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From Neoadjuvant Therapy to Surgical Treatment: Combining Management of Central Giant Cell Granuloma of The Mandible in A Pediatric Case

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Abstract | **Case Report**

Giant cell granuloma (GCG) of the mandible is a rare, benign but aggressive bone tumor characterized by the presence of multinucleated giant cells resembling osteoclasts. It most commonly affects adults aged 30-50 and typically presents with symptoms such as pain, swelling, tooth mobility, and facial asymmetry. The diagnosis is established through imaging techniques such as X-rays, CT scans, and MRIs, followed by biopsy for histological confirmation. For years, the treatment was essentially based on surgical resection with possible reconstructive surgery and radiation therapy in cases of incomplete excision or recurrence. Prognosis is favorable when complete resection is achieved, but regular follow-up is crucial due to the high potential for recurrence. In some cases, other therapies are mandatory, either as a monotherapy or as neoadjuvant therapy. We report a case of a giant cell granuloma of the mandibula which occurred in a 14 year old male. The patient was initially treated with neoadjuvant intralesional corticosteroid injections, resulting in a significant reduction of the lesion. Subsequently, the patient underwent surgical curettage to remove the remaining mass.

Keywords: Central giant cell granuloma, Mandible, Neoadjuvant treatment, Corticosteroids injections, Curettage treatment.

INTRODUCTION

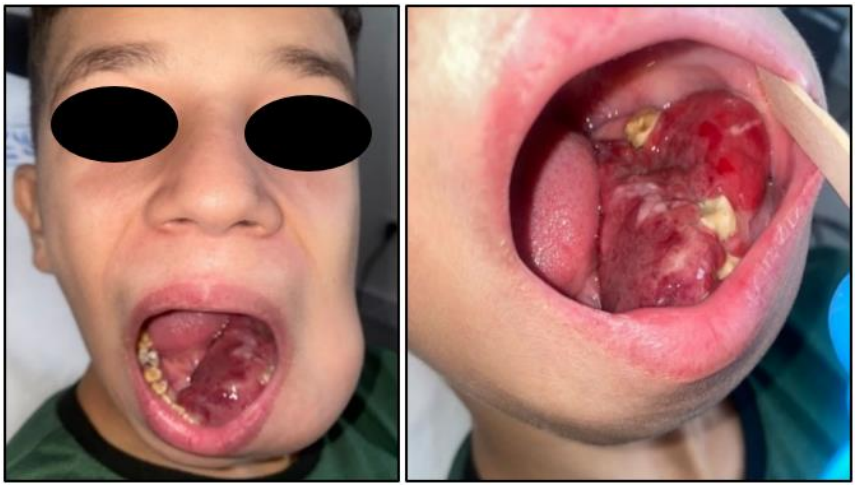
Giant cell tumor (GCT) is a benign yet aggressive neoplasm that features spindle-shaped stromal cells, mononuclear cells resembling histiocytes, and a large number of evenly distributed osteoclastic giant cells. It makes up 5% of all primary bone tumors, with 25% occurring in the epiphyses of long bones and 2% in craniofacial bones [1,2]. GCT are a heterogenous type of tumor that we find in the oral and maxillo facial region, including: Cherubism, Giant cell granulomas, aneurysmal bone cyst and brown hyperparathyroidism tumor [3]. In order to rule out differential diagnoses, a pre-therapeutic assessment must be carried out. Central giant cell granuloma (CGCG), first described by Jaffé *et al.,* in 1953 [1], is a benign tumor of the jaws with a non-odontogenic origin and a bony starting point. It accounts for 7% of jaw tumors and has an incidence of 0.00011% in the general population. Twenty-one percent (21%) of patients are under 15 years of age [5]. Diagnosis is primarily based on a combination of clinical and radiological findings, with confirmation provided by histopathological examination. CGCG is categorized into two forms: non-aggressive and aggressive [3]. Due to the variability in lesion size at the time of diagnosis, the risk of recurrence, associated dental damage, bony deformities, and its potential impact on maxillomandibular growth, treatment in pediatric cases is not standardized [5]. Although a range of therapeutic approaches is proposed in the literature, the outcomes are often variable, with significant sequelae or adverse effects in some cases [1-5].

We report a rare case of CGCG in the mandible of a young patient, leading to an extensive bone resorption, treated with a combined approach of a neoadjuvant medical treatment by multiple injections of corticosteroids (Triamcinolone) before a surgical curettage treatment.

CASE REPORT

A 14-year-old male patient with no significant medical history presented to our maxillofacial surgery department for a painless left mandibular swelling that has appeared 6 months before his admission, gradually

increasing in size and bleeding upon contact. The clinical examination showed a left lower jugal swelling, without inflammatory signs in the area, signs of fistulation nor sensitive disorder [Figure 1a]. The oral examination revealed a large, tender mass in the left part of the mandibula in the molar region, with vestibular filling, extended to the incisive-canine block and to the mouth floor, accompanied by a complete disruption of the dental architecture [Figure 1b].



a **b**

Figure 1: a. Left lower jugal swelling
b. Gingival mass in the molar left part of the mandible

A facial CT scan was performed, revealing a left mandibular osteolytic tumoral process measuring 46x37 mm, extending over 45 mm with a total volume of 76,6 cm^3 [Figure 2]. The histopathological examination after biopsy revealed a giant cell granuloma.

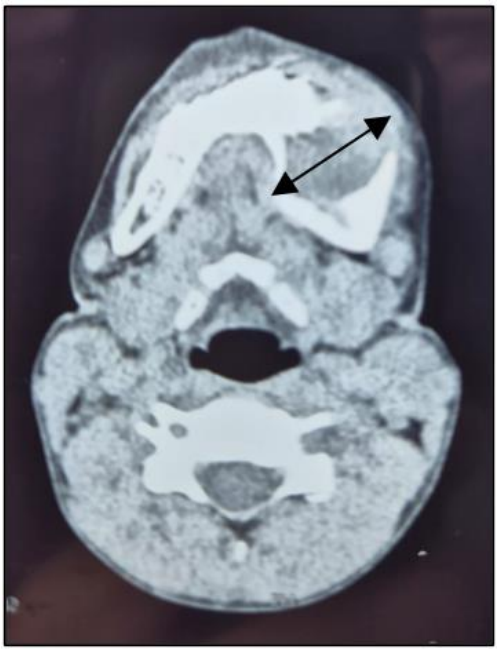


Figure 2: Facial CT Scan showing a left mandibular osteolytic tumoral process

Due to the size and extent of the lesions, a neoadjuvant treatment with intralesional injection of triamcinolone was administered. Prior to initiating the infiltrations, a comprehensive pre-treatment workup was conducted. This included a full lipid panel, infectious screening, ophthalmologic examination, blood glucose measurement, C-reactive protein (CRP) testing, and evaluation of serum calcium and potassium levels as well as parathyroid hormone (PTH) assay.

The adapted protocol involved an injection of 12 ampoules of 40 mg for the first two sessions, followed by 8 ampoules for the next two, then 6 the following 2 sessions, 4 ampoules for 2 sessions, and finally 2

ampoules during the last two, all between September-December 2023, with a total of 12 sessions [Figure 3 and 4], with CRP and serum potassium levels measured before each session.

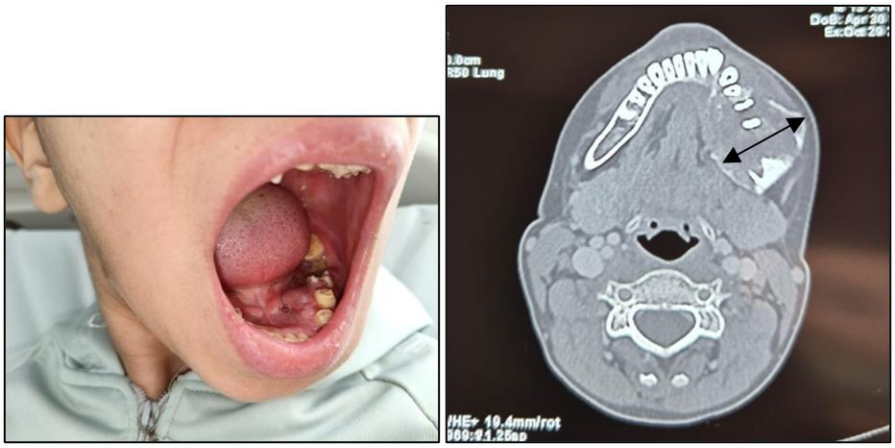


Figure 3: Clinical and radiological size reduction after the 4th session

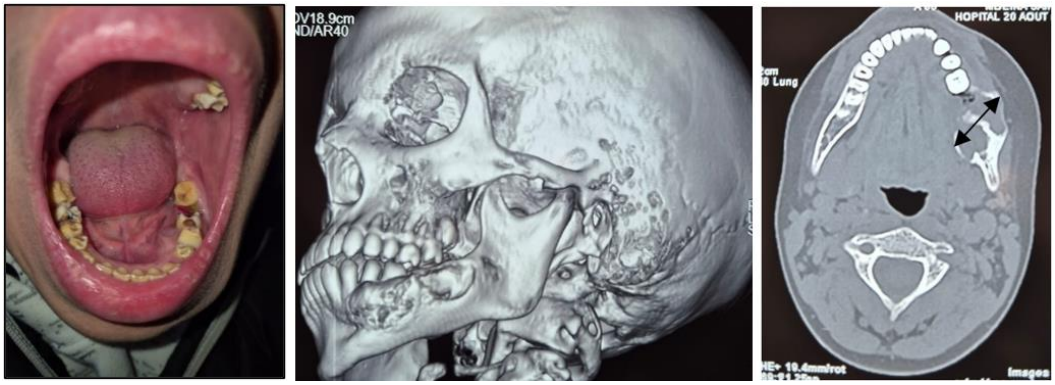


Figure 4: Clinical and radiological size reduction after the 12th session of intralesional injection

This was followed by surgical treatment, under general anesthesia, consisting in a curettage of the residual bony cavity [Figure 5], after tumor size reduction from the injections and clinical-radiological monitoring. In the post-operative period, our patient received prophylactic antibiotic therapy, consisting of amoxicillin-clavulanic acid for 7 days, to prevent infection. This was combined with level 1 analgesic treatment for pain management, and the patient was instructed to maintain good oral hygiene using mouthwashes. As part of our treatment protocol, a final intralesional injection of 40 mg of triamcinolone was administered 15 days post-operatively to further reduce the risk of recurrence.

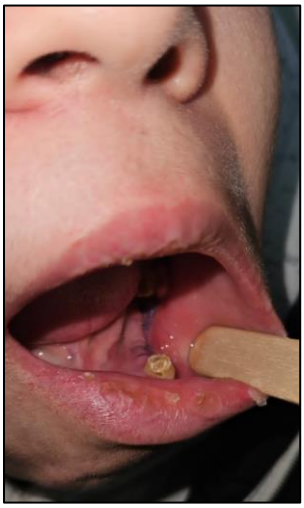


Figure 5: Post operative aspect of the tumor after a surgical curettage

After one year and several follow-up consultations, a control facial CT scan was performed, showing post-therapeutic changes in the left mandible with no signs of recurrence or osteolysis [Figure 6].

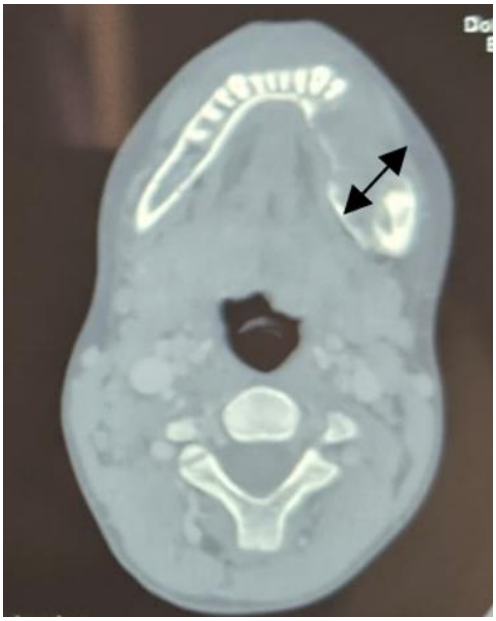


Figure 6: Showing post-therapeutic changes in the left mandible with no signs of recurrence or osteolysis

During the clinical examination at the same last consultation, the intraoral tumor mass was no longer present, and the vestibule was clear [Figure 7].

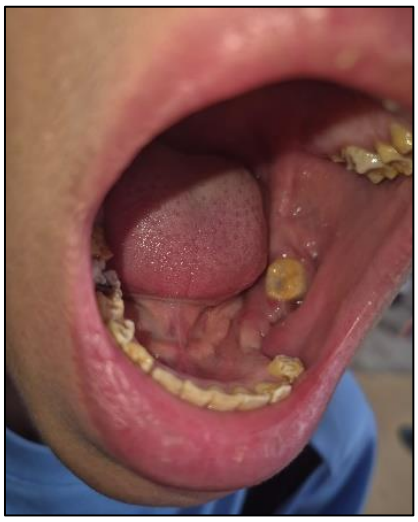


Figure 7: Free oral vestibule with no tumoral infiltration

DISCUSSION

Giant Cell Tumors of the Mandible (GCTM), although considered benign, are clinically significant due to their potential for local destruction, their invasive nature, and the frequency of recurrence, particularly in aggressive cases. These tumors rarely affect the facial bones, but when they do it's mostly the jaw that is concerned although they are classified as non-odontogenic tumors, meaning they originate from tissues not related to tooth development [1]. They can affect both the mandible and maxilla, with the first being more frequently involved [1,2]. Among the various types of giant cell lesions, the central giant cell granuloma (CGCG) stands out as the most frequently diagnosed in the mandible. This condition was first described by Jaffé in 1953 [1] and has since been recognized as one of the major benign bone lesions in the oral and maxillofacial region. CGCG represents approximately 7% of all jaw tumors and is more prevalent in younger populations, with about 21% of cases occurring in patients under the age of 15 [1-3].

The cause of giant cell granuloma (GCG) remains uncertain and continues to be explored. While once thought to result from trauma, the lack of such history in patients suggests other possibilities, including

infections, developmental issues, genetics, and inflammation. Its higher prevalence in younger individuals may be linked to active craniofacial growth. Multiple GCGs are sometimes associated with genetic syndromes affecting the RAS/MAPK pathway, such as Noonan, LEOPARD, and Costello syndromes [3,4].

The clinical presentation of CGCG of the mandible is highly variable and depends largely on the tumor's aggressiveness. Non-aggressive forms of are often asymptomatic and grow slowly, often going unnoticed until they reach a significant size. In contrast, aggressive forms are characterized by a rapid growth, pain, and functional impairment, leading to more pronounced symptoms [3,5]. Patients with aggressive tumors may also experience facial asymmetry, mucosal ulceration, tooth mobility, and even neurological deficits, depending on the tumor's extension into adjacent structures. Neurological symptoms can result from the invasion of cranial nerves or the proximity of the lesion to critical neural structures, leading to pain, sensory disturbances, or motor dysfunction [5,6]. In our patient's case, the tumor is considered aggressive due to its rapid growth, important dental disruption and frequent bleeding even with the lack of pain and sensitive disorders.

Radiological examination is essential for both diagnosing and assessing the extent of CGCG. X-rays, CT scans, and MRIs provide critical information about the location, size, and characteristics of the lesion. Giant cell tumors typically present as well-defined, osteolytic lesions, with an appearance often compared to a "soap bubble" due to the multiple cystic spaces within the bone [6]. The osteolysis may affect not only the cancellous bone but also the cortical bone, leading to significant bony destruction. Aggressive lesions are more likely to exhibit resorption of the dental roots, as well as cortical bone lysis, which is indicative of the tumor's more invasive nature [3,5]. For our patient, a facial CT scan revealed an osteolytic lesion infiltrating the adjacent soft tissues, involving the alveolar canal and the roots of the adjacent molars and premolar with root resorption, and extending to the floor of the mouth near the base of the tongue. These findings were consistent with the diagnosis of CGCG and were later confirmed through a biopsy that showed a proliferation of multinucleated giant cells embedded in a fibroblastic stroma.

Central giant cell granuloma (CGCG) presents with nonspecific clinical and radiological features, making differential diagnosis essential. It can resemble several jaw lesions, notably cherubism, a hereditary condition characterized by bilateral, multilocular jaw expansion in early childhood with histologic similarities to CGCG. Another important consideration is the giant cell tumor (GCT), as both lesions share overlapping features [4]. However, histopathological analysis can help differentiate them: CGCG typically exhibits fewer multinucleated giant cells, more osteoid formation, recent hemorrhage, and hemosiderin deposits, whereas GCT shows more uniform distribution of giant cells and areas of necrosis [6]. Some authors even suggest that CGCG and GCT may represent different points along a single pathological spectrum. Other conditions to consider in the differential diagnosis include aneurysmal bone cyst, benign chondroblastoma, brown tumor of hyperparathyroidism, fibrous dysplasia, non-osteogenic fibroma, and osteosarcoma [3,4,5]. To help distinguish CGCG from brown tumor and other metabolic bone lesions, a parathyroid hormone (PTH) assay and a phosphocalcic workup—including calcium and phosphate levels—are essential components of the diagnostic process.

Non aggressive CGCG typically responds well to conservative treatments, such as intralesional corticosteroid injections (e.g., Triamcinolone), which can reduce tumor size prior to surgical intervention [6]. On the other hand, the aggressive form is characterized by rapid growth, often exceeding 5 cm in size and a higher likelihood of local invasion, making it more challenging to treat. They often invade adjacent tissues, including nerves, blood vessels, and other soft tissues, which can cause significant morbidity. Furthermore, these aggressive tumors are more likely to recur after treatment, even after complete surgical excision [4,6]. Recent studies have also implicated genetic factors, specifically mutations in the CXCR4 gene, which may play a role in tumor progression and recurrence [5,6].

For our patient the tumor was considered aggressive hence the combination of two treatment modalities and strict clinical and radiological surveillance. A series of intralesional triamcinolone injections were administered as part of a neoadjuvant therapy regimen, the injection protocol involved twelve sessions (twice a week for six weeks), with a gradual reduction in the dosage of the corticosteroid proportionally to the tumor size. This treatment resulted in a significant reduction in tumor size, facilitating subsequent surgical curettage. Intralesional corticosteroid therapy is considered effective for aggressive forms of CGCG, as it can help reduce the size of the lesion without the need for mutilating interventions. Other medical treatments for giant cell granulomas include bisphosphonates (e.g., pamidronate), which help inhibit osteoclastic bone resorption and stabilize the bone lesions, though their efficacy remains a topic of ongoing debate [6, 7]. Additionally, alpha interferon, though still largely experimental, has shown promising effects in reducing lesion size and minimizing the risk of recurrence, particularly in aggressive cases [8, 9]. Surgical curettage, which involves scraping away the tumor tissue from the affected bone is associated with a favorable outcome and low recurrence rate when the tumor has been reduced to an acceptable size. In contrast, less responsive lesions may require more extensive procedures, including segmental resection of the mandible or maxilla followed

by reconstructive surgery in order to prevent deformities, ensure cosmetic recovery and restore the structure and function of the jaw [8, 9]. In some cases, synthetic materials or titanium plates may be used as alternatives for reconstruction, depending on the specific needs of the patient and the extent of the bone loss. The decision to use bone grafts or other materials depends on several factors, including the size of the lesion, the location of the tumor, and the patient's overall health [8].

The prognosis for patients with mandibular CGCG largely depends on the form of the tumor and the treatment response. Non-aggressive forms generally have an excellent prognosis with a low recurrence rate after curettage or partial resection [8,9,10]. In contrast, aggressive forms, even after complete surgical resection, are often associated with frequent recurrences (30%-70%) [10,11]. In our case, the patient's prognosis could be favorable due to the successful reduction in tumor size following intralesional corticosteroid injections and surgical curettage and the absence of clinical and radiological signs of recurrence after months of follow ups.

Long-term surveillance is essential for detecting any potential recurrence of the tumor. Even with successful initial treatment, the recurrence of CGCG is a concern, especially in aggressive forms. Regular follow-up with clinical evaluations and radiological imaging (such as CT scans or MRIs) is necessary to monitor for any signs of recurrence [12] and to assess whether the tumor has completely resolved or if any new lesions have developed, allowing for prompt intervention if necessary [12, 13].

Conclusion

Mandibular central giant cell granuloma, although benign, represent a complex pathology with significant clinical and functional implications. The treatment of these tumors requires a personalized approach, depending on the clinical form, the patient's age, the extent of the lesion and the risk of recurrence. While medical treatments, such as intralesional corticosteroid injections, can offer tumor reduction prior to surgical intervention, surgical resection remains the standard treatment for aggressive forms. Long-term outcomes depend on the rigorous management of recurrences and associated complications. Rigorous clinical and radiological monitoring in the post-operative period are equally important to prevent recurrences and ensure immediate management in such cases.

References

1. Jaffe, H. L. (1953). Giant-cell reparative granuloma, traumatic bone cyst, and fibrous (fibro-osseous) dysplasia of the jawbones. *Oral Surgery, Oral Medicine, Oral Pathology, 6*(1), 159–175.
2. Jain, R., & Puri, A. (2022). *Revisiting Jaffé's classic study on central giant cell granuloma: A review of current literature and contemporary management strategies*. *Journal of Oral and Maxillofacial Surgery*, 80(9),1752–1761.
3. Aksu, S., Yalcin, S., & Topkara, A. (2023). *Surgical treatment of central giant cell granuloma of the mandible in a pediatric patient: A case report and review of the literature*. *Journal of Oral and Maxillofacial Surgery*,81(5),725–729.
4. El Hamid, S., Ouail, I., Bahaa, R., Oukerroum, A., & Faiçal, S. (2020). *Impressive regression of aggressive central giant cell granuloma with the use of intralesional corticosteroid injections*. Oral and MaxillofacialSurgeryCases,6,100057.
5. Choudhary, S., Nanjundappa, R., & Sundaram, S. (2023). *Central giant cell granuloma: A comprehensive review of clinical features, treatment modalities, and recurrence rates*. *Journal of Clinical andDiagnosticResearch*,17(3),13–17.
6. Koh, K., Tan, W. T., & Tan, P. M. (2022). *Management of central giant cell granuloma with corticosteroid injections: A systematic review of efficacy and safety*. *Oral Surgery, Oral Medicine, Oral Pathology and Oral Radiology*,133(6),720–728.
7. Bredell, M., Rordorf, T., & Kroiss, S. (2021). *Role of bisphosphonates in the management of central giant cell granuloma of the jaw: A systematic review*. *Oral Diseases*, 27(7), 1602–1609.
8. Varghese, A. M., & Mani, M. P. (2022). *Immunohistochemistry and molecular diagnosis of central giant cell granuloma of the jaw: An update*. *Indian Journal of Dental Research*, 33(2), 137–143.
9. Browne, P., McDonnell, A., & Carrington, J. M. (2021). *Radiographic assessment of central giant cell granuloma: The role of advanced imaging modalities*. *Journal of Cranio-Maxillofacial Surgery*, 49(8), 713–721.
10. Mohan, A., & Smith, T. (2021). *Long-term outcomes of curettage versus resection for central giant cell granuloma of the mandible: A retrospective study*. *Oral Oncology*, 115(10), 104558.
11. De Cidrac, L., Kadri, M., Pecorari, R., Nguyen, T., & Radoï, L. (2021). Diagnostic difficulty of an aggressive and recurrent giant cell granuloma: A short case report. *Journal of Oral Medicine and Oral Surgery, 27*(1), Article 12.
12. Hwang, J., & Park, S. (2023). *Interferon and corticosteroids for the management of aggressive central giant cell granuloma: A systematic review*. *Oral Diseases*, 29(6), 1762–1768.
13. Jang, J., & Lee, S. W. (2023). Gene mutations associated with the pathogenesis of central giant cell granuloma: A review of the literature. *Journal of Oral Pathology and Medicine*, 52(5), 289–295.