Central Giant Cell Granuloma Arising in the Mandible:
A Case Report and a Review of Literature

IZUMI YOSHITOMI, GORO KAWASAKI AND AKIO MIZUNO

Introduction

Giant cell granulomas that occur in the mandible or maxilla are classified as non-neoplastic proliferative lesions, and these are different from true giant cell tumors that occur in the tubular bone1). Central giant cell granuloma (CGCG) occurs less frequently than peripheral giant cell granuloma, and it can cause destruction of the bone and tooth displacement. In this paper, we present a young male with CGCG of the mandible and discuss the clinical, radiological, histopathological, and therapeutic characteristics of cases in Japan.

Case Presentation

An 8-year-old boy was referred to our hospital because of a swelling of the gingiva in the right mandibular molar region.

The patient noticed swelling of the gingiva and developed spontaneous pain in the right first premolar region one month before visiting our hospital, and consulted a dentist. Under the initial diagnosis of apical periodontitis of the first deciduous molar, the tooth was extracted. After extraction, he still felt continuous pain, and the granulation-like tissue in the socket increased in size; therefore his dentist performed curettage. However, the granulation-like tissue increased further, and so he was referred to our clinic.

The patient’s medical and family histories were unremarkable. Extraoral examination revealed a slightly diffuse swelling with tenderness of the right mandible. Intraoral examination revealed a 20 × 18 × 3 mm, relatively well-defined, elastic hard mass which involved the right mandible extending from the area of the lateral incisor to the first premolar. The color of the mass was reddish-brown and the surface was irregular. In addition, the canine and first premolar teeth have moved markedly.
and they were dislocated on the buccal side (Fig. 1).

Orthopantomography revealed a radiolucent area with a relatively indistinct margin involving and extending from the lower right first premolar to the left lateral incisor. The size of the lesion was 85 mm at the largest diameter (Fig. 2). A computed tomography scan showed expansion of the mandible bone and absorption of the cortical bone (Fig. 3).

Magnetic resonance imaging (MRI) revealed a low signal intensity area on T1-weighted images, a high signal intensity area on T2-weighted images, and the lower part of the mass was shown to be multilocular (Fig. 4).

Although the results of laboratory tests revealed that alkaline phosphatase (ALP) showed a concentration of 1.077 ZU/L (reference range: 115-359 ZU/L), this was not regarded as abnormal because he was in his growth phase.

The clinical diagnosis was a benign tumor of the right mandible. Biopsy was performed and the pathological diagnosis was a giant cell granuloma. Under general anesthesia, the lesion was excised en bloc including the teeth from the mandibular right second premolar to the incisor. Although the lesion could be easily dissected
from the surrounding bone, it was not encapsulated. After excision, the exposed bone surface was shaved with a round bur. The lesion was located under the permanent teeth with uncompleted roots. A brown hemorrhagic area and cystic structure were noted in the lesion (Fig. 5). No recurrence has been detected during the approximately 5 years since surgery.

Pathological Findings: The solid region consisted of the accumulation of multinucleate giant cells and mononuclear spindle to oval cells circumscribed by fibrous connective tissue. Hemorrhage and the deposition of hemosiderin were observed in this area. Multinucleate cells and mononuclear macrophages contained the hemosiderin granules. The size and form of the multinucleate giant cells varied, as the cells contained from several to dozens of nuclei and were heterogeneous in form (Fig. 6). Although the cystic region was macroscopically identified, there were many variously sized spaces filled with unclotted blood as well as osteoid and bone formation, similar to aneurismal bone cyst.

Discussion

Giant cell granuloma was distinguished from giant cell tumor in 1953 by Jaffe.[1] It was classified with giant cell reparative granulomas as a non-neoplastic lesion, and in later years the word ‘reparative’ was dropped. The following suggestions for the cause of giant cell granulomas have been proposed: they are part of the reparative process for a internal marrow hemorrhage caused by trauma,[2] or hormone abnormality,[3] they develop from odontogenic mesenchymal cells,[4] or are caused by a malfunction of an endothelium[5]; however, a consensus has not been reached.

Giant cell granulomas, giant cell tumors, brown tumors, or Cherubism are all possible causes of the occurrence of a giant cell lesion in the jaw, and so must be considered during the diagnosis. Brown tumors are accompanied by hyperparathyroidism and show an increase in serum calcium and ALP and a decrease in serum phosphorus. They are histopathologically similar to giant cell granulomas. In this case, a brown tumor could be excluded because of a lack of characteristic findings except a growth-dependent increase in ALP. Cherubism is a disease that takes the eternal chromosome dominant inheritance form. It is generally seen in boys aged from 18 months to 5 years old and is characterized by a painless swelling of both sides of the mandible or both maxilla and the development of scleritis. Histopathologically, Cherubism resembles giant cell granuloma. This case revealed no findings suggestive of Cherubism.

It is difficult to distinguish clinically between giant cell tumors and giant cell granulomas. Histopathologically, giant cell granulomas generally have smaller size and less number of giant cells, which show more irregular external form and contain less number of nuclei, compared with giant cell tumors. In addition, the distribu-
tion does not show uniformity and is instead compacted around a hemorrhagic nest. Our case revealed these histopathological findings, so we finally diagnosed him with giant cell granuloma.

Since 1973, we have reviewed 28 Japanese cases of giant cell granuloma including the present case. Clinical data were analyzed focusing on the age, gender, size and location of lesions, radiographic findings, surgical treatments, and prognoses.

CGCG usually occurs in the first 3 decades of life\textsuperscript{3-7}. In our series, the age of patients ranged from 1 to 52 years (mean: 16.6 years). Twenty-four of all patients were under 30 years (85.7%), 9 patients (32.1%) of the 24 were under 10 years old, and 11 (39.3%) of the 24 were aged between 11 and 20.

Bernier et al. reported that there were no differences between genders\textsuperscript{8}, but Waldron et al. evaluated 38 cases and noted that 68% (26 cases) involved females\textsuperscript{9}. Furthermore, Bhaskar reported that it occurs frequently in women\textsuperscript{9}. Our study revealed that 11 patients (39.3%) were male and 17 patients (60.7%) were female.

In our series, regarding the clinical behavior, 25 cases (89.3%) showed swelling and 19 of these were not accompanied by pain. The pain experienced by our patient disappeared after treatment with an antibiotic; therefore, we suggest that the infection was associated with the lesion.

The anterior part of the mandible up to the first molar teeth is the most common location for CGCGs\textsuperscript{10}. Bataineh et al.\textsuperscript{11} reported that 39% of their cases’ CGCGs were located in the incisor, canine, and premolar regions. CGCGs are thought to arise in regions of the