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Letter to Editor

Clinical Management and Long-Term Follow-Up of Central Giant Cell Granulomas in the Jaw Bones: Case Reports and Treatment Outcomes

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ABSTRACT

Central giant cell granulomas (CGCG) are benign jaw lesions most commonly found in dentate regions. They typically exhibit slow growth and appear as unilocular or multilocular radiolucencies on radiographic examination. Enucleation with curettage remains the treatment of choice; however, long-term follow-up is recommended due to the significant risk of recurrence. This report presents two cases of CGCG and discusses their clinical outcomes in relation to current literature.

Keywords: central, giant cell granuloma, radiolucent lesion

Dear Editor,

According to the World Health Organization, central giant cell granuloma (CGCG) is a non-odontogenic, non-neoplastic intraosseous lesion. It is characterized histologically by numerous hemorrhagic foci, clusters of multinucleated giant cells, and interlacing bone trabeculae [1,2]. CGCG accounts for approximately 7% of benign lesions of the jaw bones. It predominantly affects the mandible (75%), with fewer cases involving the maxilla [2,3]. CGCG typically affects patients aged 10–25 years and is more common in females. The lesion often crosses the midline and occurs anterior to the first molars in the mandibular body [4]. The etiology of CGCG remains unclear; although Jaffe considered it a reactive lesion related to trauma-induced reparative processes, other theories suggest an inflammatory etiology. CGCG typically presents as a painless, slow-growing lesion. It often causes cortical bone expansion and may be detected incidentally on radiographs. In some cases, it may also cause root resorption and displacement of adjacent teeth. Radiographically, it appears as a unilocular

or multilocular radiolucent lesion [5]. Histopathological examination reveals features consistent with CGCG, including vascularized fibrous connective tissue, hemorrhagic foci, hemosiderin pigment, multinucleated giant cells, and bone trabeculae [6]. The conventional treatment involves curettage, or resection with a margin of healthy bone. However, in children and adolescents, surgery may impair tissue development and cause facial deformities. Alternative treatments, including corticosteroids, calcitonin, interferon-alpha, and radiotherapy, have been explored [3].

PATIENT PRESENTATION

Patient 1

A 22-year-old female presented with swelling and mild spontaneous pain localized in the anterior maxilla region. CT revealed a radiolucent lesion associated with bone destruction and root resorption of the adjacent teeth. Enucleation and curettage were performed. Due to the poor prognosis of the central and lateral incisors involved in the lesion, these teeth were extracted.Histopathological examination revealed vascularized fibrous connective tissue with hemorrhagic foci and hemosiderin pigment, confirming the diagnosis of central giant cell granuloma. The patient was also referred to the endocrinology department to rule out primary hyperparathyroidism and Brown tumor. Endocrine evaluations revealed no abnormalities. The patient was followed up regularly for 15 years, during which no recurrence was observed (Figure 1).

Main Points

- Central giant cell granuloma (CGCG) is a rare, benign but potentially aggressive lesion primarily affecting the anterior mandible and maxilla in young adults.
- This case series presents two patients with CGCG treated surgically with curettage and marginal resection, including tooth extraction to minimize recurrence risk.
- Long-term follow-up (15 and 19 years) demonstrated no recurrence, supporting the efficacy of the individualized conservative surgical approach.
- Early diagnosis and multidisciplinary management including clinical, radiological, and histopathological evaluation are essential for optimal outcomes.
- Regular postoperative monitoring is crucial for timely detection of recurrence and ensuring long-term treatment success.

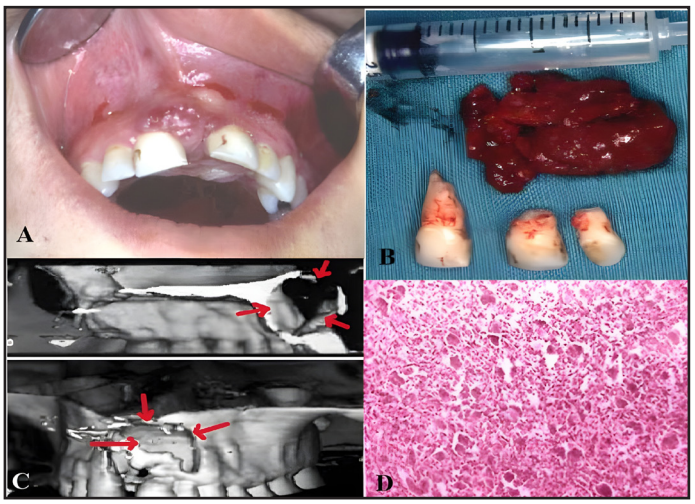

Figure 1. Clinical, Radiological, Surgical, and Histopathological Findings of a Central Giant Cell Granuloma Located in the Anterior Maxillary Region

A: Intraoral clinical view of a well-defined radiolucent lesion located in the anterior maxilla.

B: Post-surgical appearance following excision of the lesion and extraction of the adjacent teeth.

C: Three-dimensional computed tomography image of the maxilla within the craniofacial skeleton.

D: Histopathological image showing multinucleated giant cells situated within a vascularized fibrous connective tissue containing numerous hemorrhagic foci and hemosiderin pigment.

Patient 2

A 28-year-old male patient presented to our clinic with complaints of swelling and mild spontaneous pain in the anterior mandibular region. After clinical examination, computed tomography (CT) was performed. It revealed a lesion in the anterior mandible causing cortical bone destruction. Treatment included curettage followed by marginal resection. As the prognosis of both canine teeth directly associated with the lesion was considered poor, they were extracted.Histopathological findings were consistent with CGCG as described above. Numerous hemorrhagic foci and hemosiderin pigment were also observed. Similar to the first case, the patient was referred to the endocrinology department to exclude primary hyperparathyroidism and Brown tumor. Endocrine evaluations were within normal limits. These findings confirmed the diagnosis of CGCG (Figure 2). The patient has been monitored at regular intervals following surgery, and no signs of recurrence have been observed during the 19-year follow-up period. The long-term postoperative intraoral clinical outcomes for both patients are illustrated (Figure 3).

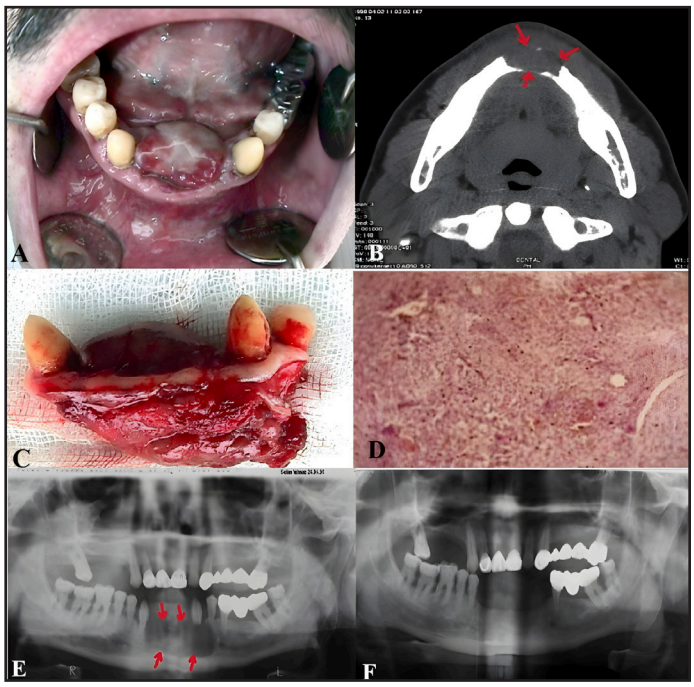

Figure 2. Clinical, Radiological, Surgical, and Histopathological Findings of a Central Giant Cell Granuloma Located in the Anterior Mandibular Region

A: Intraoral clinical view of a well-defined lesion located in the anterior mandible.

B: Computed tomography image showing a well-demarcated radiolucent lesion within the bone.

C: Surgical view obtained following excision of the lesion along with the associated teeth.

D: Histopathological examination revealing multinucleated giant cells within a vascularized fibrous connective tissue containing numerous hemorrhagic foci and hemosiderin pigment (H&E staining).

E: Preoperative panoramic radiograph showing a radiolucent area in the anterior mandibular region.

F: Postoperative panoramic radiograph at the 10-year follow-up demonstrating new bone formation and healing in the area where the lesion was excised.

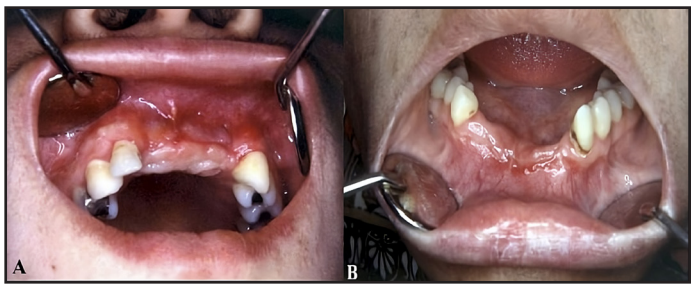

Figure 3. Postoperative Intraoral Clinical Photographs of Patients 1 and 2

A: Intraoral clinical photograph at the 5-year follow-up of the lesion located in the anterior maxilla.

B: Intraoral clinical photograph at the 10-year follow-up of the lesion located in the anterior mandible.

DISCUSSION

According to Whitaker's analysis of 142 cases, giant cell lesions are most commonly located in the mandible (75%), particularly in its anterior region (49%) [7].One case involved the anterior maxilla, whereas the other was located in the anterior mandible. This is partly consistent with previous studies, which identify the anterior mandible as the most frequently affected site. Chuong highlighted that the aggressive subtype of CGCG is more common in children and has a high recurrence potential [8]. Adjacent teeth were extracted to minimize the risk of recurrence by ensuring complete removal of lesion cells. This procedure increases the likelihood of complete excision. No recurrences were observed during long-term follow-up.Garnier reported that CGCG can cause root resorption and tooth displacement due to lesion growth [9]. These clinical features support the characterization of CGCG as a locally aggressive lesion, as previously described in the literature.

The clinical and radiological features of central giant cell granulomas (CGCG) have been well characterized in recent studies. Shrestha et al. reported that these lesions typically appear on CT scans as expansile radiolucencies with cortical thinning and bone destruction [2]. Current literature indicates that CGCGs generally present as uni- or multilocular radiolucencies, often exhibiting a "soap bubble" or "honeycomb" appearance. Tooth displacement is observed in approximately 50% of cases, and root resorption in 37%. Lesions are commonly located in the anterior mandible of young patients and are more frequent in females [10]. These findings are consistent with the clinical presentations of our cases.

Both surgical and medical approaches have been described for treatment. Conservative surgery, consisting of curettage with peripheral ostectomy, is considered the standard treatment for non-aggressive lesions, whereas aggressive or recurrent lesions may require en bloc resection. Recent adjunctive therapies include intralesional corticosteroid injections, calcitonin, interferon-alpha, bisphosphonates, and denosumab [11]. Denosumab, in particular, has shown promising results in reducing lesion size, but its use is limited due to potential side effects, such as jaw osteonecrosis.

Differential diagnosis is critical in CGCG management. Lesions such as Brown tumors secondary to primary hyperparathyroidism, aneurysmal bone cysts, ameloblastomas, odontogenic myxomas, cherubism, and central odontogenic fibromas may present with similar clinical and radiological features [12]. Distinguishing CGCG from these lesions requires biochemical tests, histopathological evaluation, and imaging studies. In our cases, endocrinological assessment excluded Brown tumors, and histopathological findings confirmed the diagnosis of CGCG.

CONCLUSION

Central giant cell granulomas, particularly those exhibiting aggressive behavior, require careful and individualized treatment planning. A multidisciplinary approach incorporating clinical, radiological, and histopathological findings is essential for accurate diagnosis.In pediatric patients, conservative but timely intervention is recommended for permanent tooth germs affected by the lesion. However, radical surgery should be considered when recurrence risk is high. Long-term follow-up is crucial for the early detection of recurrence and monitoring the efficacy of the therapeutic approach.

Yours sincerely,

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Data Availability Statement: The data supporting the findings of this study are available from the corresponding author upon reasonable request.

Author's Statement Regarding the Use of Artificial Intelligence-Supported Tools: Artificial intelligence (AI)-supported tools were used at a rate of 22% during the preparation of this manuscript. This percentage resulted primarily from the inclusion of standardized content, such as the Declaration of Helsinki and universally accepted histopathological terminology, which may contain commonly used and repeated phrases. AI tools were utilized solely for formatting purposes. All scientific content, interpretations, and conclusions were entirely generated by the authors, who bear full responsibility for the integrity and originality of the work.

Informed Consent: All patients included in this study provided written informed consent for the use of their clinical data and images for research and publication purposes. Patient confidentiality and anonymity were strictly maintained throughout the study.

Conflict of Interest: The authors declare no conflict of interest regarding the publication of this article. No financial, personal, or professional affiliations exist that could have influenced the content or outcomes of this study.

Ethical Approval: In this case series, all procedures involving human subjects were conducted in accordance with the ethical standards of our institution and the Declaration of Helsinki. Patient confidentiality was strictly maintained, and a thorough informed consent process was carried out in each case.

Author Contributions: Burak Akay: Conception, Design, Writing, Mert Kirdemir: Supervision, Writing, Critical Review, Kemal Dindar: Materials, Literature Review, Hüseyin Koca: Data Collection and Processing, Analysis and Interpretation.

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