleated and multiple fragments were removed. The presence of black particles in the tumoral mass was characteristic (Figure 3). After complete enucleation of the lesion, buccal bone dehiscence was observed on teeth 13 and 14 (Figure 4). The lesion was further removed from the inner wall of the flap. The flap was properly sutured. The patient was prescribed analgesic, anti-inflammatory, and antibiotic drugs.

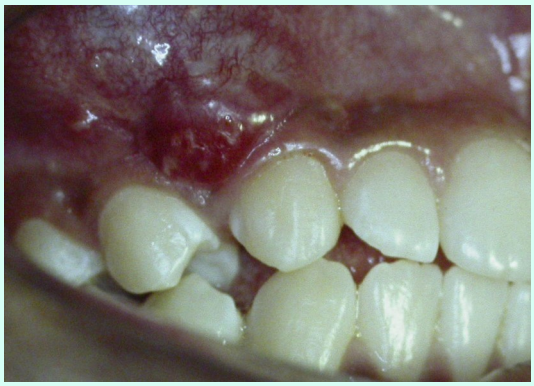

Figure 1: *Pre-operative clinical aspect: tumoral mass between the teeth 13 and 14*

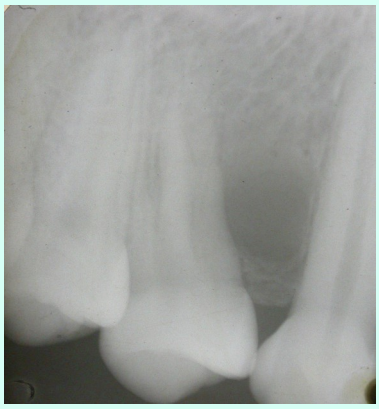

Figure 2: *Initial radiographic aspect: diffuse radiolucent image between teeth 13 and 14*

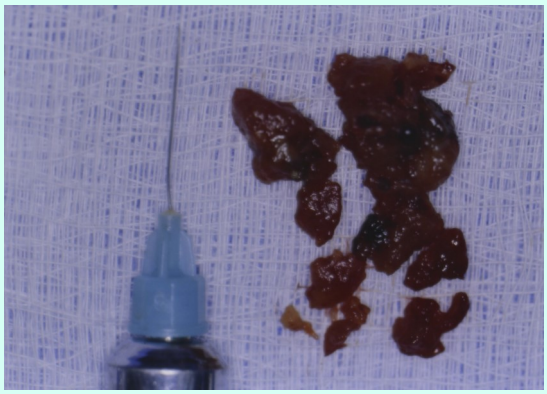

Figure 3: *Fragments of the lesion removed, with black particles*

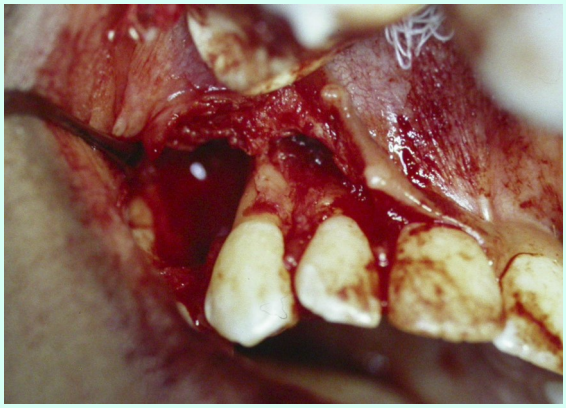

Figure 4: *Bone cavity and dehiscence observed on teeth 13 and 14*

The lesion was fixed in 10% formalin and sent to the Laboratory of Surgical Pathology of the School of Dentistry of the University of São Paulo. Histological sections were stained by Hematoxylin and Eosin and showed proliferation of densely cellularized mesenchymal tissue with spindle-shaped cells. There were also multinucleated giant cells scattered throughout the stroma, ranging from rounded to elongated shapes (Figure 5). Immature bone tissue, blood vessels, and hemorrhagic areas complemented the histological picture, determining as final diagnosis, central giant cell granuloma.

The patient was evaluated at 15 days post-surgery, and the remaining sutures were removed. No complaints or post-surgical complications were reported.

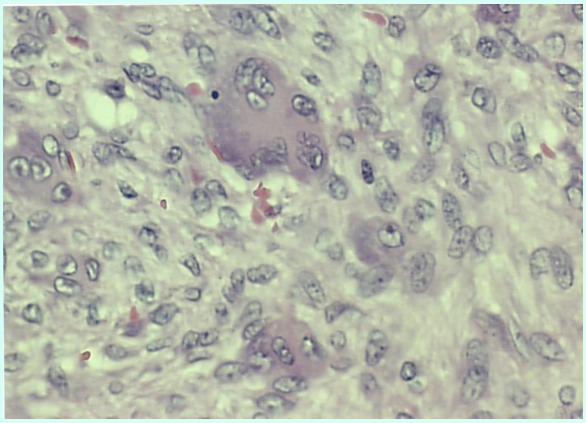

Figure 5: *Histopathological aspect of a central giant cell granuloma (staining: HE; 40X magnification), presenting multinucleated giant cells in the midst of densely cellularized mesenchymal tissue.*

In addition, serologic and biochemical tests were ordered to rule out the possibility of hyperparathyroidism. The patient was referred to an endocrinologist, and biochemical tests (calcemia, calciuria, creatinine, alkaline phosphatase and phosphatemia) were performed. No alterations were observed, ruling out the possibility of hyperparathyroidism. The test results are summarized in Table 1.

Test	Result	Reference Value
Calcemia	10 mg/dL	from 8.4 to 10.2 mg/dL
Calciuria	135 mg/24h	less than 300 mg/24h
Phosphatemia	4.8 mg/dL	from 3.9 to 6.1 mg/dL
Alkaline phosphatase	115 U/L	from 61 to 394 U/L
Creatinine	0,8 mg/dl	from 0.5 to 1.0 mg/dL

Annually, the patient has been clinically and radiographically evaluated, with no signs of recurrence after 8 years of follow-up (Figures 6 and 7).

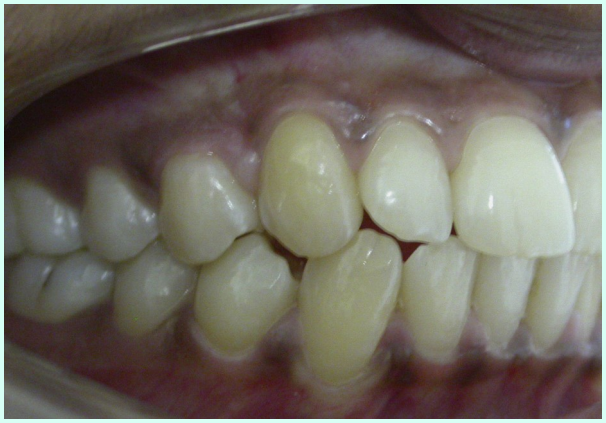

Figure 6: *Clinical aspects after 8 years of follow-up*

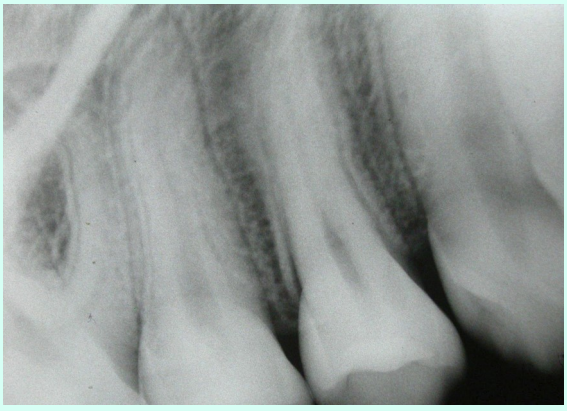

Figure 7: *Radiographic aspect after 8 years of follow-up*

Discussion

Central giant cell granuloma is clinically characterized as an osteolytic intraosseous lesion; with an increased soft tissue mass; it can be symptomatic or asymptomatic; reaching variable dimensions; uni or multilocular. Multiple lesions in the same bone are rare and, when present, may be associated with hyperparathyroidism. It can cause an increase in volume, with facial asymmetry; expansion and perforation of the cortical bone, tooth displacement or impaction, or root resorption of teeth adjacent to the lesion[1,9-14,17-21,23]. Usually the lesion is associated with vital teeth[17,19], as was observed in the present case. The lesion may also be related to tooth loss and tooth germ involvement in children[7]. The behavior of the lesion is variable, and it can be mild, not causing root resorption and showing little tendency to recur; or aggressive, with rapid growth, and can cause root resorption, besides the tendency to recur[1,18,19,21].

The histopathological aspect is constituted by fibrous stroma (with spindle-shaped cells and multinucleated giant cells, which may be scattered or aggregated in hemorrhagic foci) or loose (very vascularized). Capillaries can be observed, with few endothelial cells; osteoclasts; myofibroblasts; fibroblasts; occasional mononucleated cells; extravasation of blood cells and deposition of hemosiderin and hematoidin[1,3,5,8,9,15,19,20]. The histopathologic constitution of giant cell granuloma is the same as that of hyperparathyroidism and kerubism[12,22].

The diagnosis is defined by clinical, radiographic and histopathological findings[19,20,21,23]. In addition to the brown tumor of hyperparathyroidism, other lesions make up the differential diagnosis: benign pathologies (aneurysmal bone cyst, odontogenic keratocyst, ossifying fibroma, fibrous dysplasia, kerubism and ameloblastoma) and malignant pathologies (malignant giant cell tumor, osteogenic sarcoma, lymphoma and fibrosarcoma)[1,5,8,9,11,15,20]. Kerubism is a particular type of central giant cell granuloma of familial hereditary origin, which affects body and angle of the mandible, being usually bilateral, but with a tendency to remission and involution after puberty[12]. The brown tumor of hyperparathyroidism should be considered mainly in cases of multilocular lesions[8,9,17,20,21,24]. In these cases, following the example of our conduct, the dental surgeon should make a mandatory referral to the endocrinologist physician and research hormonal rates and request tests (calcemia, creatinine, alkaline phosphatase, phosphatemia, and calciuria), as a differential of central giant cell granuloma[9,10,15,17,19,20].

The recommended treatment was surgical excision, usually by curettage technique, enucleation, and in more advanced cases, segmental bone resection[1-3,5,7-12,14,15,18-21,23,24]. Alternative techniques have been suggested such as intra-lesional injection of corticosteroid, human calcitonin, triamcinolone, denosumab and systemic interferon[1-3,5,7,9-11,14,18,21,23,24]. Based on misdiagnosis of the clinical characteristics of the lesion adjacent to the tooth, the surgical technique was associated with the endodontic technique[11]. According to Dahlkemper et al.[19] (2000), about 20% of the lesions were associated with one or more devitalized teeth; 87% of the cases were associated with endodontic retreatment, with removal of periapical tissue for histopathological examination (curettage and root resection).

As this is a pathology with relatively destructive potential, proservation should be strictly followed. The recurrence rate has been determined to be 0 to 49%[3,7,9,12,15,20], usually related to failures in curettage of aggressive lesions[11].

Conclusions

Central giant cell granuloma is a benign osteolytic lesion, whose clinical and radiographic features, although not pathognomonic, aid in diagnosis, but which is only elucidated by histopathological features. Biochemical tests can help in the detection of the brown tumor of hyperparathyroidism, the main systemic lesion in the differential diagnosis that could compromise treatment in the oral cavity. Several therapeutic modalities can be employed, although surgical removal is the most used, still considering the possibility of recurrence.

Conflict of Interest

The authors declare no conflict of interest.

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