



Characteristic MRI and cone beam CT findings in a case of paradental cysts arising in the bilateral retromolar regions of the mandible

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ABSTRACT

Paradental cyst is an inflammatory odontogenic cyst linked with mandibular molars. The occurrence rate of the lesion ranges from 0.9 to 4.7% suggesting its infrequency. The histopathologic findings in hematoxylin and eosin routine staining are not pathognomonic, and the correlation with clinical and imaging characteristics is essential to establish the final diagnosis. The periapical radiographs show a unilocular radiolucency on the distal or disto/buccal aspect of the involved tooth, however, the lesion can superimpose over the roots and mimic periapical pathology. We report the imaging features of a rare bilateral paradental cyst with an emphasis on magnetic resonance imaging and cone beam computed tomography to help a correct identification and characterization of the cyst and to reliably establish the diagnosis.

Key words: Cone beam computed tomography, jaw cysts, magnetic resonance imaging, oral diagnosis

INTRODUCTION

Paradental cyst is an inflammatory odontogenic cyst in the mandibular area, with a rare occurrence of 0.9–4.7% among odontogenic cysts, developing laterally with the cemento-enamel junction of a totally or partially erupted molar.^[1,2] It was first described by Main in 1970^[3] and Craig suggested the name paradental cyst.^[4]

The World Health Organization (WHO) has defined the paradental cyst as a cyst occurring near to the cervical margin of the lateral aspect of a root as a consequence of an inflammatory process in a periodontal pocket. A

distinctive form of the paradental cyst arises on the buccal and distal aspects of erupted mandibular molars where there is a history of pericoronitis.^[5]

Patients report different degrees of pain, tenderness, and swelling and, in some cases, it can be observed along with suppuration through the periodontal pocket.^[2,6]

Radiographically, the paradental cyst can have different features depending on the superposition of anatomical structures, presence of infection, and size and location of lesion,^[2] however, is often presented as a well-defined

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radiolucent area with sclerotic border usually laterally positioned to a tooth, superimposed over roots and an intact periodontal ligament space and lamina dura,^[2,7] and sometimes radiolucency extended apically.^[4]

Microscopic examination shows the lining consisting of hyperplastic, non-keratinized, spongiotic stratified squamous epithelium. The fibrovascular connective tissue capsule is a seat of severe chronic or mixed inflammatory cell infiltrate.^[7] Paradental cyst has no pathognomonic histopathological features in routine hematoxylin and eosin (H and E) staining, and its difficult to distinguish from other odontogenic inflammatory cysts, hence requiring the correlation with clinical and diagnostic imaging.^[6,7] A recently published paper showed a lining immunohistochemical profile similar to the junctional/sulcular epithelium, positive for cytokeratins 13, 14, 17, 19, UEA-I binding, and perlecan. This specific immunohistochemical profile could be an important tool to distinguish the paradental cyst from other inflammatory origin cystic lesions.^[8]

The plain film appearance of the paradental cyst has been described in the extant literature. However, the appearance of this cyst on cone beam computed tomography (CBCT) and magnetic resonance imaging (MRI) have received relatively little attention.

CBCT and MRI appearances can contribute toward differentiating paradental cyst from the other lesion. Here, we discuss the CBCT and MRI of one rare bilateral case. The purpose of this article is to review the role of diagnostic imaging of paradental cyst with an emphasis on the MRI findings.

CASE REPORT

A 22-year-old man presented with painful swelling of the right and left sides of the mandible, high fever, sore throat, and lymphadenopathy. His medical history was unremarkable. A clinical examination revealed a partially erupted left and right mandibular third molars and pericoronitis was diagnosed. Panoramic radiograph [Figure 1a] demonstrated a well-defined semilunar-shaped radiolucency demarcated by a fine radiopaque border. Intraoral periapical [Figure 1b and c] radiographs showed round shaped, unilocular, lucent lesions with sclerotic border at third molars. The hypothesis of paradental cyst was considered. Although conventional radiographs provided information, the patient was advised for CBCT and MRI.



Figure 1: (a) Panoramic radiograph showing a well-defined radiolucent lesion associated with mandibular third molars; (b, c) Intraoral radiographs revealing lesions with semilunar-shaped radiolucent involving third molars

CBCT scan (GENDEX GXCB-500, Gendex Dental Systems, Des Plaines, IL, USA) was obtained with a field of view (FOV) of 16×6.0 cm with a 0.2 mm voxel size. An MRI scan (Philips Achieva 1.5T, Philips, Andover, MA, U.S.A) was obtained using an 8-channel phased array head coil and T1 sequence (TR = 478 ms, voxel size 0.72 mm isotropic, TE = 16 ms, FOV 1.0×21.0 cm, slice gap = 2.0 mm), T2 sequence (TR = 6.5 ms, voxel size 0.72 mm isotropic, TE = 90.0 ms, FOV 21×21 cm, slice gap = 2.0 mm).

CBCT showed a well-defined unilocular lesion with a thin radiopaque border bilaterally adjacent to the area of the third mandibular molars [Figure 2a and b]. No associated periosteal reaction or soft tissue was seen.

T1-weighted images revealed intermediate-to-low signal intensity surrounded by a thin delineation of hypointense compatible with cortical bone [Figure 3]. T2-weighted images showed homogeneous high signal content, indicating inflammatory response, regular contour presenting regular and elliptic appearance (adjacent to the third molars) [Figure 4].

Before surgery, the patient received instructions regarding appropriate oral hygiene. The area was irrigated with hydrogen peroxide. The treatment plan was to enucleate both the cysts and the extraction of teeth under local anesthesia. The lesions were sent for histopathological analysis.

After extraction of the teeth and cystic lining was done, a course of oral antibiotics, nonsteroidal anti-inflammatory analgesics, and an antimicrobial mouthwash was prescribed

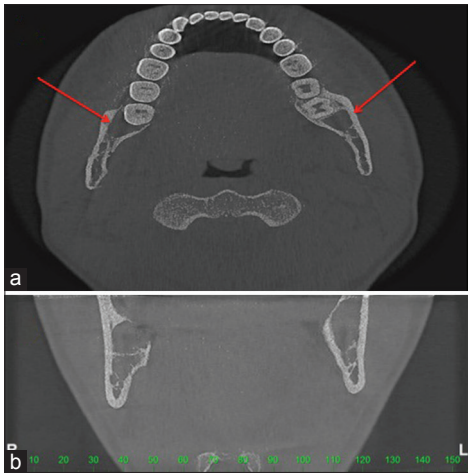


Figure 2: Cone beam computed tomography axial view showing a well unilocular lesion (arrows) with a thin radiopaque border bilaterally (a); coronal view of low density corticated in the molar area

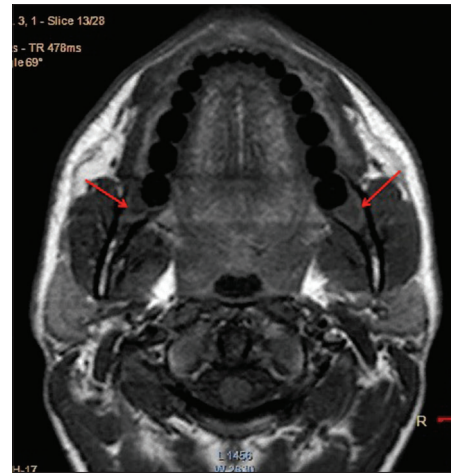


Figure 3: Axial T1-weighted magnetic resonance images showing the hypointense signal intensity of the lesion (arrows) and its real limits



Figure 4: Axial T2-weighted magnetic resonance images with hypersignal area of the lesion (arrows)

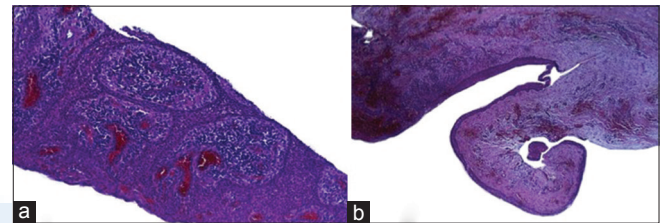


Figure 5: Histologic exam showing a non-keratinized stratified squamous epithelium, showing hyperplasia and fibrovascular connective tissue with hyperemic vessels, hemorrhage in focal areas, and chronic inflammatory cell infiltrate

for 1 week. After 1 week, the healing was uneventful and without complications.

Histopathological examination showed a cystic capsule lined by a hyperplastic, non-keratinized, spongiotic stratified squamous epithelium. The capsule was composed of fibrovascular connective tissue showing hyperemic vessels, hemorrhage in focal areas, and severe chronic inflammatory cell infiltrate [Figure 5a and b].

DISCUSSION

The paradental cyst is an uncommon inflammatory odontogenic cyst related to an inflammatory process, mainly pericoronitis, involving a tooth in eruption.^[2,5] The cyst is considered to be a kind of inclusion cyst arising in the periodontal pocket, with a possible junctional/sulcular

epithelial origin.^[8] Bilateral occurrence has rarely been reported and represents 23% of the cases.^[2]

Imaging assessment plays an important role in the in the detection of odontogenic cyst, assists with the diagnosis, and determines the size of the lesion and the relationship to the adjacent structure.^[9]

It has been reported that the radiographic image of the paradental cyst involved the first or second molar and is always characterized by a well-defined radiolucency associated with the roots on the buccal aspect.^[1,2,7]

However, the paradental cyst is frequently misinterpreted when associated with atypical clinical and radiographic features, affecting the diagnostic.^[6,10] For this reason, the imaging study of the differential diagnosis of this lesion has become extremely important.

Conventional radiographs are routinely used as the first level diagnostic imaging modality because it is widely available at a low cost. However, technical limitations of them in many cases take, usually, a necessary second level diagnostic test such as CT and/or MRI.^[11] CT is commonly performed

with multislice system that allows volumetric data with multiplanar reconstruction. Despite this methodological innovation, CT is executed with radiation exposure. On the other hand, MRI does not employ ionizing radiation and provides specific information for tissue characterization using T1 and T2-weighted image.^[11]

CT images as well as CBCT improve tissue contrast and provide better delineation of the borders of the lesion.^[6] Both CT techniques produce three-dimensional images of the bony structures and can obtain cortical bone information about the borders, buccal expansion, and exact measurements of the cyst,^[6] however, they do not allow the visualization of the contents of the lesion because of their poor soft tissue contrast.^[11] In panoramic reconstruction, a low-density pericoronal area associated with mandibular third molars was observed.

Analysis of lesion contents can be imperative for distinguishing from other odontogenic lesions.^[11] MRI scan typically shows odontogenic cysts with low-to-intermediate signal intensity on T1-weighted images and high signal intensity on T2-weighted images, which is consistent with high protein concentration and a mixed inflammatory cell infiltrate.

A review of the literature shows there is limited discussion about the CBCT and MRI features of paradental cysts. CBCT can show the location and lesion of extension; MRI can provide additional details regarding the liquid component of the lesion.

Of course, we should not forget the importance of clinical history and pathologic features for predicting prognosis and guiding the treatment of the patients.

In conclusion, we have reported CBCT and MRI findings in a case of bilateral paradental cyst of the mandible third

molars. Advanced imaging techniques played an essential role in the diagnosis and surgical planning.

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Conflicts of interest

There are no conflicts of interest.

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