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Aggressive Central Giant Cell Granuloma of the Maxilla Presenting as Extensive Hemimaxillary Expansion: A Case Report

Soukaina Oujdad[1], Sanaa Rimaoui[1,2], Lamiaa Kissi[1]

[1]Department of Oral Surgery, Dental Consultation and Treatment Center, Ibn Rochd University Hospital Center, Faculty of Dental Medicine, Hassan II University, Casablanca, Morocco
[2]Removable Prosthodontics Department, Dental Consultation and Treatment Center, Ibn Rochd University Hospital Center, Faculty of Dental Medicine, Hassan II University, Casablanca, Morocco
Email: soukainaoujdad@gmail.com

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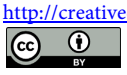

Abstract

Central giant cell granuloma (CGCG) is an uncommon benign intraosseous lesion of the jaws characterized by the proliferation of multinucleated giant cells within a fibrovascular stroma. Although most lesions present as slow-growing and asymptomatic, aggressive forms may cause significant bone destruction and involvement of adjacent anatomical structures. Maxillary localization is relatively rare and may present diagnostic and therapeutic challenges due to the proximity of the maxillary sinus, nasal cavity, and orbital floor. We report the case of a 20-year-old patient with no significant medical history who presented with a progressive bony expansion of the left hemimaxilla evolving over six months. Clinical examination revealed a hard, painless intraoral swelling extending from the vestibular and palatal aspects of teeth 22 to 27, with normal overlying mucosa and no regional lymphadenopathy. Panoramic radiography demonstrated a radiopaque osseous lesion involving the left maxilla. Cone-beam computed tomography (CBCT) revealed a large complex lesion occupying the entire left hemimaxilla with extension into the maxillary sinus, the lateral wall of the nasal cavity, and the orbital floor. Histopathological examination following incisional biopsy confirmed the diagnosis of central giant cell granuloma. The patient underwent left hemimaxillectomy under general anesthesia with complete en bloc resection of the lesion. Postoperative rehabilitation was achieved using a maxillofacial obturator prosthesis to restore oral-nasal separation and improve functional outcomes. Extensive maxillary CGCG remains a rare but potentially aggressive lesion requiring careful radiological assessment and histopathological confirmation. Radical surgical management combined with appropriate prosthetic rehabilitation can provide satisfactory

functional and aesthetic outcomes while reducing the risk of recurrence.

Subject Areas

Maxillofacial Surgery, Oral Pathology

Keywords

Central Giant Cell Granuloma, Hemimaxillectomy, Maxillofacial Prosthesis

1. Introduction

Central giant cell granuloma (CGCG) is an uncommon benign intraosseous lesion of the jaws characterized by the proliferation of multinucleated osteoclast-like giant cells within a fibrovascular stroma. First described by Jaffe in 1953 as a "giant cell reparative granuloma", this entity is currently considered a benign but potentially locally aggressive lesion with variable clinical behavior ranging from slow-growing asymptomatic lesions to rapidly expanding destructive tumors [1].

CGCG accounts for approximately 7% of benign jaw lesions and predominantly affects children and young adults, with a higher prevalence in females [2]. The mandible is more frequently involved than the maxilla, particularly the anterior region crossing the midline [3]. Maxillary lesions are less common but may demonstrate more extensive growth due to the thin cortical bone and the proximity of adjacent anatomical structures such as the maxillary sinus, nasal cavity, and orbit [4].

Clinically, CGCG typically presents as a painless swelling causing progressive expansion of the cortical plates. Radiographically, the lesion may appear as a unilocular or multilocular radiolucency, sometimes associated with cortical thinning, tooth displacement, or root resorption [2]. Because these features overlap with those of other giant cell-rich lesions of the jaws, including brown tumors of hyperparathyroidism, aneurysmal bone cysts, and giant cell tumors, histopathological examination remains essential for definitive diagnosis [5].

The management of CGCG remains controversial and depends largely on the biological behavior of the lesion. Treatment options range from conservative approaches, such as curettage or intralesional corticosteroid therapy, to more aggressive surgical resections in cases of extensive or aggressive lesions [6]. Reconstruction and prosthetic rehabilitation may be necessary when large maxillary defects are created following tumor removal in order to restore oral function and quality of life [7].

In this report, we present a rare case of an extensive central giant cell granuloma involving the left hemimaxilla in a young adult patient, with extension into the maxillary sinus, nasal cavity, and orbital floor. The clinical, radiological, and histopathological features, as well as the surgical management and prosthetic rehabilitation, are discussed in light of the current literature.

2. Case report

A 20-year-old male patient with no significant medical history presented with a progressive maxillary left-sided bone expansion that had been evolving for approximately six months.

Extraoral examination did not reveal any facial asymmetry or visible facial deformity.

On intraoral examination, a bony expansion of the left hemimaxilla was observed, extending from the vestibular and palatal aspects of teeth 22 to 27. The swelling was covered by clinically normal mucosa. On palpation, the lesion was hard in consistency, non-tender, and non-fluctuant, consistent with a bony expansion. No regional lymphadenopathy enlargement was detected (Figure 1).

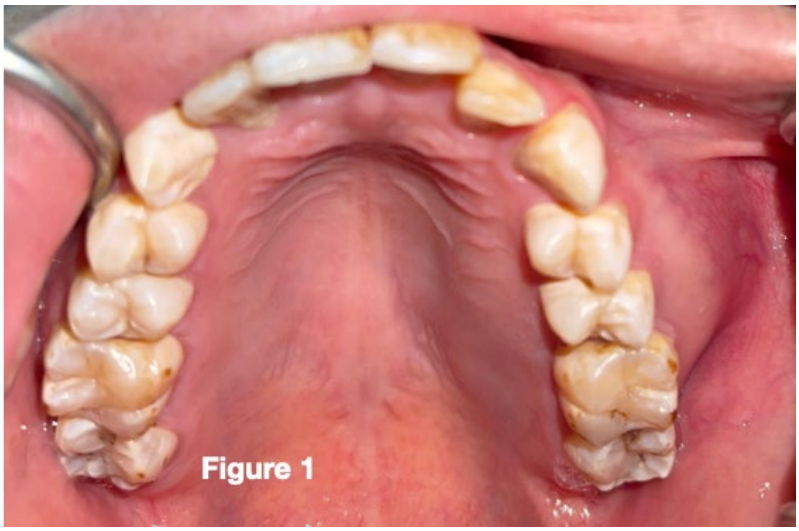

Figure 1. Intraoral clinical view showing a bony expansion of the left hemimaxilla extending from tooth 22 to tooth 27. The overlying mucosa appears healthy and intact, with no signs of ulceration, bleeding, or inflammation. The swelling was firm on palpation and asymptomatic, with no associated pain.

The lesion appeared as a predominantly radiopaque to mixed-density mass on panoramic imaging, which is atypical for central giant cell granuloma, classically described as radiolucent. However, CBCT analysis revealed a heterogeneous internal structure with areas of lower density, cortical expansion, and invasion of adjacent anatomical spaces. The presence of internal septations, bone remodeling, and aggressive expansion maintained CGCG in the differential diagnosis despite the unusual radiographic appearance (Figure 2).

Based on the clinical and radiological findings, the initial differential diagnosis included ossifying fibroma, fibrous dysplasia, and central giant cell granuloma.

An incisional bone biopsy was subsequently performed under local anesthesia, and histopathological examination confirmed the diagnosis of central giant cell granuloma. To exclude a brown tumor associated with hyperparathyroidism, a metabolic workup was performed including serum calcium, phosphate, and parathyroid hormone levels, all of which were within normal limits (PTH: 35.8 ng/L).

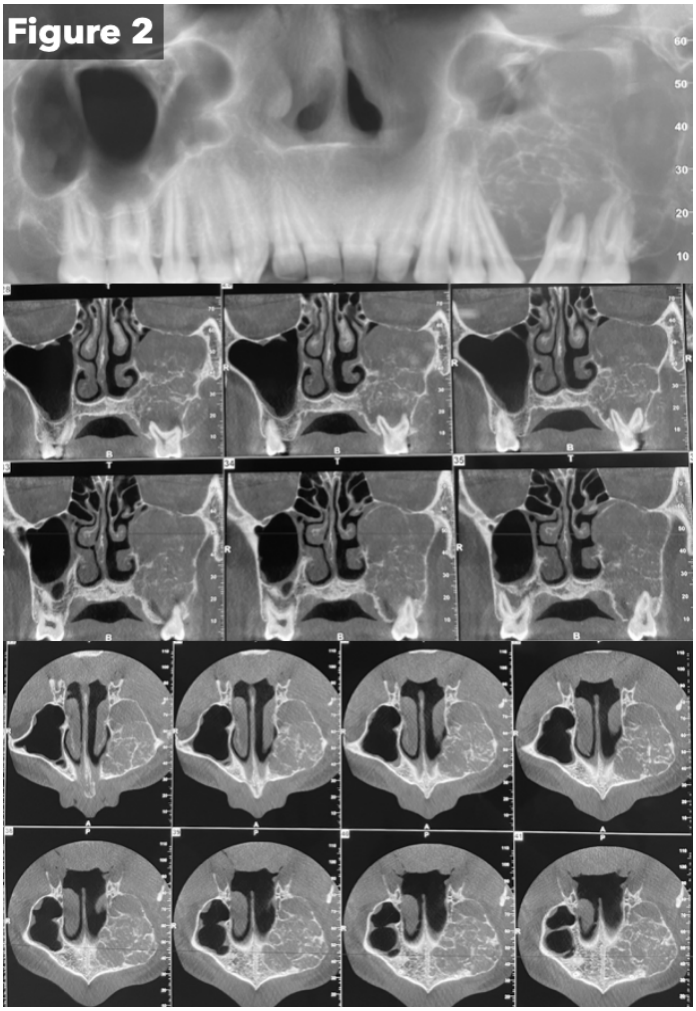

Figure 2. Panoramic and cone-beam computed tomography (CBCT) reconstruction demonstrating a large, well-defined mixed radiolucent-radiopaque lesion with a multilocular "honeycomb" internal pattern involving the left hemimaxilla. The lesion extends from the region of teeth 22 to 27 and is associated with expansion of the maxillary bone, with involvement of the left maxillary sinus, the lateral wall of the nasal cavity, and the floor of the orbit.

Histopathological examination of the incisional biopsy revealed numerous multinucleated osteoclast-like giant cells irregularly distributed within a cellular fibrovascular stroma. Areas of hemorrhage and hemosiderin deposition were observed, along with scattered reactive bone formation. These findings were consistent with central giant cell granuloma.

The final surgical specimen confirmed the same histopathological features without evidence of malignancy.

Given the extensive size of the lesion, its aggressive behavior, and its extension into the maxillary sinus, nasal cavity, and orbital floor, conservative management options such as curettage or medical therapy were considered insufficient. Hemimaxillectomy was therefore chosen to ensure complete removal and minimize the

risk of recurrence. After adequate surgical access was obtained, the lesion was resected en bloc together with the involved portion of the left hemimaxilla, ensuring clear surgical margins. The surgical specimen was submitted for definitive histopathological examination, which confirmed the diagnosis.

Following tumor resection, a maxillary defect communicating with the oral cavity, maxillary sinus, and nasal cavity was created (Figure 3). To restore the separation between the oral and nasal cavities and to allow early functional rehabilitation, the patient was managed with a maxillofacial prosthetic obturator (Figure 4).

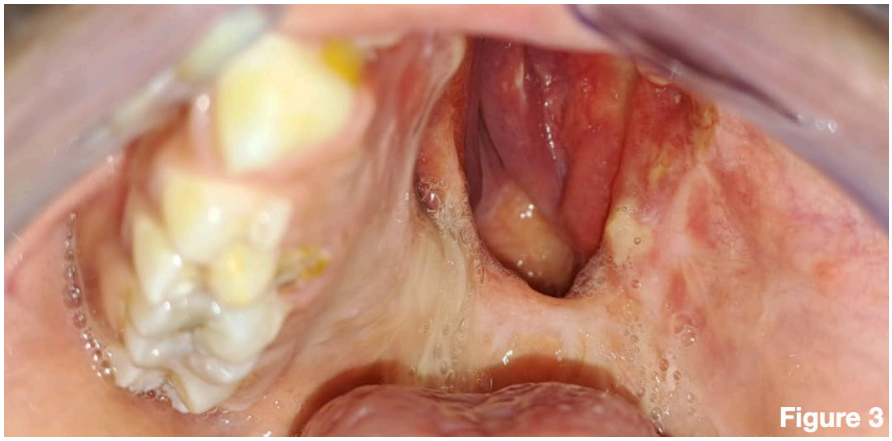

Figure 3. Intraoperative view following tumor resection showing the postoperative maxillary defect and the margins of the left hemimaxillectomy.

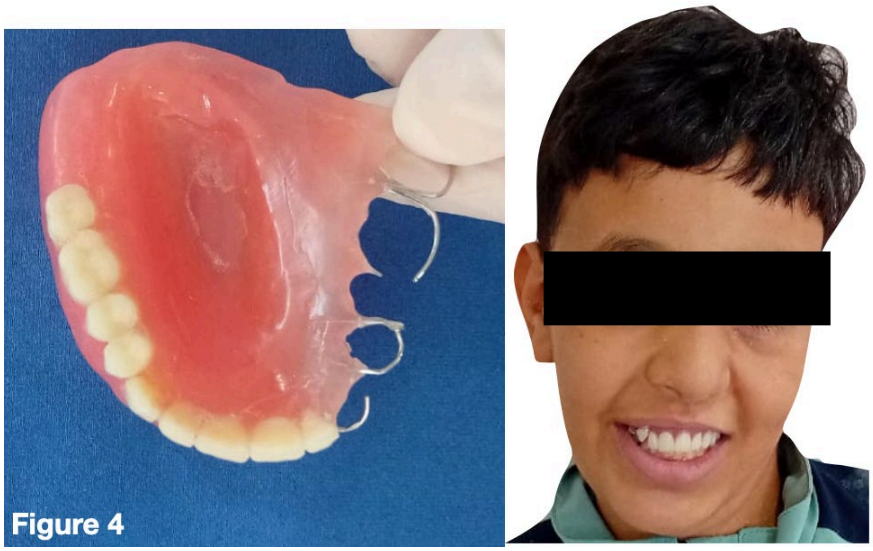

Figure 4. Maxillofacial obturator prosthesis and intraoral placement following hemimaxillectomy. The prosthetic rehabilitation restores the palatal defect, re-establishes oral-nasal separation, and contributes to the restoration of facial support, masticatory function, speech, and smile aesthetics.

An immediate surgical obturator was first placed at the end of the procedure to facilitate wound protection, support soft tissue healing, and improve postoperative functions such as speech and swallowing. Subsequently, after the initial healing period, the patient was referred for definitive prosthetic rehabilitation. A max-

illofacial obturator prosthesis was fabricated to restore the palatal defect, improve mastication and phonation, and re-establish the separation between the oral and nasal cavities, thereby significantly improving the patient's functional outcomes and quality of life.

The patient was followed postoperatively with weekly relining of the interim obturator using a delayed-setting impression material until complete healing was achieved.

At the 12-month follow-up, no signs of bleeding, pain, or inflammation were observed. The fibromucosal tissue lining the surgical defect appeared healthy and well-adapted. Importantly, no clinical or radiological signs of recurrence were detected during the follow-up period.

Based on these favorable outcomes, the patient is currently scheduled for definitive rehabilitation with a cast removable partial denture incorporating an obturator.

3. Discussion

Central giant cell granuloma (CGCG) is a benign intraosseous lesion characterized histologically by the presence of multinucleated osteoclast-like giant cells within a fibrovascular stroma with areas of hemorrhage and occasional reactive bone formation [8]. First described by Jaffe in 1953 as a "giant cell reparative granuloma", its exact etiology remains uncertain, and several mechanisms including reactive, developmental, or neoplastic origins have been proposed [8] [9].

CGCG predominantly affects young individuals, most commonly during the first three decades of life, with a slight female predominance [2] [3]. The lesion is more frequently observed in the mandible, particularly in the anterior region, whereas involvement of the maxilla is less common. When located in the maxilla, however, the lesion may expand extensively because of the thin cortical bone and proximity to anatomical cavities such as the maxillary sinus and nasal cavity [1] [2]. In the present case, the lesion involved the entire left hemimaxilla and extended into the maxillary sinus, nasal cavity, and orbital floor, which represents a relatively uncommon but well-documented presentation of aggressive CGCG.

Clinically, CGCG typically presents as a painless swelling associated with progressive cortical bone expansion. However, aggressive lesions may show rapid growth, cortical perforation, tooth displacement, and root resorption [8] [9]. Radiographically, the lesion most commonly appears as a unilocular or multilocular radiolucent defect with variable internal septa and cortical expansion, although these features are not pathognomonic [3] [6]. Although CGCG is typically radiolucent, atypical mixed or radiopaque presentations have been reported, particularly in lesions with internal bone formation or long-standing evolution [10].

Among these entities, the brown tumor of hyperparathyroidism is particularly important because it is histologically indistinguishable from CGCG. Consequently, biochemical evaluation including serum calcium, phosphate, and parathyroid hormone levels is necessary to exclude an underlying metabolic

disorder [11].

In the present case, the diagnosis of CGCG was confirmed following incisional biopsy and histopathological examination, which demonstrated multinucleated giant cells dispersed within a cellular fibrovascular stroma, consistent with the classical histological features of this lesion.

The therapeutic management of CGCG remains controversial due to its unpredictable biological behavior. Treatment options range from conservative approaches such as curettage to more aggressive surgical resections depending on lesion size, location, and aggressiveness [12]. Conservative surgical curettage is generally recommended for small, well-defined lesions, whereas extensive lesions with cortical perforation or invasion of adjacent anatomical structures may require more radical surgical approaches [6]. In aggressive cases, procedures such as partial maxillectomy may be necessary to ensure complete removal of the lesion and reduce the risk of recurrence [4].

In the present case, the lesion exhibited extensive involvement of the maxilla with invasion of the maxillary sinus and adjacent structures. Therefore, a hemimaxillectomy was performed in order to achieve complete surgical excision and adequate oncologic margins. Surgical excision remains the most widely used treatment modality and is reported in approximately three-quarters of cases described in the literature [12].

Several non-surgical treatment modalities have also been proposed in recent years, particularly for large lesions or in young patients in order to avoid extensive surgical defects. These include intralesional corticosteroid injections, calcitonin therapy, interferon-α, and more recently denosumab [13]. These pharmacological approaches aim to inhibit osteoclastic activity and reduce lesion size, sometimes allowing less invasive surgery. However, their effectiveness remains variable and further studies are needed to establish standardized treatment protocols [13].

Recurrence is one of the main concerns in the management of CGCG. Reported recurrence rates vary widely in the literature, ranging from approximately 13% to 22%, with most recurrences occurring within the first two years after treatment [3] [6] [13]. Factors associated with higher recurrence rates include aggressive clinical behavior, cortical perforation, and inadequate surgical removal [3] [4]. Therefore, long-term clinical and radiological follow-up is recommended to detect possible recurrence at an early stage.

Another important aspect in the management of extensive maxillary lesions is postoperative functional rehabilitation. Maxillectomy may result in oro-nasal communication leading to significant impairment of speech, swallowing, and mastication. In such cases, prosthetic rehabilitation with an obturator plays an important role in restoring oral function and improving quality of life. Immediate surgical obturators are commonly placed following tumor resection to protect the surgical site and facilitate early postoperative function, and they are subsequently replaced by definitive prosthetic obturators once healing is completed [14].

4. Conclusion

This case highlights the diagnostic and therapeutic challenges associated with extensive CGCG of the maxilla. It also emphasizes the importance of a multidisciplinary approach involving oral surgeons, pathologists, radiologists, and prosthodontists to achieve optimal management, functional rehabilitation, and long-term follow-up.

Informed Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying clinical images. All identifying information has been omitted to ensure patient confidentiality. Ethical approval was not required for this single case report in accordance with institutional guidelines.

Conflicts of Interest

The authors declare no conflicts of interest.

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