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## Correspondence

# Cholesterol granuloma in the anterior maxilla—A case report

### KEYWORDS

Cholesterol granuloma;  
Maxilla;  
Radiolucent lesion

A radiolucent lesion at the periapical area of a tooth is frequently encountered in the routine dental practice. The majority of these radiolucent lesions are periapical granulomas and radicular cysts. However, a cholesterol granuloma (CG) is occasionally discovered in the jaw bone.<sup>1–3</sup> Here, we reported a case of CG in the anterior maxilla of a 45-year-old female patient. The report of this CG case was reviewed and approved by the Institutional Review Board at the MacKay Memorial Hospital, Taipei, Taiwan (23MMHIS108e).

This 45-year-old female patient complained of two gumboils at the palatal gingiva of the maxillary incisors for almost one month. The past medical history of the patient was non-contributory. Intraoral examination showed a fluctuating mass at the labial gingiva of the left maxillary central incisor. The panoramic (Fig. 1A) and periapical radiographs (Fig. 1B) revealed a well-circumscribed radiolucent lesion mainly at the periapical area of the left maxillary central incisor. In addition, it was also found that the left maxillary central incisor had been treated with the periapical surgery and retrograde filling. Emergency treatment with incision and drainage of the fluctuating mass as well as medication of antibiotics for a week resulted in the relief of the symptoms and signs. Surgical intervention of the cystic lesion under general anesthesia was determined and arranged after discussing with the patient and obtaining the informed consent from the patient. During the surgical intervention, tooth fracture and a bony defect at the labial alveolar cortical bone plate of the left maxillary central incisor were noted. The cystic lesion with semi-solid materials at the periapical area of the left maxillary central incisor and near the subnasal region was enucleated under

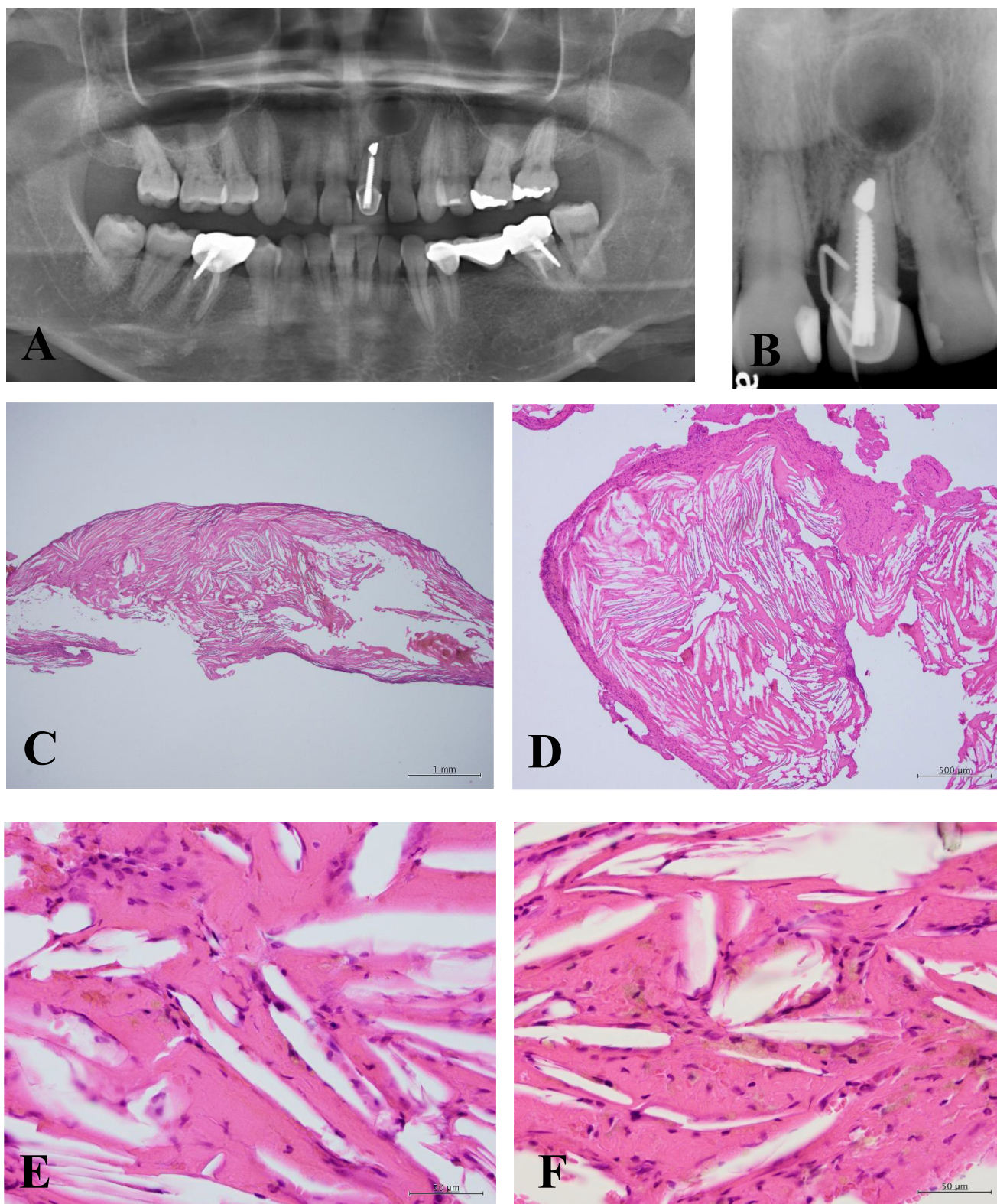
general anesthesia. The specimen was sent for histopathological examination. Microscopically, it showed a collection of cholesterol clefts surrounded by a thin layer of the inflamed fibrous connective tissue (Fig. 1C and D). No evidence of cystic lining epithelium is discernible in the submitted specimen. Some of the cholesterol clefts were surrounded by the multinucleated foreign body giant cells (Fig. 1E). Moreover, the hemosiderin depositions in the macrophages and in the focal areas of the fibrous connective tissue stroma were also found (Fig. 1F). The above characteristic findings confirmed the histopathological diagnosis of a CG in the anterior maxilla.

Gosnell et al.<sup>2</sup> summarized 13 CG cases with the addition of their own CG case in the mandible. Kaffe et al.<sup>3</sup> pointed out that little attention had been paid to the entity of CG and clarified that the terminology of CG should be used for the lesion characterized by a collection of cholesterol crystals (clefts) associated with the foreign body giant cells in the background of the fibrous connective tissue stroma. The lack of the stratified squamous lining epithelium and keratin formation differentiates the CG from the cholesteatoma.<sup>3</sup> This definition also supports the histopathologic diagnosis of the CG for our case.

The pathogenesis of CGs is thought to be an inflammatory reaction to the stacked cholesterol crystals in the fibrous connective tissue. The source of cholesterol crystals is proposed to be related to the breakdown of yellow marrow or disintegration of red blood cells from hemorrhage.<sup>4</sup> In cases of CGs within the odontogenic cysts, Yamazaki et al.<sup>5</sup> suggested that the perlecan and low-density lipoprotein (LDL) may be etiology factors that

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**Figure 1** Panoramic and periapical radiographs and histopathologic photomicrographs of our case of cholesterol granuloma. (A and B) Panoramic (A) and periapical radiographs (B) revealed a well-circumscribed radiolucent lesion mainly at the periapical area of the left maxillary central incisor. (C and D) Low-power photomicrographs showing a collection of cholesterol clefts surrounded by a thin layer of the inflamed fibrous connective tissue. (E) Some of the cholesterol clefts were surrounded by the multinucleated foreign body giant cells. (F) The hemosiderin depositions in the macrophages and in the focal areas of the fibrous connective tissue were also found. (Scale bars for histopathologic photomicrographs: C = 1 mm, D = 500  $\mu$ m, and E and F = 50  $\mu$ m).

cause the CGs. The granulation tissue of the cystic wall is rich in perlecan that contains LDL receptors and thus can trap the oxidized LDL locally. The oxidized LDL is phagocytosed by the macrophages and LDL-laden foamy macrophages are aggregated in the granulation tissue of the cystic wall. Finally, the free cholesterol materials released from the ruptured senescent macrophages are concentrated locally and crystallized, and these cholesterol crystals are then surrounded by the foreign body giant cells to form a CG in the cyst wall.

Baldini et al.<sup>1</sup> reported that intra-osseous CGs of the jaw bones are more commonly found in the edentulous region. This specific finding indicates that the CG predecessors may be the residual periapical granulomas which coincidentally have much cholesterol crystal deposition in the fibrous connective tissue after a long-term period of retention in the jaw bones.

### Declaration of competing interest

The authors have no conflicts of interest relevant to this article.

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