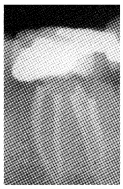
doi: 10.1111/j.1365-2591.2006.01107.x



CLINICAL ARTICLE

Periapical central giant cell granuloma misdiagnosed as odontogenic cyst

T. Lombardi[1], M. Bischof[1,2], R. Nedir[1,2], D. Vergain[1], C. Galgano[3], J. Samson[1] & R. Küffer[1]

[1]Laboratory of Oral and Maxillofacial Pathology, Division of Stomatology & Oral Surgery, School of Dental Medicine, Faculty of Medicine, Geneva; [2]Swiss Dental Clinics Group, Clinique Dentaire de Chauderon, Lausanne, Switzerland; and [3]Private Practice, Cagliari, Italy

Abstract

Lombardi T, Bischof M, Nedir R, Vergain D, Galgano C, Samson J, Küffer R. Periapical central giant cell granuloma misdiagnosed as odontogenic cyst. *International Endodontic Journal*, **39**, 510–515, 2006.

Aim To present the clinicopathological features of a series of four periapically located central giant cell granulomas (CGCGs) that were misdiagnosed and treated as being of endodontic origin.

Summary Four cases of periapical CGCGs were submitted with a clinical diagnosis of either radicular or residual cyst. In two cases, root canal treatment had been performed previously. The patients were two women and two men whose age ranged from 31 to 85 years. Two cases were located in the mandibular premolar-molar region, and two in the anterolateral region of the maxilla. Two lesions were submitted for histological examination with a diagnosis of radicular cyst whereas the remaining two were submitted with a diagnosis of residual cyst.

Key learning points

• Periapical giant cell lesions may be unilocular and therefore misdiagnosed as an endodontic lesion because of their radiographic similarity to an inflammatory periradicular lesion, especially if the teeth have been root filled or if the vitality is negative or doubtful.

• It is important to follow up the healing process of a periapical radiolucency related to a root filled tooth and, in case of persistence, to perform surgery and to submit the specimen for histological examination.

Keywords: central giant cell granuloma, periapical disease, radicular cyst, residual cyst.

Received 8 November 2005; accepted 29 December 2005

Introduction

Central giant cell granuloma (CGCG) is a benign lesion of the jaws initially thought to be the result of a reparative process (Jaffe 1953). However, it is now considered to be a

Correspondence: Dr T. Lombardi, Laboratory of Oral and Maxillofacial Pathology, Division of Stomatology & Oral Surgery, 19, rue Barthelemy-Menn, 1211 Geneva 4, Switzerland (Tel.: +41 22 3794034; e-mail: tommaso.lombardi@medecine.unige.ch).

destructive lesion developing within the alveolar bone. It may present either as an asymptomatic, painless, slow growing clinical expansion with a limited tendency to recur, or as a lesion with an aggressive behaviour characterized by rapid growth, root resorption, pain and high recurrence rate (Chuong *et al.* 1986).

Central giant cell granuloma is a giant cell lesion histologically characterized by aggregates of multinucleated giant cells, a proliferation of fibroblasts and myofibroblasts in a fibrous stroma, numerous small capillaries, foci of haemorrhage with extravasated red blood cells and haemosiderin deposits. Osteoid and new-forming bone are often present (Jaffe 1953).

Its peak incidence is the third decade and women are affected twice as frequently as men. CGCG affects mainly the anterior mandible, sometimes crossing the midline. Surgical curettage is the treatment of CGCG with a reported recurrence rate of about 10–50% (Waldron & Shafer 1966, Andersen *et al.* 1973, Eisenbud *et al.* 1988, Whitaker & Waldron 1993). CGCG is generally classified amongst the multilocular well-circumscribed noncorticated radiolucencies. However, it may occasionally manifest as a unilocular well-circumscribed and corticated radiolucency (Cohen & Hertzanu 1988, Kaffe *et al.* 1996). Although not related to dental pathoses, CGCG may be localized near the roots of teeth or the tooth apex and therefore it may be diagnosed radiographically as a periapical granuloma or a radicular cyst, particularly if the dental pulp does not respond to sensitivity tests (Dahlkemper *et al.* 2000). The aim of this study was to present the clinicopathological features of periapically located CGCG that were misdiagnosed and submitted for histological examination with provisional diagnosis of radicular or residual cysts.

Case report

Methods

Pathology reports of biopsy specimens diagnosed as CGCGs over a period of 8 years (1997–2004) were retrieved from the archives of the Oral and Maxillofacial Histopathology Laboratory, School of Dental Medicine, University of Geneva, Switzerland. Data describing age and gender of the patients, anatomical location and clinical diagnosis were analysed. Haematoxylin–eosin-stained glass slides of eligible cases were reviewed to confirm the diagnoses.

Results

Four cases of periapical CGCG were submitted with a provisional clinical diagnosis of either radicular or residual cyst. The patients were two women and two men (three European, one North African) whose age ranged from 31 to 85 years (mean age 59.2). Two cases were situated in the anterolateral region of the maxilla, one from tooth 22 to tooth 23 (Fig. 1), the other from tooth 11 to tooth 13 (Fig. 2). Two cases were located in the mandibular premolar-molar region: one in the right side extending from tooth 44 to tooth 46 (Fig. 3) and the other on the left side extending from tooth 33 to tooth 35. Two lesions were submitted with a diagnosis of radicular cyst, whereas the remaining two were submitted with a diagnosis of residual cyst. In those cases considered as radicular cysts, root canal treatment had been performed previously. Histologically, all the lesions showed features typical of CGCG (Fig. 4).

Discussion

The aim of this retrospective study was to report four cases of CGCG submitted as periapical pathoses of inflammatory origin, namely radicular and residual cysts, and to

Figure 1 Post-retreatment periapical X-ray showing both an unilocular radiolucency involving teeth 22–23 and a lateral perforation associated with an overextension of root canal filling.

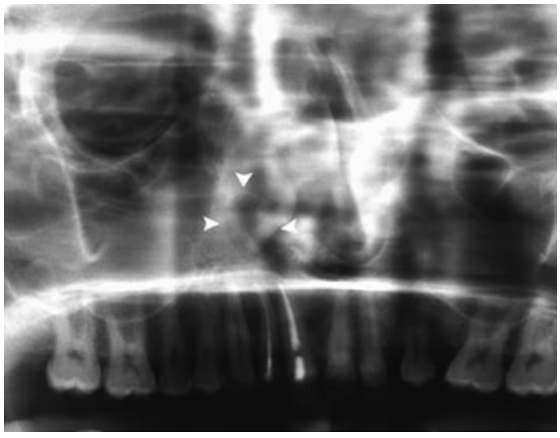


Figure 2 Panoramic radiograph showing a well limited (arrows) periapical radiolucent lesion in relation to teeth 11–13 apices.

present their clinicopathological features. Although CGCG is believed to occur at an early stage of life, usually between the ages of 10 and 30 years (Waldron & Shafer 1966, Andersen *et al.* 1973, Eisenbud *et al.* 1988, Whitaker & Waldron 1993), in the present

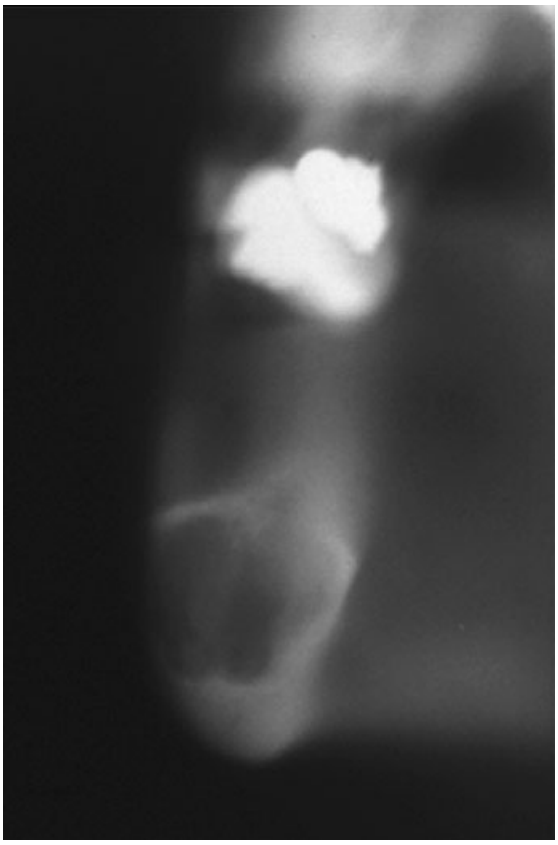


Figure 3 Tomography section showing a corticated radiotransparency extending from the buccal to the lingual plate in the edentulous 44–46 area.

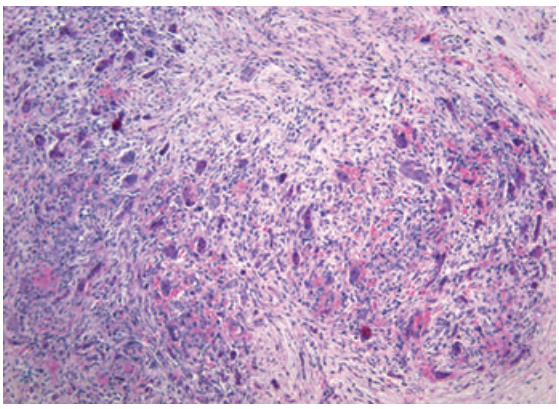


Figure 4 Multinucleated osteoclast-like giant cells, fibroblasts, capillaries, extravasated red cells within a fibrous connective tissue (H&E ×40).

study the patient's age ranged from 31 to 85 years with a mean age of approximately 60. Lesions arose in equal numbers in the mandible and in the maxilla occurring in anterior and lateral regions without crossing the midline. In a series of 16 cases of CGCG associated with teeth with nonvital dental pulps the age ranged uniformly between the first to the

seventh decade with a peak in the eighth decade (Dahlkemper *et al.* 2000). The posterior region was the most common location in the mandible whereas in the maxilla, CGCG predominantly affected the anterior region. The lesions observed in that study did not cross the midline. These clinical differences may, however, not be significant because of the limited number of cases analysed.

In two cases of the present series, the associated tooth had been previously root filled. Failure to heal subsequently led to surgical curettage of the lesions and submission for histopathological diagnosis. Endodontic misdiagnosis and unnecessary root canal treatment has been reported to have been performed in teeth adjacent to CGCGs. These lesions can actually be radiologically unilocular, well circumscribed and corticated. In this respect, a recent paper (De Lange & Van den Akker 2005) found that 75 CGCG out of 89 were unilocular and eight cases (8.9%) were small and apically located. If these lesions are present near the root of a tooth with a necrotic pulp, or with doubtful sensitivity testing, it is reasonable to perform root canal treatment. This occurred in 14 out of the 16 (87%) cases reported by Dahlkemper *et al.* (2000). Other single case reports have also described root canal treatment of teeth for periradicular lesions subsequently histologically diagnosed as CGCG. In one case (Sykaras 1981), a caries-free mandibular incisor, which was painful to percussion and with a nonvital pulp as indicated by electronic pulp testing, was root filled. Because the lesion did not heal after 6 months and the patient continued to experience pain, periapical curettage was carried out and a diagnosis of CGCG made. Martin (1982) reported a maxillary lateral incisor, which was root filled by a general practitioner without an appropriate vitality test. Both enlargement of the lesion and pain led first to nonsurgical retreatment and finally to curettage and histological examination of the lesion. Glickman (1988) reported a case of CGCG on a restored mandibular premolar with a history of trauma and relentless painful chronic periodontitis treated twice by nonsurgical endodontic treatment before carrying out an apical curettage. Selden (2000) reported a CGCG occurring in the periapical region of a maxillary left lateral incisor, which failed to respond to electronic pulp testing. The canal was filled during the third visit. Radiographic examination 1 month later showed extensive resorption of the root. An apicectomy along with curettage of the lesion was then performed. Seven months later, there were signs of recurrence with considerable enlargement of the radiolucency. Two months later the lesion was removed surgically with the extraction of the involved teeth (21, 22 and 23).

Nary *et al.* (2004) recently described a case presenting as a radiolucent area between teeth 31 and 32 that were negative to pulp testing. A root filling was performed. Eight months later, there was no clinical or radiological healing, and clinical examination revealed a hard swelling of the lingual cortex. Curettage of the lesion was planned and histological examination revealed a CGCG. With the exception of Nary *et al.* (2004), all the above reports included root canal treatment, which was performed as the lesions were considered to be periapical granulomas or radicular cysts.

Conclusion

The radiographic appearance of a CGCG is not pathognomonic and may be confused with other jaw lesions. The high incidence of common odontogenic lesions, for instance inflammatory periradicular lesions associated with pulpal pathosis, frequently led clinicians to disregard other diagnostic entities, such as CGCG (Kaffe *et al.* 1996). The localization around the roots of teeth, especially if these have been root filled or if the vitality is negative or doubtful, can create diagnostic difficulty and delay the appropriate diagnosis and treatment. It is important to follow up the healing process of pre-existing periapical radiolucencies of root filled teeth, or those that appear following root canal treatment and,

in cases of failure or persistent radiolucency and clinical symptoms, to perform surgery and to submit the specimen for histological examination. In such a context, it is important to consider that macroscopic examination does not allow to distinguish between CGCG and either periapical granulomas or cysts (Dahlkemper *et al.* 2000).

Disclaimer

Whilst this article has been subjected to Editorial review, the opinions expressed, unless specifically indicated, are those of the author. The views expressed do not necessarily represent best practice, or the views of the IEJ Editorial Board, or of its affiliated Specialist Societies.

References

Andersen L, Fejerskov O, Philipsen HP (1973) Oral giant cell granulomas: a clinical and histological study of 129 new cases. *Acta Pathologica Microbiologica Scandinavica* **81**, 606–16.

Chuong R, Kaban LB, Kozakewich H, Perez-Atayde A (1986) Central giant cell lesions of the jaws: a clinicopathologic study. *Journal of Oral and Maxillofacial Surgery* **44**, 708–13.

Cohen MA, Hertzanu Y (1988) Radiologic features, including those seen with computed tomography, of central giant cell granuloma of the jaws. *Oral Surgery, Oral Medicine, Oral Pathology* **65**, 255–61.

Dahlkemper P, Wolcott JF, Pringle GA, Hicks ML (2000) Periapical central giant cell granuloma: a potential endodontic misdiagnosis. *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontics* **90**, 739–45.

De Lange J, Van den Akker HP (2005) Clinical and radiological features of central giant-cell lesions of the jaw. *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontics* **99**, 464–70.

Eisenbud L, Stern M, Rothberg M, Sachs SA (1988) Central giant cell granuloma of the jaws: experience in the management of thirty seven cases. *Journal Oral Maxillofacial Surgery* **46**, 376–84.

Glickman GN (1988) Central giant cell granuloma associated with a non-vital tooth: a case report. *International Endodontic Journal* **21**, 224–30.

Jaffe HL (1953) Giant cell reparative granuloma, traumatic bone cyst, and fibrous (fibro-osseous) dysplasia of the jawbones. *Oral Surgery, Oral Medicine, and Oral Pathology* **6**, 159–75.

Kaffe I, Ardekian L, Taicher S, Littner MM, Buchner A (1996) Radiologic features of central giant cell granuloma of the jaws. *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontics* **81**, 720–6.

Martin LR (1982) Systematic approach to endodontic diagnosis – a must! A case report. *Clinical Preventive Dentistry* **4**, 25–7.

Nary Filho H, Matsumoto MA, Fraga SC, Goncales ES, Servulo F (2004) Periapical radiolucency mimicking an odontogenic cyst. *International Endodontic Journal* **37**, 337–44.

Selden HS (2000) Central giant cell granuloma: a troublesome lesion. *Journal of Endodontics* **26**, 371–3.

Sykaras SN (1981) Central giant cell granuloma: report of a case. *International Endodontic Journal* **14**, 185–7.

Waldron CA, Shafer WG (1966) The central giant cell reparative granuloma of the jaws. An analysis of 38 cases. *American Journal of Clinical Pathology* **45**, 437–47.

Whitaker SB, Waldron CA (1993) Central giant cell lesions of the jaws. A clinical, radiologic, and histopathologic study. *Oral Surgery, Oral Medicine, and Oral Pathology* **75**, 199–208.