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Case Report

Central giant cell granuloma: A case report

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ABSTRACT

Central giant cell granuloma (CGCG) is a benign intraosseous lesion of the jaw that is found predominantly in children and young adult. The true nature of this lesion is controversial and remains unknown. The three competing theories are that it could be a reactive lesion, a developmental anomaly or a benign neoplasm. It is an uncommon pathological condition occurring in <7% of all benign lesions of the jaw and diagnosed during the first two decades of life. CGCG formerly called as giant cell reparative granuloma is a nonneoplastic proliferative lesion of unknown etiology. It is considerably more common in the mandible than in the maxilla. A case of 30-year-old male with CGCG in mandible is presented with emphasis on clinical, radiological, and management of the lesion.

KEY WORDS: Central giant cell granuloma, benign, giant cell lesions, mandible

INTRODUCTION

Central giant cell granuloma (CGCG) is defined as an intraosseous lesion consisting of cellular fibrous tissue that contains multiple foci of hemorrhage, aggregations of multinucleated giant cells and occasionally trabeculae of woven bone [1]. It was described by Jaffe in 1953 that separated giant cell lesions of jaw from other jaw lesions.He considered it to be a locally reparative reaction of bone, which can be either due to inflammatory response, local trauma or hemorrhage [2].

Clinically, it can vary from benign to rather aggressive lesion and demonstrates varying histopathological features [3]. Nonaggressive and aggressive variants are compared by Choung *et al*. according to clinical and radiographic behavior. Nonaggressive lesions are slow growing, almost asymptomatic growth that does not perforate the cortical bone or induce root resorption and has low tendency to recur whereas aggressive lesions which are usually seen in younger patients are painful, rapidly growing with expansion or perforation of cortical bone, radicular resorption, and high tendency to recur. He interprets that large functional surface area is occupied by giant cells and larger relative giant cells in aggressive lesion [4].

It occurs most commonly in children and young adults and has a female predilection. Lesions are located more commonly in the mandible mostly involving molar and premolar area and frequently cross the midline. Its presence in the mandibular body area, the entire ramus, condyle and coronoid leads to a therapeutic challenge for surgeons [5]. The treatment modalities include surgical excision either by curettage or en bloc resection and alternative nonsurgical approaches such as intralesional corticosteroid injections, calcitonin injections, and subcutaneous alpha interferon injections. Here, we report a case of CGCG in mandible with emphasis on clinical, radiological, and management of the lesion.

CASE REPORT

A medically fit 30-year-old male patient came to dental OPD with a chief complaint of painless swelling on the lower front jaw region since 1½ years. History revealed that initially the size of the swelling was small which grew to present size. There was no history of trauma.

On extra oral examination, a single, focal, diffuse swelling of size 9 cm × 6 cm was seen on the lower anterior region of jaw extending superiorly 1 cm below the lower lip, inferiorly to the lower border of mandible and beyond, posteriorly along the right middle canthus of eye crossing the midline till the left middle canthus of eye. The surface of the swelling appeared normal with no secondary changes. On palpation, swelling was hard in consistency, nontender with no local rise in temperature. No abnormality detected in lymph node and salivary gland [Figure 1a].

Intraorally, solitary well circumscribed oval-shaped swelling was present on the anterior mandible extending from right second premolar to left second premolar region obliterating the labial vestibule. It was associated with expansion of labial cortical

plate. No displacement of teeth was seen, but the involved teeth were mobile. The mucosa over the swelling was normal. On palpation, swelling was hard in consistency and nontender [Figure 1b].

Pulp vitality test was carried out from right mandibular first premolar to left mandibular second premolar which revealed no response suggesting it to be nonvital. Furthermore, delayed response was seen with right and left second premolar and first molar. The presumable clinical differential diagnosis for the above-mentioned case could be considered namely CGCG, ameloblastoma, and odontogenic keratocyst.

Radiographs of the patient included occlusal view to check expansion of cortical plate and panoramic view to check extent of lesion which revealed the presence of solitary multilocular lesion extending from mesial aspect of 36 till mesial aspect of 46 with minute loculations giving honey comb appearance. There is profuse expansion of buccal and lingual plate along with resorption of roots in anterior region [Figure 2a and b].

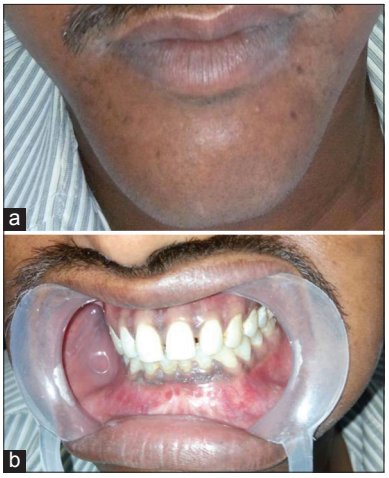

Figure 1: (a) Extra oral swelling, (b) intraoral swelling with vestibular obliteration

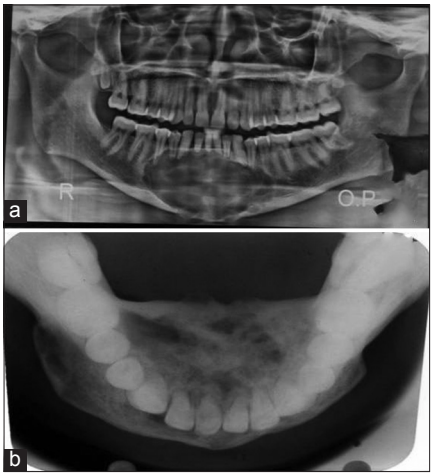

Figure 2: (a) Pre-operative panoramic view showing size and extent of lesion, (b) pre-operative occlusal view showing expansion of cortical plates.

The presumable radiographic differential diagnosis for the above-mentioned case could be considered namely CGCG, ameloblastoma, odontogenic myxoma, and aneurysmal bone cyst.

Routine hemogram examination was normal. Fine needle aspiration cytology of anterior mandibular lesion and aspiration was done which showed foamy histiocytes, macrophages, and mixed inflammatory infiltrate which revealed features suggestive of cystic lesion. Further, incisional biopsy was carried out which showed cellular vascular stroma with large number of multinucleate giant cells proliferating fibroblasts, histiocytes, areas of hemorrhage, and new bone formation [Figure 3].

Based on clinical, radiographic and histopathology report, final diagnosis was CGCG was achieved.

Treatment was started with Kenacort -A (10 mg/ml) and lidocaine solution 2% with epinephrine 1: 200,000 (50% mixture by volume). Solution (4 ml Kenacort - A and lidocaine) was injected with 5 cm disposable syringe by estimating the site where cortical bone was more expanded and the thinnest point. Six injections were administered with 7 days interval. Routine follow-up was performed at monthly intervals. Post-operative and follow-up, panoramic view [Figure 4] and cone beam computed tomography (CBCT) was taken which revealed

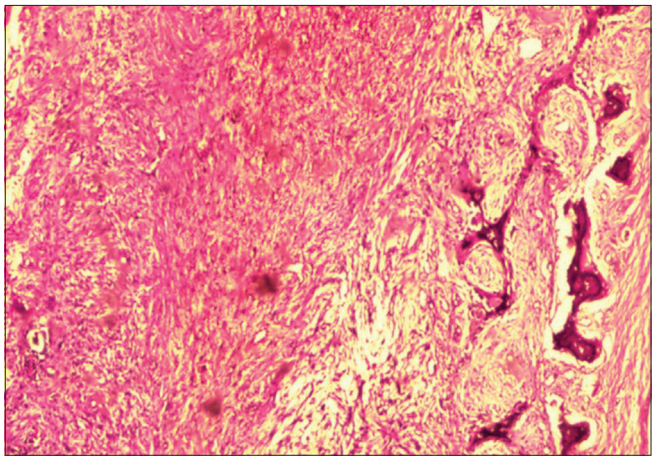

Figure 3: Presence of giant cells

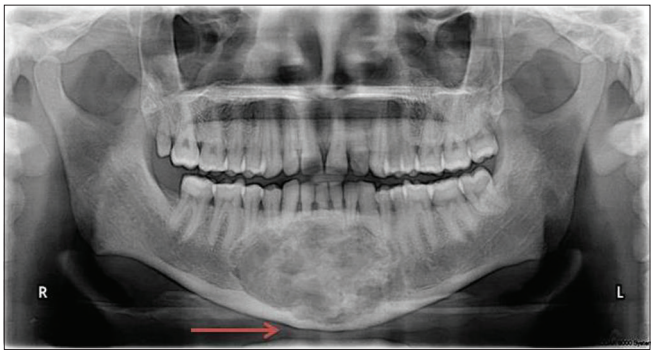

Figure 4: Post-operative panoramic view showing size of the lesion along with osteoblastic activity resulting in formation of the lost bone at the inferior border of mandible. (Red arrow)

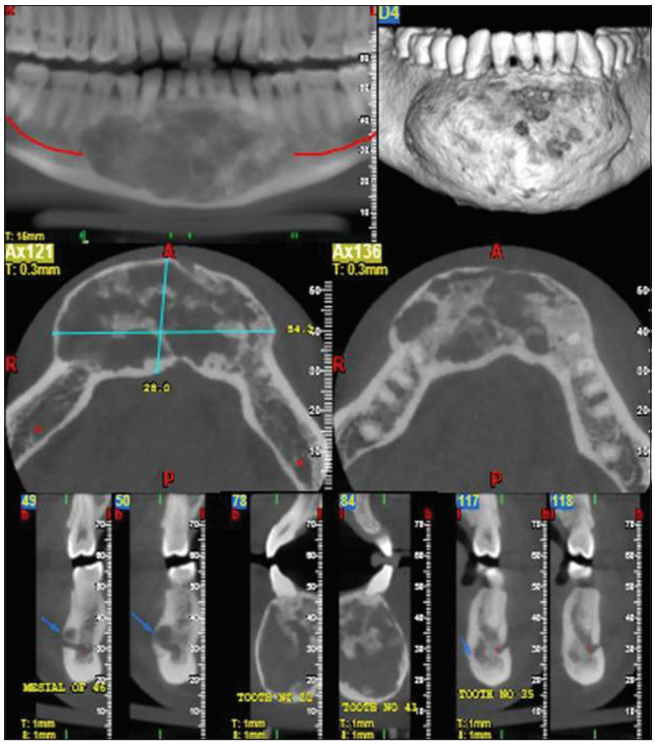

Figure 5: Cone beam computed tomography size of the lesion along with osteoblastic activity resulting in formation of the lost bone at the inferior border of mandible

regression in the size of the lesion along with osteoblastic activity resulting in the formation of the lost bone measuring thickness of about 0.5 cm at the inferior border of mandible [Figure 5].

DISCUSSION

The CGCG, also known as giant cell lesion, was first described by Jaffe in 1953 as an apparently reactive intraosseous lesion of the mandible and maxilla following trauma induced intraosseous hemorrhage and containing prominent giant cells [6]. He separated CGCL from long bone giant cell tumor based on differences in their histological pattern and clinical behavior. Due to its reactive in nature, he gave the term reparative giant cell granuloma [7].

It is the disease of the young presenting as a painless expansile mass ranging from a slowly growing asymptomatic swelling to an aggressive lesion causing pain and bone destruction, being more common in the anterior portion of the mandibular body sometimes crossing the midline, the epicentre being anterior to the first molar region. Cortical plates are thinned, with sometimes perforation but gross soft tissue involvement is rare as often remains limited to its effects on periosteum [8]. It is an uncommon lesion that accounts for <7% of all benign lesions of the jaw. Females are affected more frequently than males which may be explained by recent suggestions of the association between hormonal secretion and the appearance of CGCG in females [9].

The radiographic feature is variable ranging from unilocular to multilocular radiolucent lesions with well-defined margins. Internal structure reveals a stubble granular pattern of calcifications which may be organized into wispy septa. Sometimes, septa are defined at right angles to the periphery and divide the internal aspect into compartments giving honey comb appearance. Displacement of adjacent teeth, tooth buds, and resorption may occur. The lamina dura of teeth within the lesion are usually missing and inferior alveolar canal is displaced inferiorly [10].

Differential diagnosis includes:

- Ameloblastoma which is seen in older age, in posterior part of mandible and is multilocular
- Odontogenic myxoma which is usually associated with missing or impacted tooth, multilocular with honey comb appearance
- Browns tumor of hyperparathyroidism, which is seen after second decade of life, has high serum calcium levels
- Cherubism with epicenter located in the posterior aspect of the mandible and maxilla, multiple and bilateral
- Aneurysmal bone cyst which causes profound expansion and aspiration produces blood.

Histopathological examination reveals numerous multinucleate giant cells with foci of osseous structures. The mononuclear cells form osteoclasts like giant cells *in vitro* by the development of osteolytic lesions. Besides osteoclasts, the mononuclear cells differentiate themselves in macrophages that play critical role during inflammatory and reparative process [9].

CBCT is excellent for demonstration of bony thinning or destruction. The lesion attenuation is similar to muscle. Magnetic resonance imaging evaluates extent of the lesion as well as evaluating adjacent soft tissue. It has low to intermediate intensity signals on both T1W and T2W images similar to giant cell tumor [6].

Management includes simple enucleation or curettage to en bloc resection. The most widely accepted method of surgical treatment is aggressive curettage. Nonaggressive lesions respond well to curettage, but aggressive lesions have recurrence rate around 11-70% after enucleation or curettage. Therefore, for aggressive lesions, curettage has been combined with adjunctive therapies [8]. Curettage of the tumor mass followed by the removal of the peripheral bony margins results in low recurrences and good prognosis. Nonsurgical treatment is by intralesional instillation of corticosteroids, subcutaneous calcitonin injections, and bisphosphonates. Corticosteroids inhibit osteoclasts in marrow cultures and under conditions of bone absorption by increased apoptosis. It may act by suppressing any angiogenic or inflammatory component in the lesion [11]. Calcitonin inhibits the function of giant cells, antagonizing osteoclastic bone resorption but it takes longer to affect CGCGs. It can be administered in two modes, i.e., 100 IV subcutaneously daily or 50 IV subcutaneously and 200 IV nasal spray daily [12].Interferon appears to encourage bone formation through stimulation of osteoblasts and preosteoblasts and inhibit bone resorption [13,14].It is administered 48-72 h postoperatively at a dose of 2,000,000-3,000,000units/m^2 once daily subcutaneously. It is also suggested that interferon- 2a

combined with bisphosphonates might further improve the treatment of giant cell lesions [15]. Conservative surgical approaches can be used for nonaggressive lesions. However, in the cases of aggressive lesions, an alternative or adjuvant therapy can be applied [8].

CONCLUSION

CGCG being a rare disease sometimes shows an aggressive behavior, hence it is important for clinicians to understand their clinical behavior and radiologic presentation and classifying these lesions as aggressive or nonaggressive can help in choosing the most appropriate treatment. The identification of therapeutic targets with ongoing clinical and laboratory research on protein expression can hold future promise for the therapy of CGCG. The long-term success in the management of the lesions adds to the controversy over the actual histopathogenesis of this lesion and its prognosis. This case highlights the difficulty in diagnosing and management of the lesion. Hence, this lesion continues to develop the interest and mystify the clinicians.

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