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An Uncommon Maxillary Presentation of Aggressive Central Giant Cell Granuloma in a Child: Clinical and Radiological Insights

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Abstract:

- ***Background***

Central Giant Cell Granuloma (CGCG) is a benign intraosseous lesion of the jaws, exhibiting a variable clinical course. The aggressive variant is characterized by rapid expansion, cortical perforation, and a higher recurrence rate. Maxillary involvement, particularly in pediatric patients, is rare and often poses diagnostic and therapeutic challenges.

- ***Case Presentation***

This case report describes a 13-year-old female presenting with a rapidly enlarging, painless swelling in the anterior maxilla. Clinical, radiographic, and histopathological findings confirmed the diagnosis of aggressive CGCG. Cone-beam computed tomography revealed cortical breach with extension into the maxillary sinus and nasal cavity. Surgical excision under general anesthesia was performed, followed by splint placement. Postoperative recovery was uneventful, and the patient remains under regular follow-up with no signs of recurrence to date.

- ***Conclusion***

Early diagnosis and surgical intervention are crucial in managing aggressive CGCG, especially in pediatric patients, to prevent functional and esthetic complications. Radiographic assessment and histopathological confirmation remain vital for appropriate treatment planning and minimizing recurrence risk.

Keywords: *Central Giant Cell Granuloma, Aggressive Lesion, Pediatric Maxilla, Jaw Tumor, Surgical Excision, CBCT.*

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I. INTRODUCTION

Central giant cell granuloma (CGCG), as defined by the World Health Organization (WHO), is an intraosseous lesion composed of cellular fibrous tissue with hemorrhagic foci, multinucleated giant cells, and occasional woven bone.[1] CGCG accounts for approximately 7% of benign mandibular tumors, with peak incidence between 10–25 years and a female predilection.[2] Though its pathogenesis remains unclear, factors such as trauma, inflammation, and genetic predisposition have been implicated.[3,4] CGCG is subclassified into aggressive and non-aggressive types. The aggressive variant is characterized by rapid growth, cortical perforation, root resorption, and higher recurrence.[5]

This report presents a rare case of an aggressive CGCG in a 13-year-old female, originating in the right hemi-maxilla and extending into the sinus and nasal cavity.

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II. CASE PRESENTATION

A thirteen-year-old, previously healthy female presented to the Department of Oral Medicine and Radiology with a swelling involving the right maxilla for the past two months (Fig. 1). The swelling was initially smaller in size and progressed to its current size following a procedure. It was not associated with pain. There was no history of trauma, fever, other swellings, secondary changes, or recurrence. No history of sensory loss or paresthesia in the face. The patient had visited a nearby hospital and underwent investigations for the same at a private institution.

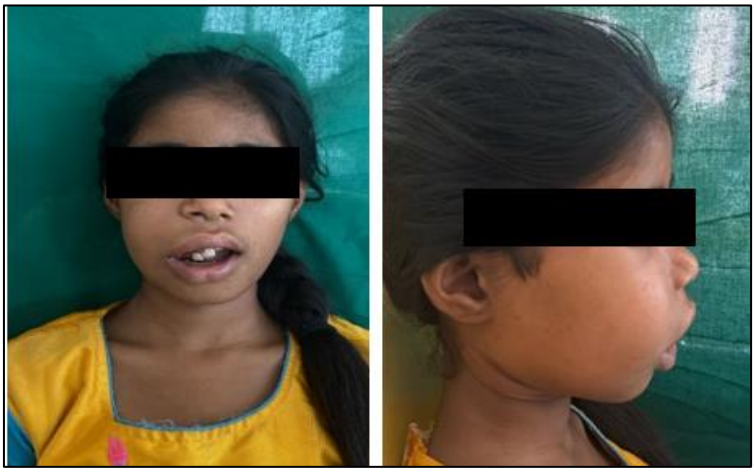

Fig 1: Extraoral photographs of the patient.
(A) Frontal view showing incompetent lips and protrusion of the maxillary anterior teeth.
(B) Profile view highlighting midfacial asymmetry.

➢ *On Extra-Oral Examination*

A solitary, diffuse 4×4 cm swelling was noted on the right midface with nasolabial fold obliteration and nasal distension. It extended from the infraorbital ridge superiorly to the corner of the mouth inferiorly, and medially to the ala of the nose. The swelling was afebrile, firm, non-tender, non-fluctuant, non-pulsatile, and showed no secondary changes (Fig. 1).

➢ *On Intra-Oral Examination:*

A diffuse dome-shaped mass with vestibular obliteration is seen from 11 to 16 region extending to the palate. The swelling seen pushing the midline (Fig. 2).

The overlying mucosa appeared to be erythematous, and on the labial aspect, the swelling appeared ulcerated with granulation tissue having well-defined borders (Fig. 2).

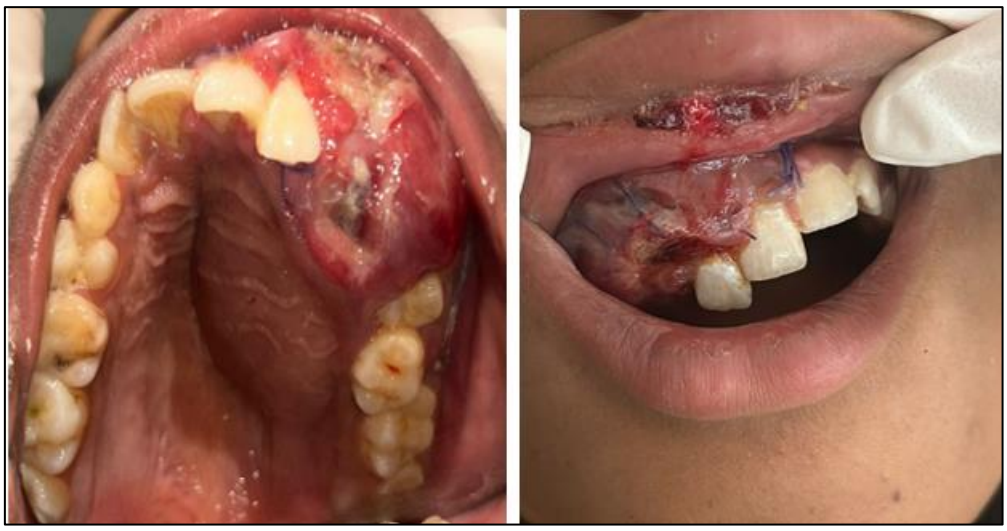

Fig 2: Intraoral views of the anterior maxillary region.
(A) Occlusal view showing palatal extension of the anterior maxillary swelling.
(B) Labial view showing the presence of granulation tissue in the anterior maxilla with displacement of 11, 12.

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The entire segment of the swelling was mobile.

A provisional diagnosis of aggressive central giant cell granuloma was made based on clinical findings, with a differential diagnosis including Brown's tumor, ameloblastoma, and juvenile ossifying fibroma.

Investigations: Patient was advised for OPG, blood investigations, CBCT and incisional biopsy.

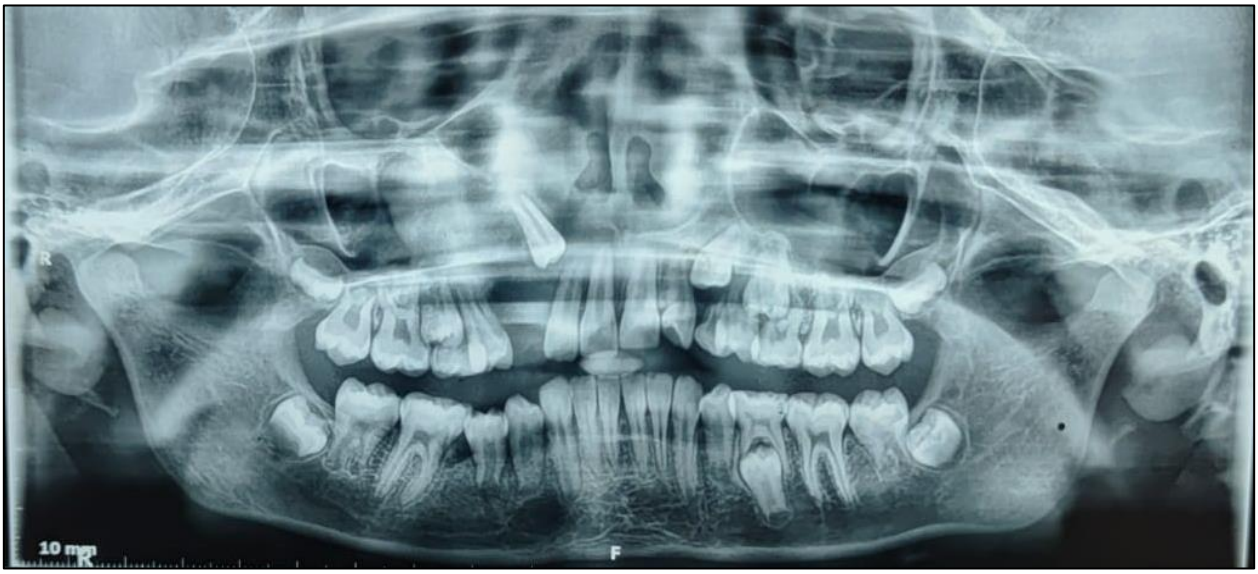

Fig 3: Preoperative Panoramic Radiograph Showing Diffuse Radiopacity in the Anterior Maxilla, Extending from the Region of tooth 11 to 14.

OPG revealed displacement of 11, 12, and erupting 13. The lesion is seen involving the right maxillary sinus (Fig. 3). CBCT revealed an expansile mass seen in the right maxilla, extending into the right maxillary sinus and nasal cavity with breach in the cortical plates. Visible internal septae with very fine granular pattern (Fig. 4). Biochemical investigation: Serum calcium, phosphorus, CBC revealed normal values. An incisional biopsy was performed and histological study revealed the lesion to be composed of cellular areas of proliferating mononuclear spindle-shaped cells with numerous osteoclast-like giant cells in aggregates, in a background of hemorrhage and hemosiderin deposition. A final diagnosis of aggressive central giant granuloma was given. Excision of the lesion was done under general anesthesia, followed by placement of a splint for support. The patient was planned for rehabilitation. The patient will remain under regular follow-up for a duration of one year to monitor clinical progress and ensure treatment outcomes.

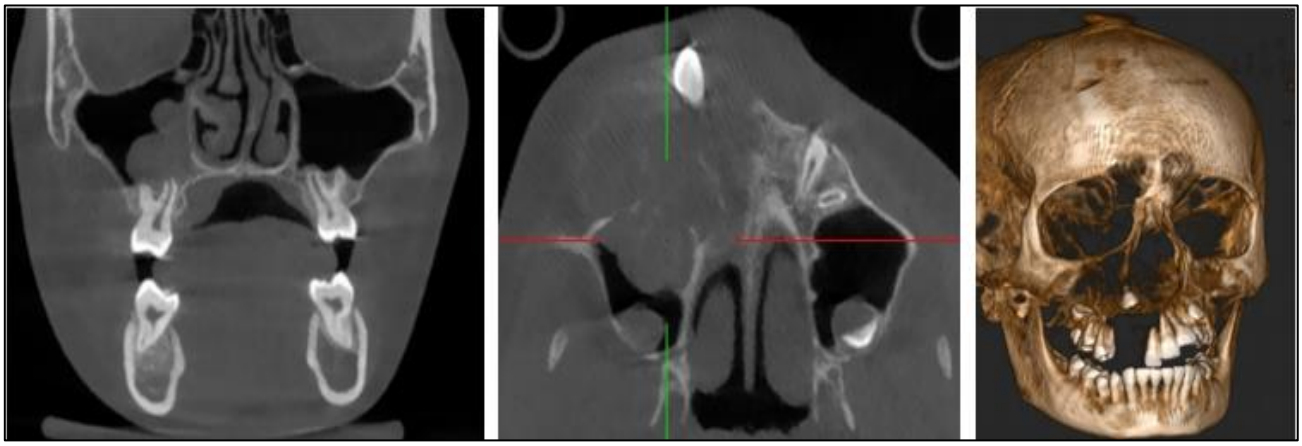

Fig 4: CBCT Imaging of the Maxillofacial Region.
(A) Coronal section showing a radiolucent lesion involving the anterior maxilla with cortical expansion and displacement of adjacent tooth.
(B) Axial section revealing thinning and breach of the labial cortical plate with involvement of the nasal floor.
(C) 3D reconstructed image demonstrating anterior maxillary swelling with cortical distortion and displacement of maxillary anterior teeth.

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III. DISCUSSION

CGCG was first described by Jaffe in 1953.[1] It exhibits a wide range of clinical behavior, from indolent to highly aggressive lesions. While CGCG is more commonly found in the mandible, maxillary lesions can be particularly aggressive due to anatomical vulnerabilities such as thin cortical bone and proximity to the sinus and nasal cavity.[5]

Aggressive CGCG typically occurs in younger patients and has a female predilection.[5] Radiographic imaging often reveals a multilocular radiolucency with features such as root resorption, tooth displacement, cortical thinning or perforation, and internal septation.[3] Cone-beam computed tomography (CBCT) in this case showed an expansile lesion with breach of the labial cortical plate and involvement of the adjacent sinus and nasal structures, consistent with aggressive CGCG as described in current literature.

Biochemical investigations are vital to rule out Brown tumor of hyperparathyroidism, which closely mimics CGCG both clinically and histologically. Evaluation of serum calcium, phosphorus, and alkaline phosphatase levels is essential, and if abnormalities are detected, parathyroid hormone (PTH) levels must be assessed. In this case, normal serum calcium and phosphorus levels effectively excluded hyperparathyroidism, supporting the diagnosis of a true CGCG.

Histopathological examination confirmed the diagnosis, revealing cellular fibrous tissue populated by proliferating spindle-shaped mononuclear stromal cells, numerous osteoclast-like multinucleated giant cells, and areas of hemorrhage with hemosiderin deposits. These findings are consistent with the characteristic histological features of CGCG.

While literature supports both surgical and pharmacological treatment modalities, the decision to proceed with surgery in this case was influenced by the lesion's aggressive nature, size (>4 cm), cortical perforation, and involvement of adjacent structures. Conservative options such as intralesional corticosteroids or calcitonin were deemed inappropriate given the extent and progression. Denosumab, though effective, carries concerns regarding compliance and long-term side effects in pediatric patients.[2] Surgery provided immediate debulking and histological confirmation, minimizing recurrence risk.

This case emphasizes the need for early recognition and a tailored approach, particularly in pediatric cases where anatomical and psychological impacts are significant. A multidisciplinary strategy involving oral radiology, pathology, and surgical teams is key to optimal patient care. Continued follow-up is essential due to the recurrence potential of aggressive CGCGs.

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