CASE REPORT

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Central Giant Cell Granuloma of Right Mandible Post Extraction: A Case Report

Merin Thariyan[1]*, Sunali Khanna[2]

[1]Post Graduate student, Department of Oral Medicine and Radiology, Nair Hospital Dental College, Mumbai
[2]Professor& Head of Department, Oral Medicine and Radiology, Nair Hospital Dental College, Mumbai

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ABSTRACT

BACKGROUND: The World Health Organisation describes Central Giant Cell Granuloma (CGCG) as an intraosseous lesion made up of cellular fibrous tissue with several hemorrhage foci, aggregations of multinucleated giant cells, and some woven bone trabeculae1. These tumours are more common in the mandible than in the maxilla, making for 7% of all benign tumours of the jaw.The cause is unknown, although potential causes in-clude inflammatory foci, trauma, or genetic predisposition. Aggressive and non-aggressive CGCG subtypes are recognised. The most prevalent kind, known as the non-aggressive variation, manifests as a painless lesion that grows slowly and expands the cortical bone. Conversely, younger individuals may present with severe giant cell granulomas that have the following characteristics: they may be larger than 5 cm, expand quickly, exhibit root resorption, cause tooth displacement that results in malocclusion, thin or puncture the cortical bone, or recur after curettage.The presented case is an aggressive variant of CGCG.

Introduction: In the craniofacial region, particularly in the jaw bones, Central Giant Cell Granuloma (CGCG) is an uncommon, histologically benign, but locally aggressive and destructive osteolytic disease of osteoclastic origin. A rapid diagnostic assessment, together with adequate histopathologic verification, is essential to improve the management and prognosis of this locally destructive lesion. This post-extraction development is unusual, as CGCGs are typically not associated with recent dental extractions, adding complexity to the diagnostic process. The lesion exhibited aggressive growth within a short period, necessitating prompt intervention. This case contributes to the literature by highlighting the potential for CGCG to manifest in extraction sites, which may necessitate a re-evaluation of post-extraction monitoring protocols.Future research could explore the factors that predispose extraction sites to CGCG formation, as well as the long-term outcomes of different surgical techniques.

Observation: A rare case of a large destructive CGCG involving the right mandible, causing extensive bony resorption as well as cortical expansion with perforations, in a 29-year-old male is presented. It was diagnosed and treated successfully to preserve the continuity of the mandible.

Keywords: Central Giant Cell Granuloma, Giant cells, Osteoclasts, Osteolytic lesion

CASE PRESENTATION

A29-year-oldmalepatientpresentedwithaswelling on the right side of the face for two months. The swelling was reported after the extraction-of premolar 45 due to pain and gross caries. The swelling gradually increased in size over the period of two months. The premolar was extractedwithout taking a pre-operative radiograph. It was not associated with any systemic symptoms. There was no paraesthesia. Medical

Corresponding author: Merin Thariyan, , Department of Oral Medicine and Radiology, Nair Hospital Dental College, Mumbai

Email: merinthariyan96@gmail.com

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history and family history were non-contributory. A facial examination revealed a diffuse swelling on the right lower side of the face resulting in facial asymmetry. The overlying skin was normal. The swelling had no localized elevation of temperature and no associated lymphadenopathy. Intraoral examination revealed fair oral hygiene. There was a swelling in the buccal aspect extending from the lower right first premolar44 to the first molar 46 posteriorly obliterating the buccal sulcus. The swelling extended lingually. It had a smooth surface with no evidence of fluctuation on palpation. It was non-tender and hard on palpation. The superficial aspect of swelling showed indentations due to upper molars with slight keratosis during occlusion. (Figure 1)

Further, an OPG was taken (figure 2). It revealed an ill-defined radiolucency in the right mandibular posterior region extending anterior-

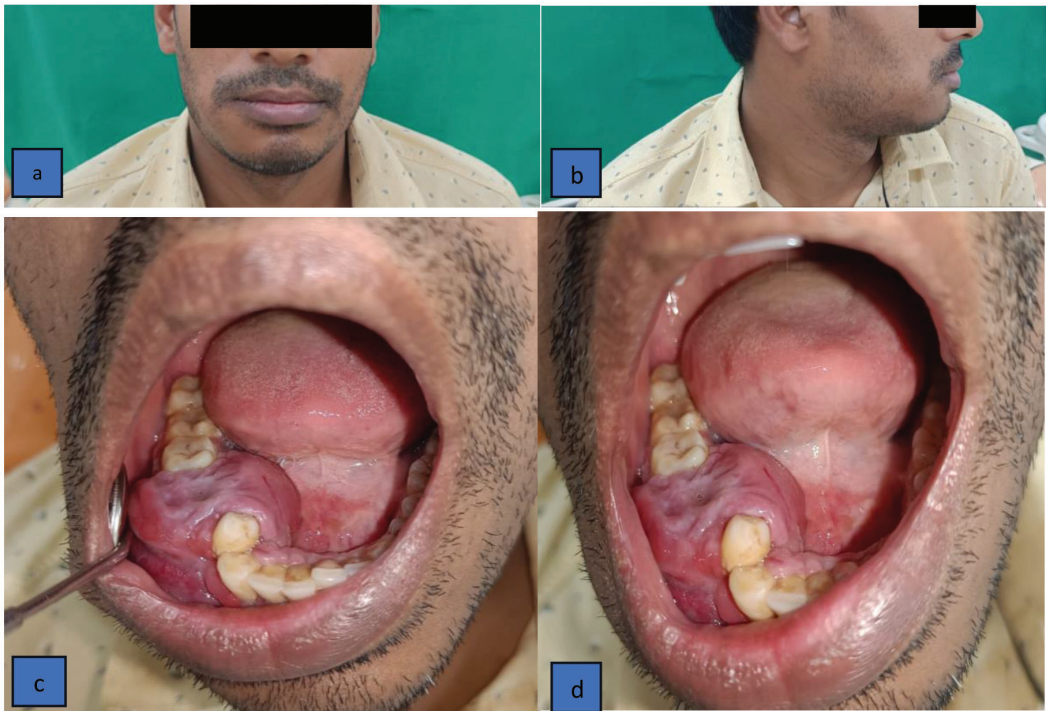

Fig. 1: (a and b): Extra-oral swelling of the right lower jaw (c and d) Intra-oral photograph depicting growth in the right mandibular premolar region

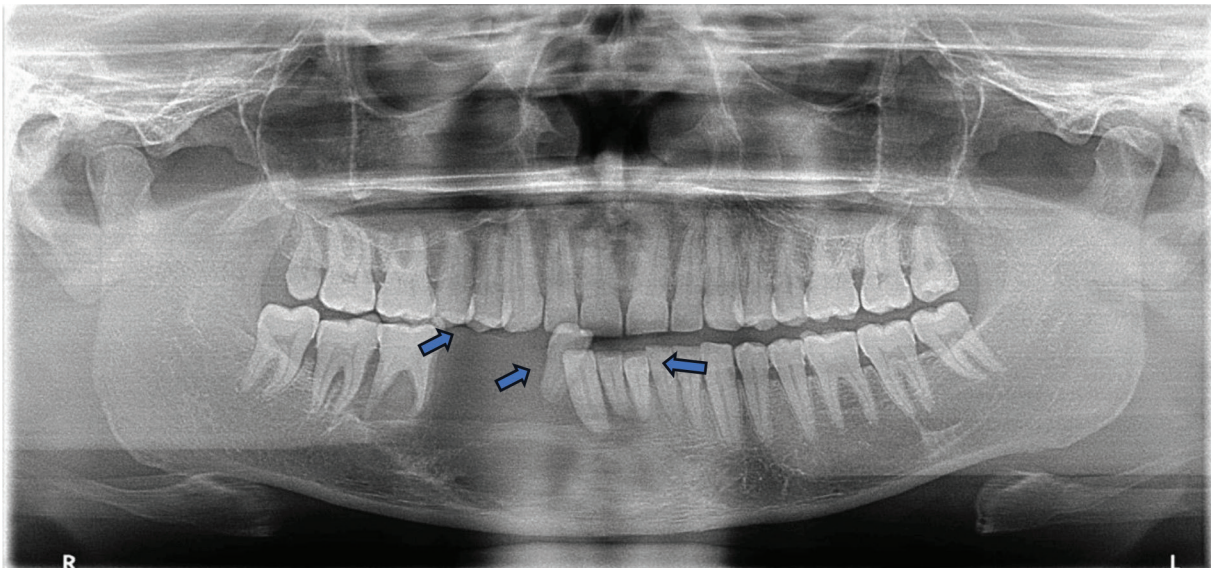

Fig. 2: Orthopantomograph showing a unilocular radiolucent lesion in the ramus of right mandible.

posteriorly from the mesial aspect of 42 to the mesial aspect of 47 and superior-inferiorlyfrom the alveolar crest to the lower border of the mandible. Alveolar bone in 44, 45, 46 region is not traceable. Thinning of the lower border of the mandible was noted. A scalloped border can be noted in the distal aspect of the lesion. External root resorption noted with 43, 44 and 46. Floating tooth appearance noted with 44, 46. Pathological migration was noted with 44. Missing with 45.

A computed Tomographic scan of the PND & neck revealed an expansile, lytic lesion involving the right lower alveolus with homogeneous enhancement noted measuring approximately 3.5 x 2.8 cm at the level of the right lateral incisor till the right second molar withresorption of the roots of the first molar and canine. The mandibular canal is seen at the inferior aspect of the lesion with an indistinct bony margin. The mandibular foramenis uninvolved. There is a discontinuity in the outer and inner cortex of the mandible with expansion of the loweralveolus. Reactive appearing bilateral level 1B and II nodes are seen;the largest measuring 16 x 10 mm at right level II.The CT impression mentioned an expansile, lytic lesion involving the right lower alveolus with relatively homogenous enhancement as described, which favorsthe diagnosis of a chronic benign osteoclastic lesion.

CBCT FINDINGS

A single, multilocular partially corticated radiolucent osteolytic lesion with the 43, 44, 45, and 46 regions extending: mesiodistally from the mesial aspect of 43 and distally up to the distal surface of 46. Buccolingually the lesion is causing expansion, thinning, and discontinuity of buccal and lingual cortical plate at places 43, 44, 45, and 46 regions. Superior inferiorly from the alveolar crest up to 2-3 mm above the lower border of the mandible. The internal structure of the lesion is completely radiolucent with evidence of few locules and thin septa within it at places near 46 regions. The periphery of the lesion is partially corticated along with the expansion of the buccal cortical plate. Complete loss of alveolar bone is noted in 44, 45, and 46 regions with only a fairly well-defined inferior border remaining. Effects on surrounding structures: there is thinning, expansion and perforation of adjoining buccal cortical bone. Thinning and discontinuity of the lingual cortex at places in 43, 44, 45, and 46 regionsare observed. Floating tooth appearance is observed with 44 and 46 secondary to complete loss of alveolar bone. External root resorption is observed with 44 secondary to the lesion. Alteration of the trabecular bone pattern is observed causing thinning of cortical bone. Complete Loss of lamina dura with 46 is observed. Downward displacement of IANC and foramen is evident along with uneven destruction of cortices of IANC (Figure 3).

Provisional diagnosis based on clinical and radiological findings was given as Central Giant Cell Lesion.

Differential diagnosis: Brown's tumor of hyperparathyroidism, aneurysmal bone cysts, giant cell tumors, fibro-osseous lesions

The way that CGCG appears on radiography can vary. The lesion typically manifests as a multilocular or unilocular radiolucency. It exhibits varying cortical plate destruction and expansion and can be well-defined or poorly characterised. The lesion's radiological appearance is not pathognomonic and can be mistaken for a number of different jaw lesions. Histopathology ultimately provides the definitive diagnosis because radiological and clinical findings are not very specific.

DIMENSIONS (approx.)

	MESIODISTALLY (WIDTH)	BUCCOLINGUALLY (DEPTH)	HEIGHT
AT THE CORONAL 3RD LEVEL	32.5 mm	25.3 mm	21.7-27.6
AT THE MIDDLE 3RD LEVEL	30.5 mm	25.4 mm	21.7-27.6
AT THE APICAL 3RD LEVEL	19.0 mm	17.9 mm	21.7-27.6

(All dimensions are taken from the internal cortex)

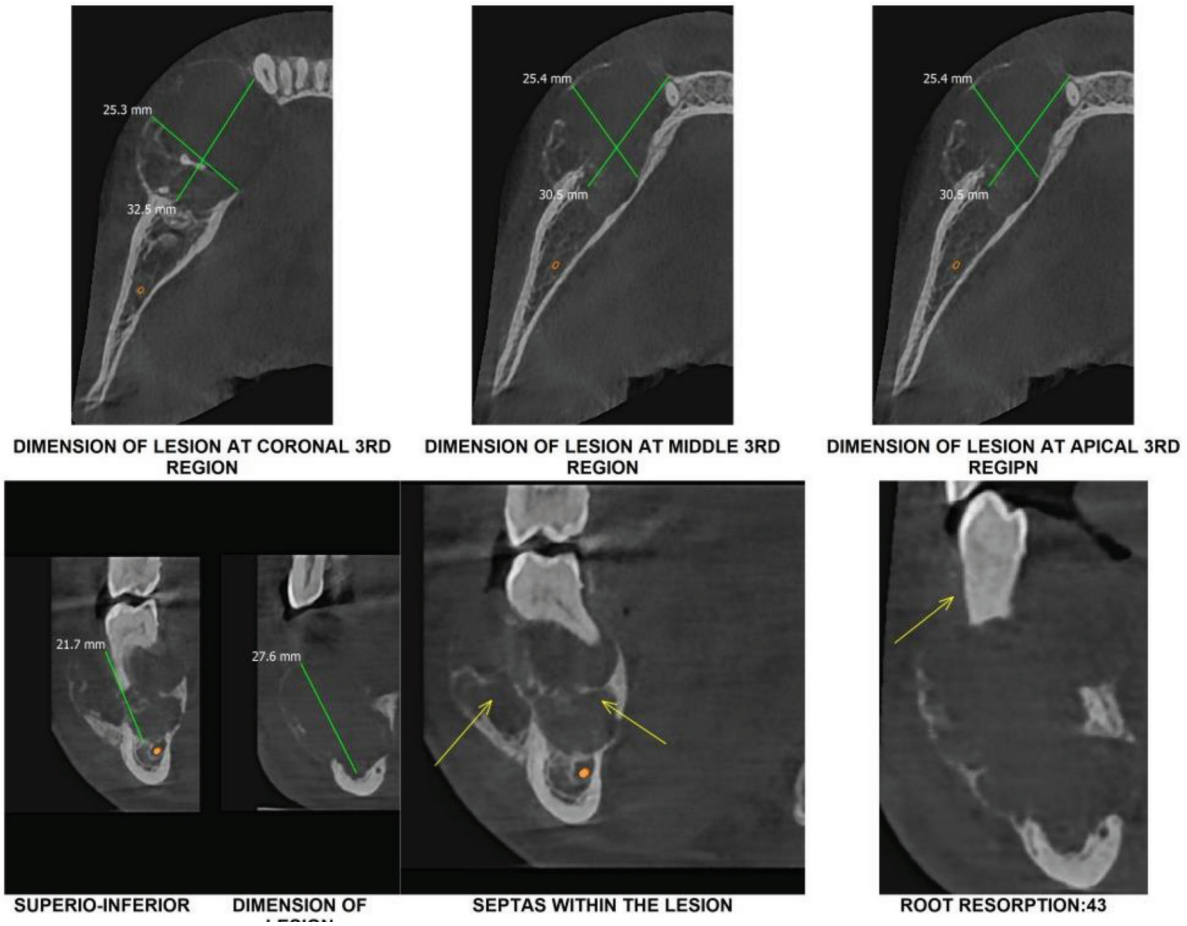

Fig. 3: Axial and curvilinear section of right mandibular radiolucency.

Incisional biopsy was done from the intraoral site, from the buccal aspect, under local anesthesia. Multiple bits measuring 0.5*0.5 cm were submitted. Histopathologic examination revealed (Figure 4) stratified squamous epithelium lined tissue with submucosa showing a lesion composed of osteoclast-like giant cells, interspersed plump mononuclear cells in a vascularised stroma with extravasated RBCs. These findings were consistent with the Giant cell lesion favoring Giant cell granuloma. It is difficult to distinguish this lesion histologically from the brown tumor of hyperparathyroidism. Hence serum levels of calcium, phosphorus, and alkaline phosphatase were advised which were found to be within normal limits. The final hematopathology report was in the normal range. CBC was in the normal range. neutrophils were slightly raised. Therefore, CGCG was diagnosed.

Management:Anenucleationand curettage with reconstruction plating were plannedunder general anesthesia (Figure 5). Central giant cell lesion

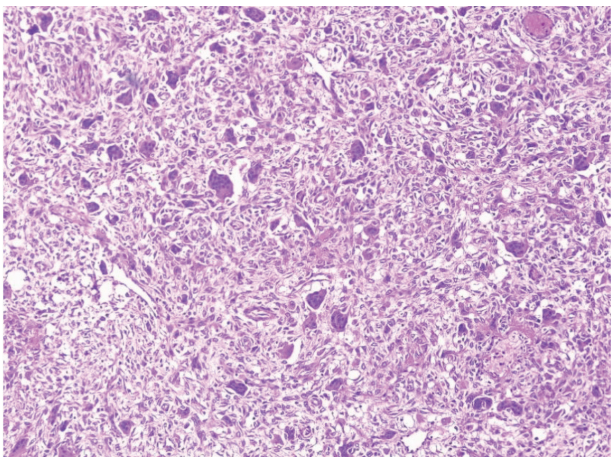

Fig. 4: Photomicrograph showing the presence of giant cells (H and E, ×10)

of right posterior mandible was enucleated and curettage with extraction of 42, 43, 44,47, 48 under GA. Intermaxillary fixation was done. Antibiotic prophylaxis (Augmentin 625 mgtwice per day, Metrogyl 400 mg thrice a day for 5 days orally) started 24 hours before surgery was prescribed before the surgical procedure and was continued 5

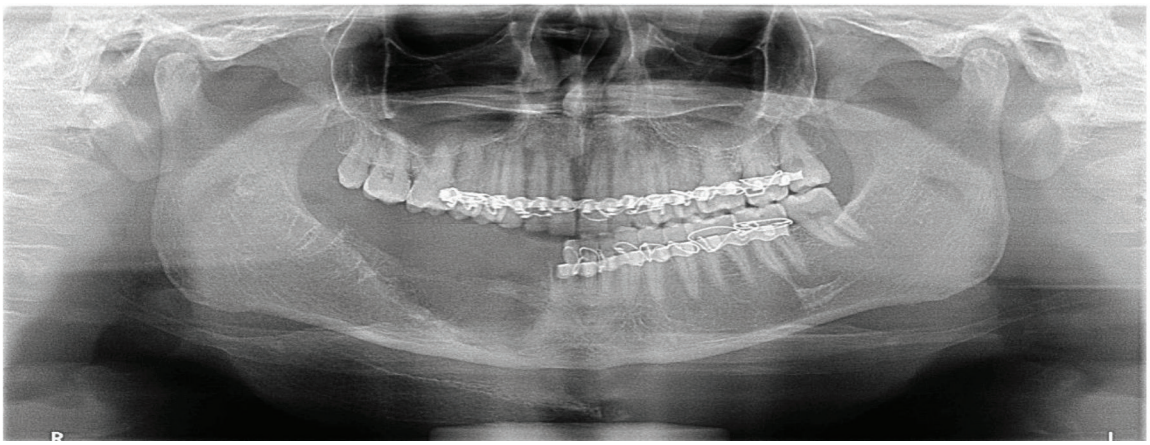

Fig. 5: Orthopantomograph showing the reconstruction plate repairing the defect in the right mandible

days after the surgery. The patient was followed up after 7-days.

Discussion

CGCG is a proliferative lesion of undetermined etiology, which is nonneoplastic. While the exact cause of CGCG of jawbones is unknown, theories include increased reparative processes brought on by prior trauma and intraosseous hemorrhage, which in turn sets off the reactive granulomatous process.[5,6]Giant cell lesions of the jaws were commonly diagnosed as giant cell tumorsbefore the early 1950s, and these lesions were thought to be comparable to extragnathic skeleton lesions. To differentiate these lesions from giant cell tumors, which are typically located in the epiphyseal areas of long bones, Jaffe' introduced the term giant cell reparative granuloma in 1953. Jaffe thought that these lesions in the jaw were probably a result of a local reparative reaction rather than actual neoplasms. Following the widespread acceptance of Jaffe's theories, the jaw lesions have been referred to as giant cell granuloma or giant cell reparative granuloma since 1953.[9]

Bone tumors in the craniomaxillofacial region can be difficult to correctly identify and diagnose. Radiographically, several bone tumors, including the CGCG, aneurysmal bone cyst, ameloblastoma, ossifying fibroma, odontogenic myxoma, sarcomas, and arteriovenous malformations, show like soap bubbles or honeycombs with scalloped edges.8 When diagnosing expansile lesions of the mandible, lymphoid neoplasia such as non-Hodgkin's lymphomas and infectious granulomas must also be taken into account.[10] All granulomatous diseases have one thing in common: they are all characterized by a chronic inflammatory response with distinct microscopic granulomas that form as a result of either known or unknown etiologic agents, such as neoplastic processes, trauma, autoimmune diseases, or bacteria, fungal, or parasitic infections[11]. Furthermore, the existence of distinct multinucleated big cells with uniformly distributed nuclei suggested CGCG. On radiography, CGCG can appear in a variety of ways. Usually, the lesion appears as a unilocular or multilocular radiolucency. It exhibits varying cortical plate destruction and expansion and can be well-defined or poorly characterized. The lesion's radiological appearance is not pathognomonic and can be mistaken for several different jaw lesions. Histopathology ultimately provides the definitive diagnosis because radiological and clinical findings are not very specific. In most cases, CGCG of the jaw manifests as a single, painless radiolucent enlargement. Certain lesions are more harmful and have a clear propensity to return. A more aggressive type of such lesion will require more radical treatment.[12]

The clinical and radiographic findings will determine how the patient's CGCG is managed. In general, curettage of well-defined localized lesions is linked to a low rate of recurrence[13]. In cases where there is radiographic evidence of cortical perforation in extensive lesions, more radical excision is required, requiring even partial

maxillectomy or mandibulectomy. The medical management of CGCG as a supplement to surgery involves the use of steroids or calcitonin, which inhibits osteoclastic activity[14]. Interferonalpha could be useful in the management of aggressive CGCG, presumably due to its anti-angiogenic effects[15].Bisphosphonates have been administered intravenously in CGCG with promising results[16]. The gold standard of treatment of CGCG is surgical enucleation and curettage, and this was used in the case presented.

Conclusion

In conclusion, the case of central giant cell granuloma (CGCG) of the right mandible highlights the importance of early diagnosis and comprehensive treatment planning in managing this uncommon, yet potentially aggressive lesion. The patient's successful outcome following surgical intervention emphasizes the effectiveness of enucleation and curettage in treating CGCG. Regular follow-up is essential to monitor for recurrence, which remains a concern due to the lesion's locally aggressive nature. This case underscores the need for a multidisciplinary approach, involving oral surgeons, radiologists, and pathologists, to ensure optimal patient care and management.This case provides valuable insights for oral medicine and radiologists, oral maxillofacial surgeons and other dental professionals, highlighting the need for awareness of CGCG as a potential complication following dental extractions.

Informed Consent was obtained.

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Ethical Clearance/Statement of Ethics*:* This is a case report so ethical clearance was not needed. Patient consent was taken.

Conflict of interest: The authors declare that they have no conflicts of interest about this article.

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