Intralesional Corticosteroid Injection for Central Giant Cell Granuloma: An Alternative Treatment for Children

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ABSTRACT

The purpose of the present article was to report a case of central giant cell granuloma (CGCG) associated with intralesional corticosteroid injections. Although benign, the CGCG may be locally aggressive, causing extensive bone destruction, tooth displacement, and root resorption. The common therapy is surgery, which may result in important facial deformity and loss of teeth or dental germs. In this article, an 8-year-old girl who presented with maxillary CGCG was treated with a solution of equal parts of triamcinolone actinide (10 mg/ml) and 0.5% bupivacaine injected into the lesion for a period of 11 weeks. The osseous neoformation was gradual. After 6-years follow-up, clinical and radiographic success of treatment were observed. Based on our results and the litera-ture available, the administration of intralesional corticosteroid injections is an alternative in CGCG treatment, especially in children.

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Central giant cell granuloma (**CGCG**) is a benign intraosseous lesion that consists of cellular fibrous tissue containing multiple hemorrhagic foci, aggregations of multinucleated giant cells, and, occasionally, trabeculae of immature bone.[1-3] It is rare, corresponding to fewer than 7% of all benign maxillary lesions. It is predominantly found in children and young adults, with 60% of cases occurring before age 30, and occurs more frequently in females and in the mandible.[1,4-6] The lesion's formation mechanism is still uncertain. It is believed it may involve due to both, local and systemic causes.[5]

Regarding its radiographic aspect, it appears as a unilocular or multilocular radiolucency, with well-defined or ill-defined margins. It is important to remember that the lesion's radiologic appearance is not pathognomonic and may be confused with many other jaw lesions.

The lesion can completely involve the roots of adjacent teeth, which are immersed in pathologic tissue. Divergence of the roots of erupted teeth and displacement of nonerupted ones.[4,5]

Nonaggressive CGCG is characterized by slow, generally asymptomatic growth without cortical perforation or root resorption induction and shows a low recurrence rate. It is frequently detected by routine radiographic exams or by a painless expansion of the affected bone. Nevertheless, the aggressive CGCG is characterized by

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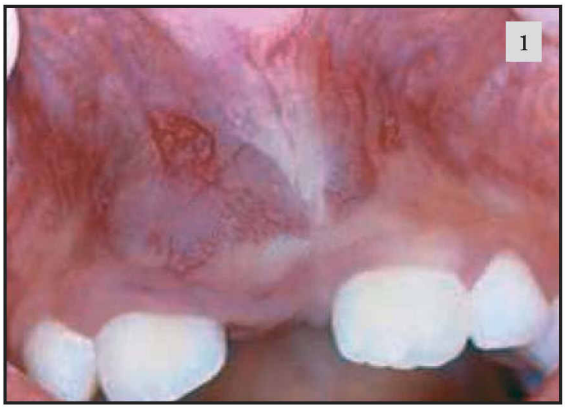
pain, fast growth, expansion, and cortical perforation, and may cause root resorption and a high tendency of recurrence.[6-8]

The choice of treatment, as well as the recurrence rate, depends on factors such as patient age, site, extension, and clinical behavior of the lesion.[9,10] The most usual treatment is surgical, which can vary from curettage to in bloc resection.[2,4,6,9,11] For more aggressive lesions involving soft tissues or which perforate corticals, in bloc resection may be necessary. This may cause considerable facial deformities and tooth loss, an especially mutilating factor in children and young adults.[5,7,11,12,13] In these cases, extensive reconstruction to re-establish anatomy and function is required.

For this reason, treatment alternatives aiming at lesion regression or elimination avoiding more invasive surgical procedures are often described, among which intralesional corticosteroid injections, and alpha interferon and calcitonin administration are the most used.[2,5,6,9,10,14-16] These therapies have the advantage of being plain, low-cost techniques which preserve vital structures. They are an option particularly for the treatment of children with extensive or multiple lesions.[5,6,9,13,15,17]

The purpose of this article is to report the clinical case of an 8-year-old girl with a maxillary CGCG, which was favorably treated with intralesional corticosteroid injections and had a 6-year follow-up period.



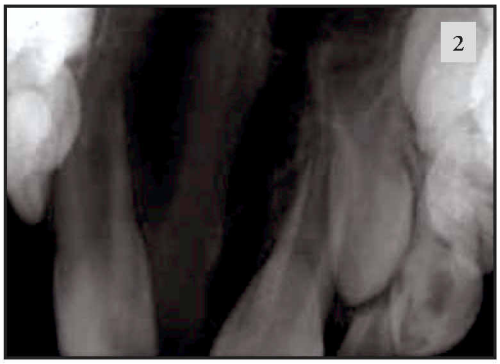


Figure 1. Intraoral view shows a swelling in the Maxilla.

Figure 2. Pretreatment radiograph showing an osteolytic lesion between upper incisors.

CASE REPORT

In February 2002, an 8-year-old female patient presented to the Center of Oral Diseases at the Dentistry School of the Federal University of Pelotas, Rio Grande do Sul, Brazil, with a painless lesion in the maxillary incisor area. According to an accompanying adult, the lesion spot had been noticed a year before, upon the loss of her primary teeth, and had grown in the previous month. The child was otherwise healthy, but her buccal condition demanded attention.

Upon intraoral examination, an asymptomatic nodular lesion with a smooth surface having a purple hue of approximately 1.5 cm in diameter was found in the anterior maxillary area. The maxillary central incisors presented mobility (Figure 1).

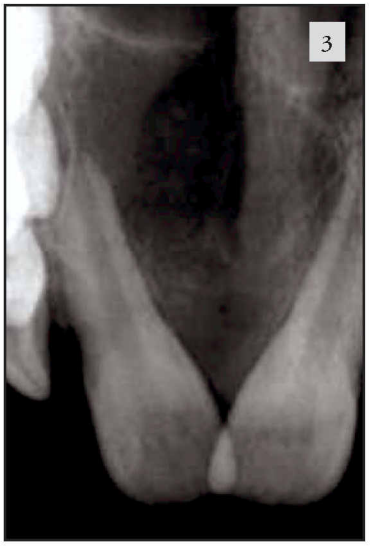
Radiographic examination revealed a unilocular radiolucent area of ill-defined margins of approximately 2 cm in diameter located in the area of teeth nos. 11 and 21, which presented incomplete root formation. The lesion caused dental displacement and bone cortical rupture, without root resorption (Figure 2).

An incisional biopsy was performed, through which fragments of a reddish granulomatous-looking material were collected. Histopathological examination revealed multiple giant multinucleated cells associated with other oval-shaped or fusiform cells. Since serologic exams ruled out hyperparathyroidism, CGCG diagnosis was reached.

Due to the patient's age, the lesion extension and eventual facial deformity that could result from conventional surgical procedure, drug therapy was chosen, with the parents' agreement, by means of intralesional corticosteroid injection.

Following the protocol outlined by Jacoway et al,[18] local bilateral infraorbital anesthesia was administered and a 2 ml solution consisting of equal parts of triamcinolone actinide (10 mg/ml) and 0.5% bupivacaine was injected into the lesion by a disposable syringe. The applications were performed every week until the 11th week when, because of tissue resistance compatible with osseous neoformation, needle penetration was no longer possible. By then, with the support of radiographic examination showing osseous neoformation, the end of treatment was established. Neither systemic side effects nor postoperative discomfort were reported.

The patient was seen for periodic assessment, which verified a pronounced decrease in mobility for teeth nos. 8 and 9. The osseous neoformation was gradual. After a 6-year follow-up period, the treatment was clinically and radiographically successful. This could be demonstrated by the absence of a radiolucent area without root divergence, complete root formation, and pulp vitality maintenance (Figures 3 and 4). The patient is currently under orthodontic treatment.



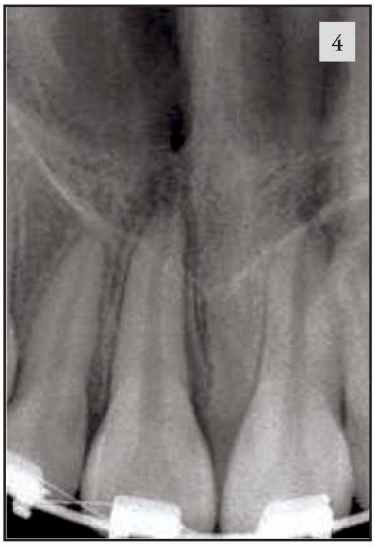


Figure 3. Intraoral radiograph was taken 1 year after the beginning of treatment; it shows partial repair of the osteolytic lesion.

Figure 4. Radiograph taken 6 years after the beginning of treatment shows complete healing of the lesion.

DISCUSSION

CGCGs are benign lesions that may show aggressive clinical behavior. Conventional treatment for this lesion is surgical removal, either by means of in bloc resection including adjacent healthy osseous tissue or by means of more conservative techniques. Although the latter have been applied rather successfully, recurrence rates as high as 70% have been reported for procedures such as enucleation and curettage.[7,10,17,19]

Among the main barriers for the development of a final treatment strategy for CGCGs are the lack of a precise comprehension of the lesion pathophysiology, which has an unpredictable behavior pattern, as well as the fact that giant cells in the maxilla are unusual. Consequently, there are few protocol accounts with a satisfactory number of patients and a long-running follow-up. In relation to clinical behavior, there are no biological markers that are able to predict it, and aggressive as well as nonaggressive lesions show the same histological characteristics.[7,9,10,16]

En bloc resection, a treatment often recommended for aggressive lesions, results in important facial deformities, which requires special attention when the lesion occurs in children with their dentition under development.[13] Thus, for young patients showing extensive lesions, alternative therapies are recommended for the pathology regression or elimination in order to avoid more invasive and mutilating surgical procedures.[6]

Various nonsurgical treatments have been described for CGCG. Radiotherapy has been considered an unsatisfactory alternative treatment, and may cause a malignant transformation of the lesion.[20] Other options include pharmacotherapy with alfa interferon, calcitonin, or imatinib—a tyrosine kinase inhibitor.[10,14,16,19,21] Aside from it being a time-consuming treatment, the pharmacotherapy produces side effects and various levels of discomfort, which makes this type of treatment less tolerable for some patients, especially children.[2]

Intralesional corticosteroid injections are another nonsurgical alternative treatment. The first effects of their use were published in 1988 by Jacoway et al,[18] who reported 3 CGCG cases being successfully treated by this method. Following this first early report, various individual or multiple cases reports showed the effectiveness of intralesional injections of corticosteroid in CGCG.[3,6,9,13,15,17]

Studies developed by Flanagan et al[22] show that the giant multinucleated cells in the CGCG are osteoclasts. Therapy by intralesional corticosteroid injections is based on the fact that these drugs have a direct role in osteoclast formation and activity by stimulating the proliferation and differentiation of precursors for these cells and inhibiting mature osteoclast activity.[5,23] In addition, corticosteroids have apoptotic activity on osteoclastic cells and inhibit lysosomal proteases, which results in bone resorption reduction.

The application of intralesional corticosteroid injections in the CGCG treatment is a plain, low-cost and rather short-duration technique which spares vital structures and avoids greater osseous defects, resulting in either the resolution of or at least the decrease in the lesion size. Due to CGCG's expansive growth, the cortical bone plates that cover the lesion are thinned and easily perforated, making this a minimally invasive procedure.[6,15]

Although CGCG cases are more frequently located in the mandible, in the present case it developed in the maxilla and was characterized by a rapid growth and perforation of the vestibular cortical bone.

Considering these characteristics of an aggressive lesion, the surgical treatment would imply a significant tooth and bone loss, with a consequent esthetic-functional sequela. For this reason, drug therapy was chosen, which does not rule out eventual future surgical treatment, if necessary.

Before administering intralesional corticosteroid injections, confirmation of CGCG diagnosis by biopsy is mandatory. Because the histologic features of CGCG of the jaw are identical to hyperparathyroidism brown tumor, the latter should be ruled out by performing the appropriate blood work-up.

Side effects related to treatment were not observed in this case, which was well tolerated by the patient. Soon after the first few months of follow-up, it was possible to observe the new bone formation and a gradual decrease in central incisor mobility. At the end of the first year, evidence of lamina dura formation was observed in teeth nos. 8 and 9. After 6-years follow-up, the treatment's clinical and radiographic success was evident.

Thus, based on the results shown in literature, it is believed that the administration of intralesional corticosteroid injections is a good choice in central giant cell granuloma treatment. This is especially true for children, as it is a simple, easily performed, and low-cost technique—most importantly, one which preserves anatomic structures and avoids severe facial deformities.

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