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Histopathological study of a characteristic calcifying odontogenic cyst



KEYWORDS

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Calcifying odontogenic cyst (COC) is an odontogenic cyst with locally aggressive clinical behavior.¹ In this study, we presented the histopathological feature of a large COC in the right anterior maxilla of a young male patient.

This 19-year-old male patient came for treatment of a swelling at the right anterior maxillary area for more than one month. The panoramic radiography showed a large radiolucent lesion at the periapical area of teeth 11 to 15 with the upper border of the cystic lesion compressing the right maxillary sinus floor and nasal cavity floor. Because the radiolucent lesion was large and relatively aggressive, the clinical diagnosis was an odontogenic keratocyst and the tentative treatment plan for this large cystic lesion was initial incisional biopsy and subsequent total excision of the cystic lesion. After discussing with the patient and obtaining the signed informed consent, the biopsy and total enucleation of the cystic lesion were performed. The biopsy and totally removed specimens exhibited similar histological feature. Thus, the histological features were presented together. Microscopically, the lesion was a cyst lined by the ameloblastomatous epithelium with the cuboidal basal cells and suprabasal stellate reticulum-like cells. The most characteristic feature was the presence of many so-called “ghost cells” with eosinophilic cytoplasm and pale centrally-located nuclear space shadow in the suprabasal and superficial areas of the lining epithelium

and in the cystic lumen (Fig. 1A, B, C, D, and E). Some of the ghost cells underwent calcification (Fig. 1D and E) and groups of ghost cells were shed into the cystic lumen (Fig. 1F). However, no dentinoid materials were found beneath the lining epithelium. The characteristic histological features confirmed the diagnosis of a COC.

The COC is a locally aggressive odontogenic cyst. It has an equal incidence of occurrence in the maxilla and mandible with approximately 65% of cases being found in the incisor and canine areas. The majority of COCs are diagnosed in the second to fourth decades of life.¹ Most COCs are between 2 cm and 4 cm in greatest diameter, and the size of a COC is often larger than that of a radicular cyst, a periapical granuloma, or a periapical scar.^{1–4} The COC is usually lined by ameloblastomatous epithelium. Therefore, the basal layer of the epithelial lining are usually cuboidal or columnar cells that are similar to ameloblasts. The overlying suprabasal layer is composed of loosely arranged epithelial cells that resemble the stellate reticulum of an ameloblastoma. The most characteristic histopathological feature of the COC is the presence of variable numbers of ghost cells in the lining epithelium. These eosinophilic ghost cells are altered epithelial cells that have basic nuclear and cell outline but without cell vitality and thus are called as “ghost cells”.¹ The lining epithelial cells and ghost cells of COCs have been studied by immunohistochemistry.⁵ It has been found that the basal cells, suprabasal cells, and ghost cells of the lining epithelium of a COC showed moderate to high expressions of amelogenin and cytokeratin 6. However, a high expression of cytokeratin 19 is discovered in only the basal and suprabasal cells but not in ghost cells of the lining epithelium of a COC. Therefore, the ghost cells showed accumulation of amelogenin and hard keratins in their cytoplasm during the pathological transformation from odontogenic epithelial cells into ghost cells.⁵

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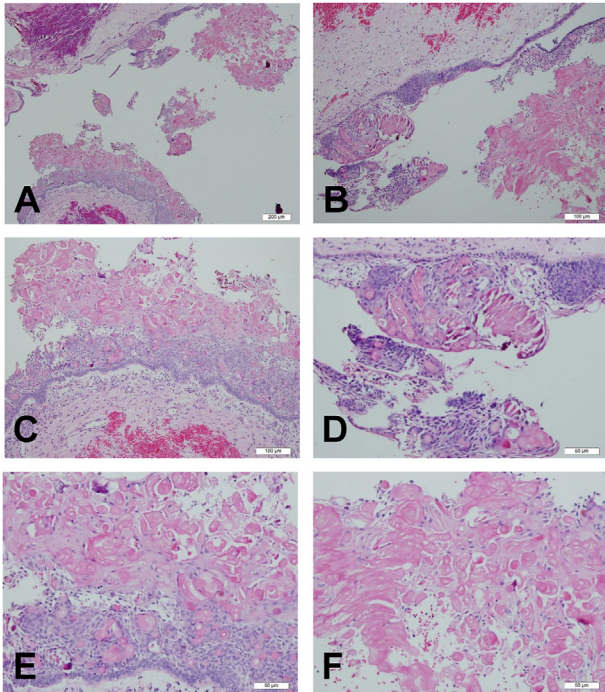


Figure 1 Hematoxylin and eosin-stained histological sections of our case of calcifying odontogenic cyst (A, B and C) Low- and medium-power microphotographs exhibiting a cyst lined by the ameloblastomatous epithelium with the cuboidal basal cells and suprabasal stellate reticulum-like cells. Many eosinophilic keratinized ghost cells were found in the suprabasal and superficial areas of the lining epithelium. Groups of ghost cells were also discovered in the cystic lumen (D and E) High-power microphotographs showing the presence of many so-called ghost cells with eosinophilic cytoplasm and pale centrally-located nuclear space shadow in the suprabasal and superficial areas of the lining epithelium. Some of the ghost underwent calcification (F) High-power microphotograph showing groups of shed eosinophilic ghost cells in the cystic lumen (Hematoxylin and eosin stain; original magnification; A, 4 × ; B and C, 10 × ; D, E, and F, 20 ×).

Declaration of competing interest

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

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