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CASE REPORT

Central Giant Cell Granuloma of the Sinonasal Region with Orbital Extension Causing Severe Facial Deformity: A Case Report

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Abstract

Background: Central giant cell granuloma (CGCG) is a benign osteolytic lesion that predominantly arises in the jaws of children and young adults. Involvement of the sinonasal region is exceptionally rare and may present significant diagnostic and therapeutic challenges because of the close proximity to critical craniofacial structures. **Case Presentation:** We report an adult patient who presented with progressive nasal obstruction and marked facial asymmetry caused by an expansile sinonasal mass. Magnetic resonance imaging demonstrated a homogeneously enhancing lesion measuring approximately 45 × 45 × 62 mm involving the left frontal and ethmoid sinuses, with extension into the medial left orbit and compression of the globe without intracranial invasion. Histopathological examination confirmed the diagnosis of central giant cell granuloma. Complete surgical excision was considered technically challenging because of the lesion's extent and anatomical location. Following multidisciplinary tumor board discussion, adjuvant radiotherapy was recommended to improve local disease control while minimizing treatment-related morbidity. **Conclusion:** Although uncommon, central giant cell granuloma should be included in the differential diagnosis of aggressive sinonasal masses. Management of extensive craniofacial lesions requires multidisciplinary evaluation, and adjuvant radiotherapy may represent a reasonable therapeutic option when complete surgical resection is not feasible.

Keywords: Central Giant Cell Granuloma, Sinonasal Neoplasms, Orbital Involvement, Radiotherapy, Craniofacial Lesions

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Introduction

Central giant cell granuloma (CGCG) is a benign but potentially locally aggressive osteolytic lesion characterized histologically by multinucleated giant cells dispersed within a fibrovascular stroma. First described by Jaffe in 1953 as "giant-cell reparative granuloma," CGCG most commonly affects the mandible and maxilla, with a predilection for children, adolescents, and young adults, particularly females [1, 2]. Although generally considered benign, its biological behavior is heterogeneous, ranging from slowly growing asymptomatic lesions to aggressive tumors associated with rapid expansion, cortical bone destruction, root resorption, tooth displacement, and local recurrence [2-4].

The pathogenesis of CGCG remains incompletely understood. Similar giant-cell lesions may occur in association with inherited disorders such as cherubism, Noonan syndrome, and neurofibromatosis type 1, making careful clinicopathological correlation essential for accurate diagnosis [3, 5]. While the vast majority of lesions arise within the jaws, involvement of the sinonasal tract, orbit, or craniofacial skeleton is exceedingly rare. Lesions in these locations present unique diagnostic and therapeutic challenges because of their proximity to the orbit, skull base, and other critical neurovascular structures [3, 6].

Here, we report an unusual case of aggressive CGCG arising within the frontal and ethmoid sinuses with orbital extension, producing significant facial deformity. The case highlights the importance of multidisciplinary management and discusses the potential role of adjuvant radiotherapy when complete surgical resection is limited by anatomical constraints.

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Case Presentation

An adult patient presented with progressive nasal obstruction accompanied by gradually increasing facial asymmetry. Clinical examination demonstrated a prominent mass involving the left naso-orbital region with evidence of orbital displacement but without visual impairment or neurological deficits.

Magnetic resonance imaging revealed a well-defined, avidly and homogeneously enhancing lobulated mass measuring approximately 45 × 45 × 62 mm. The lesion involved the left frontal and ethmoid sinuses with extension into the medial wall of the left orbit and infiltration of the adjacent subcutaneous tissues of the left naso-orbital region. The mass produced compression and lateral displacement of the left globe without evidence of optic nerve involvement, extraocular muscle invasion, intracranial extension, cystic degeneration, or necrosis.

Histopathological examination demonstrated a fibrocellular proliferation composed of spindle-to-oval mesenchymal cells containing numerous irregularly distributed multinucleated giant cells. Mitotic activity was present without significant cytologic atypia or necrosis. Focal invasion of adjacent bone and soft tissue was identified, supporting the diagnosis of an aggressive central giant cell granuloma.

Given the lesion's extensive craniofacial involvement and the anticipated morbidity associated with complete surgical excision, the case was reviewed in a multidisciplinary tumor board. Following discussion among head and neck surgeons, radiation oncologists, radiologists, and pathologists, adjuvant radiotherapy was recommended to optimize local disease control while preserving function and minimizing surgical morbidity.

Tumor Board Recommendation

Given the extensive residual disease, marked facial deformity, and the high likelihood of incomplete surgical resection with significant treatment-related morbidity, the case was reviewed by a multidisciplinary tumor board comprising head and neck surgeons, radiation oncologists, radiologists, and pathologists. After comprehensive evaluation, adjuvant radiotherapy was recommended as the most appropriate treatment strategy to optimize local disease control while preserving function and minimizing further cosmetic impairment. The patient was subsequently referred to the radiation oncology department for treatment planning (Figure 1).

Discussion

Central giant cell granuloma (CGCG) involving the sinonasal tract with orbital extension is an exceptionally rare clinical presentation. Unlike the more common mandibular and maxillary lesions, craniofacial involvement may result in substantial functional impairment and progressive facial deformity because of the close proximity to the orbit, skull base, and other critical anatomical structures [3, 6]. In the present case, extensive involvement of the frontal and ethmoid sinuses with orbital displacement resulted in significant cosmetic deformity and raised concerns regarding further local progression.

Surgical excision remains the cornerstone of treatment for CGCG and may range from simple curettage to en bloc resection depending on lesion size, anatomical

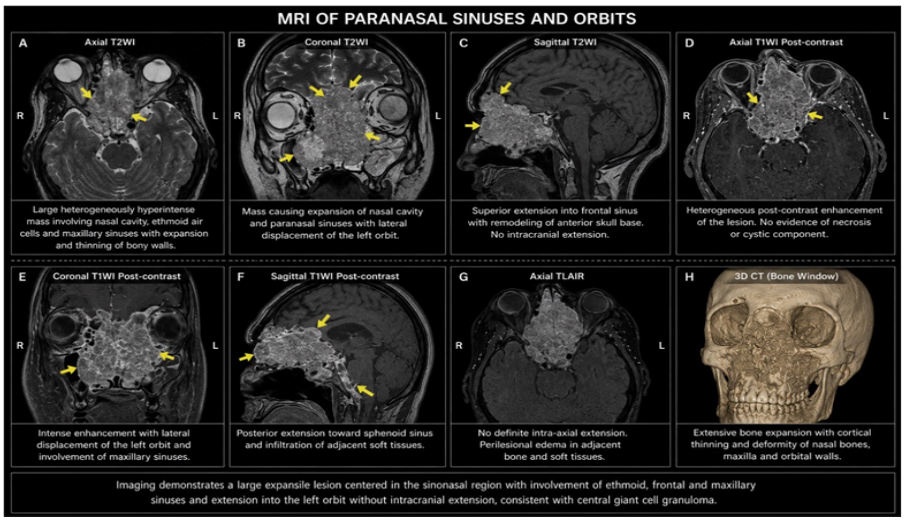

Figure 1. Pretreatment MRI of the Sinonasal Lesion. A. Axial T2-weighted MRI demonstrating a large expansile lesion centered within the left nasal cavity and ethmoid sinus with extension into adjacent paranasal sinuses and remodeling of surrounding bony structures. B. Coronal T2-weighted MRI showing superior extension of the lesion into the frontal sinus and lateral displacement of the left orbit secondary to mass effect. C. Sagittal contrast-enhanced T1-weighted MRI demonstrating craniocaudal extension of the lesion involving the frontal and ethmoid sinuses without evidence of intracranial invasion. D. Axial contrast-enhanced T1-weighted MRI revealing avid and relatively homogeneous enhancement of the lesion with extension into the left naso-orbital space. E. Coronal contrast-enhanced T1-weighted MRI illustrating erosion of adjacent bony structures, compression of the left orbital contents, and displacement of the globe. F. Sagittal contrast-enhanced T1-weighted MRI demonstrating anterior skull-base remodeling without definite intracranial extension. G. Axial FLAIR image showing the absence of parenchymal brain involvement and preservation of normal intracranial structures. H. Three-dimensional reconstruction illustrating extensive expansion and remodeling of the sinonasal skeleton with involvement of the maxillary, ethmoid, and frontal sinus regions.

location, and biological behavior [1, 4, 7]. However, complete excision can be technically challenging in lesions involving the sinonasal region or orbit because radical surgery may be associated with considerable functional and cosmetic morbidity. Consequently, alternative therapeutic approaches including intralesional corticosteroids, calcitonin, interferon-α, bisphosphonates, and more recently denosumab have been explored with variable success, particularly in aggressive or surgically challenging cases [7-9].

Emerging evidence supports a multidisciplinary and individualized treatment strategy for aggressive CGCG. Selected patients may benefit from multimodal management combining medical therapy and surgery to reduce lesion size and limit the extent of surgical resection [10]. Nevertheless, high-quality evidence remains scarce because of the rarity of these lesions, especially when they occur in uncommon craniofacial locations.

The role of radiotherapy in CGCG remains controversial because the lesion is benign and concerns persist regarding potential late adverse effects, including osteoradionecrosis, growth disturbances, visual complications, and radiation-induced secondary malignancies [3, 11]. For this reason, radiotherapy should generally be reserved for highly selected patients in whom complete surgical excision is not feasible, recurrent disease is present, or surgery would result in unacceptable morbidity. In the present case, the extensive sinonasal and orbital involvement, marked facial deformity, and anticipated morbidity of radical surgery led the multidisciplinary tumor board to recommend adjuvant radiotherapy as the most appropriate treatment option.

Because aggressive CGCG is associated with reported recurrence rates of approximately 10%–30%, careful long-term clinical and radiological follow-up is essential regardless of the treatment modality employed [4, 7].

In conclusion, although central giant cell granuloma most commonly arises within the jaws, it should also be considered in the differential diagnosis of aggressive craniofacial and sinonasal masses. Lesions involving the orbit and adjacent skull base structures pose significant diagnostic and therapeutic challenges and require multidisciplinary management. While surgical excision remains the primary treatment, adjuvant radiotherapy may represent a reasonable option in carefully selected patients when complete resection is not feasible or would result in unacceptable morbidity. Long-term surveillance remains essential because of the potential for local recurrence.

Ethics Statement

This case report was conducted in accordance with the ethical principles of the Declaration of Helsinki. According to institutional policy, formal ethical approval was not required for a single-patient case report. Research Ethics Committees Certificate (IR.MEDSAB.REC.1405.061).

Informed Consent

Written informed consent was obtained from the patient for publication of the clinical information and any accompanying images. All identifying information has been removed to protect patient confidentiality.

Conflict of Interest

The authors declare that they have no conflicts of interest related to this work.

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Author Contributions

Both authors contributed to the conception and design of the study. Clinical data were collected and interpreted by the authors. The manuscript was drafted, critically revised for important intellectual content, and approved by both authors before submission.

Data Availability Statement

All data generated or analyzed during this study are included in this published article. Additional information is available from the corresponding author upon reasonable request.

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