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Incidence of central giant cell granuloma of the jaws with clinical and histological confirmation: an archival study in Northern India

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Abstract

To record the demographics, and correlate histological findings in central giant cell granulomas (CGCGs) of the jaws with their clinical behaviour, 30 paraffin-embedded samples of CGCG were retrieved from the archives of the Department of Oral Pathology and Microbiology, Subharti Dental College, Meerut, India. The diagnosis in each case was made on the basis of clinical, radiographic, and histological findings. Data about age, sex, anatomical site, presentation, radiological features, and laboratory investigations were analysed. Histomorphometric analyses were made in each case with respect to the number of giant cells, mean number of nuclei and giant cells, fractional surface area occupied by giant cells, index of relative size, and mitotic activity. The peak incidence of CGCG was during the second decade of life with a slight female predilection, and the mandible was the most common site. Of the 30 samples considered, 20 tumours were classified clinically as non-aggressive, and 10 as aggressive, based on their clinical behaviour. Histomorphometric analysis showed significant changes between the two groups with respect to the number of giant cells, the fractional surface area, and the mitotic activity. The data obtained showed clinical and histomorphometric features that may be reliable indicators for the differentiation between aggressive and non-aggressive CGCG. These data should be taken into consideration to improve planning of individual treatment and follow-up.

Keywords: Central giant cell granuloma; Aggressive; Non-aggressive; Histomorphometric analysis; Giant cells; Fractional surface area; Relative size index

Introduction

The central giant cell granuloma (CGCG) of the jaw is usually a benign bony lesion, which accounts for fewer than 7% of all benign tumours of the jaw.[1] It was described by Jaffe in 1953 for the first time as an idiopathic, non-neoplastic, proliferative lesion.[2] WHO has defined it as an intraosseous lesion consisting of cellular fibrous tissue that contains multiple foci of haemorrhage, aggregations of multinucleated giant cells, and occasionally trabeculae of woven bone.[3] The term "reparative giant cell granuloma" was once widely accepted, as CGCG was thought primarily to be a local reparative reaction of bone, possibly to intramedullary haemorrhage or trauma.[4] The use of the term "reparative" has subsequently been discontinued, as the lesion is essentially destructive.[4]

Chuong et al. classified CGCG into aggressive and non-aggressive lesions based on signs and symptoms and histological features.[5] Aggressive lesions are characterised by one or more of the following features: pain, paraesthesiae, resorption of the root, rapid growth, cortical perforation, and high recurrence rate after curettage. Aggressive lesions are also larger, and histologically show that a larger fractional surface area is occupied by giant cells.[5]

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Currently, clinical signs and symptoms and radiological features are the main criteria that differentiate non-aggressive from aggressive lesions. In the initial diagnosis there are no strict criteria in an individual patient to differentiate between the 2 subforms. However, cytomorphometric analysis seems to be an efficient and acceptable method of examining the number and volume of giant cells compared with other components of the lesions, which might give an indication of its clinical behaviour. The pathogenesis of CGCG is not completely understood. The proliferative activity can be found in its mononuclear cells, indicating a deregulation of the cell cycle that may contribute to the pathogenesis.[6]

The treatment of choice is conservative excision by curettage, particularly for young patients. For aggressive lesions, supplementary treatment with calcitonin gives good results.[7] Our aim was to document demographics, and investigate and correlate the histological findings in CGCG of the jaws with the clinical behaviour of the lesion.

Patients and methods

In this retrospective study all existing records of the period 2001–2010 in the archives of the Department of Oral Pathology and Microbiology, Subharti Dental College, Meerut were extracted. Those with CGCG of the jaws were retrieved, the diagnosis in each case having been made from clinical, radiographic, and laboratory investigations, and histological findings. Data were analysed with reference to age, sex, anatomical site, presentation, radiological features, and histopathological findings. Serum calcium and phosphorus concentrations, and alkaline phosphatase activities, were noted in all cases to exclude hyperparathyroidism. The clinical data were evaluated without knowledge of the histopathological findings. Based on the clinical criteria that had previously been established according to those reported by Chuong et al. we classified the patients into 2 groups.[5] Non-aggressive lesions were characterised by minimal or no symptoms, slow growth, lack of root resorption or cortical perforation, and little tendency to recur. Aggressive lesions were those with pain, rapid growth, root resorption, cortical perforation, and an obvious tendency to recur.

Conventional histological examination

For each patient, slides stained with haematoxylin and eosin were assessed for the histological features mononuclear cells, stroma, and giant cells. In each case the examination was made in 25 random high-power magnification fields (HPF, magnification 400×) with a conventional light microscope and an image analysing program (Figs. 1–4).

The variables sought included the number of giant cells (those that contained 3 or more nuclei), the mean number of nuclei/giant cells, the fractional surface area occupied by giant cells, and the relative size index. The fractional surface area was calculated by projection of an eyepiece grid

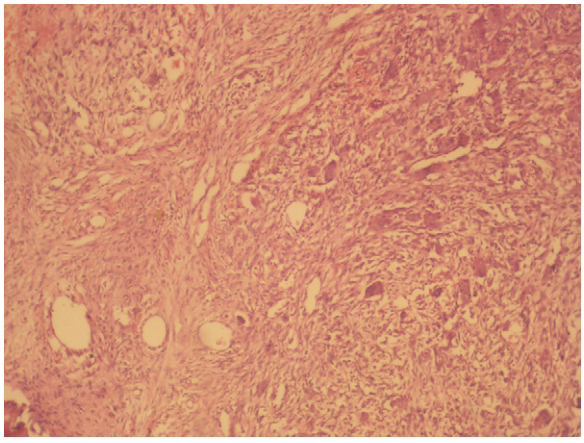

Fig. 1. Non-aggressive giant cell granuloma with sparse multinucleated giant cells scattered throughout the stroma (haematoxylin and eosin, original magnification 100×).

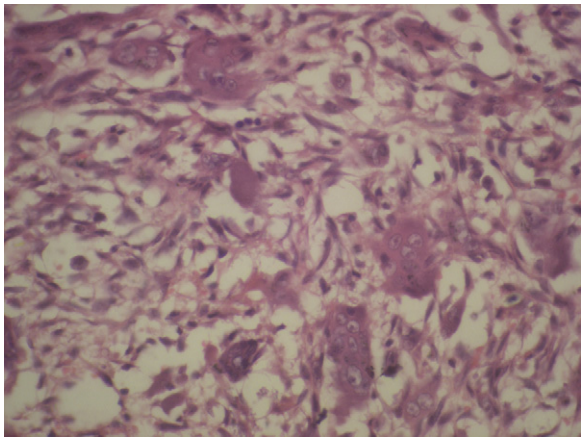

Fig. 2. Non-aggressive giant cell granuloma with small multinucleated giant cells (haematoxylin and eosin, original magnification 400×).

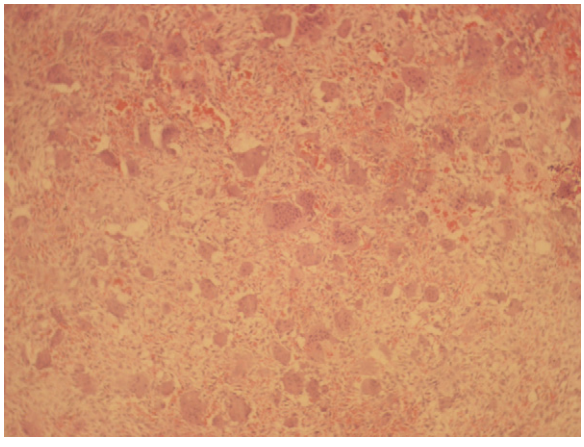

Fig. 3. Aggressive giant cell granuloma with numerous multinucleated giant cells scattered throughout the stroma (haematoxylin and eosin, original magnification 100×).