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Case Report

Cone-Beam CT Assessment of Dentigerous Cysts: Diagnostic Value and Therapeutic Implications

Adithya KNV[1]*, Vaka Sravani[2] and Shaam Sundar[3]

[1]MD Medicine, Consultant Physician, Panimalar Medical College, India

[2]Oral radiologist, Consultant, Kartik Hospital, India

[3]Panimalar Medical College Hospital, India

***Corresponding Author:** Adithya KNV, MD Medicine, Consultant Physician, Panimalar Medical College, India.

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Abstract

Dentigerous cysts are developmental or inflammatory lesions commonly associated with unerupted teeth. While the inflammatory variant is less common, it typically appears in the mixed dentition period of children and often stems from infection related to non-vital primary teeth. This report outlines a case involving a 10-year-old male patient diagnosed with an inflammatory dentigerous cyst, originating from periapical infection caused by dental caries in deciduous molars. Emphasis is placed on timely detection, clinical and radiological evaluation, definitive treatment, and the utility of cone-beam computed tomography (CBCT) in diagnosis and management. The lesion was successfully managed with enucleation and extraction, followed by uneventful recovery.

Keywords: Dentigerous Cyst; Inflammatory Odontogenic Cyst; Paediatric Cyst; Cone-Beam CT; Enucleation

Introduction

Odontogenic cysts are pathological cavities arising from the remnants of the tooth-forming epithelium within the jaws. They are classified based on their origin as either developmental or inflammatory. In children, such cysts are relatively rare, yet dentigerous cysts are the most prevalent developmental variant encountered in clinical practice.

A dentigerous cyst characteristically surrounds the crown of an unerupted tooth and attaches at the cemento-enamel junction. Although often asymptomatic, they may expand significantly if left untreated. These cysts can be subdivided into two forms:

- The developmental type, which arises due to fluid accumulation between the reduced enamel epithelium and the crown of an unerupted, typically mature tooth.
- The inflammatory type, which results from an apical infection in a non-vital primary tooth and subsequently affects the developing permanent successor.

Mandibular third molars are the most commonly involved teeth, followed by maxillary canines and premolars. While conventional panoramic radiography serves as an initial diagnostic tool, cone-beam computed tomography (CBCT) offers enhanced spatial resolution and improved assessment of lesion boundaries with minimal radiation exposure.

This report presents a rare case of an inflammatory dentigerous cyst in a pediatric patient, highlighting the clinical presentation, radiological findings, surgical intervention, and histological confirmation.

Case Report

A 10-year-old boy presented to the Department of Oral Medicine and Radiology with complaints of intermittent pain and swelling in the lower right jaw for two months. The pain was described as dull and throbbing, worsened by chewing, and was accompanied by progressive facial swelling.

Clinical examination

- **Extraoral:** Facial asymmetry was noted due to a firm, non-tender swelling measuring approximately 4 × 3 cm on the right side of the mandible.
- **Intraoral:** A well-defined swelling (~2.5 × 1.5 cm) was visible extending from the region of teeth 83 to 85. Buccal cortical expansion was evident. Deep dental caries was present in tooth 84, which also showed grade I mobility.

Radiographic findings

- Intraoral periapical radiographs revealed extensive carious lesions in teeth 83 and 84, with associated radiolucency extending toward the developing permanent premolars (44 and 45).
- Orthopantomogram (OPG) showed a well-demarcated unilocular radiolucency with sclerotic borders displacing unerupted teeth 44 and 45 inferiorly.
- CBCT imaging further detailed buccal cortical expansion, thinning of bone, displacement of developing teeth, and proximity to the inferior alveolar nerve canal.

Treatment and outcome

Following routine blood investigations and obtaining consent, the patient underwent surgical enucleation of the cystic lesion along with extraction of the involved primary and unerupted permanent teeth under local anaesthesia. The excised tissue was submitted for histopathological evaluation.

Microscopic examination confirmed the diagnosis of an inflammatory dentigerous cyst, revealing a lining of non-keratinized stratified squamous epithelium with dense chronic inflammatory cell infiltration.

Postoperative healing was satisfactory. At the one-month follow-up, no signs of infection or recurrence were observed. An eight-month follow-up radiograph showed significant bone regeneration.

Discussion

Dentigerous cysts often remain undiagnosed until they cause visible swelling or are found incidentally on radiographs [3]. The inflammatory subtype, although rare, typically arises when periapical inflammation from a necrotic primary tooth extends to the follicle of a developing permanent tooth [2].

In the present case, pulpal infection and chronic periapical inflammation in the primary molars likely contributed to the cystic development around the unerupted premolars. CBCT was instrumental in evaluating the full extent of the lesion and planning surgical intervention, as it provided detailed information about bone expansion, cortical plate involvement, and proximity to vital anatomical structures [11,14].

Differential diagnoses in such cases include odontogenic keratocysts, unicystic ameloblastomas, and infected dental follicles. However, clinical history, radiographic appearance, and histopathological analysis assist in reaching a definitive diagnosis [5,7].

Surgical enucleation is the preferred approach, particularly when the lesion affects permanent tooth development [8]. Marsupialization may be considered in larger lesions to preserve adjacent structures [1,9]. Untreated lesions can lead to serious complications, including pathological fractures, or may undergo neoplastic transformation, though this is rare [10].

Figure 1: Pre operative photograph.

Figure 2: Intra oral clinical view showing buccal swelling irt 83, 84,85.

Figure 3: IOPAR reveals of ill-defineddisto coronal radiolucency involving enamel, dentin and pulp irt 84 with well-defined unilocular radiolucency irt to the roots of 84, 85 and this radiolucency involving with mandibular permanent first premolar (44) and second premolar (45). Ill-defined radiolucency involving enamel, dentin irt 83.

Figure 4: Occlusal radiograph reveals buccal cortical plate expansion involving 83, 84, 85.

Figure 5: OPG reveals a unilocular radiolucency with well-defined corticated borders with scalloped margins in the roots of 83, 84, 85 and this radiolucency involving with mandibular permanent canine (43), first premolar (44) and second premolar (45) which was apically displaced.

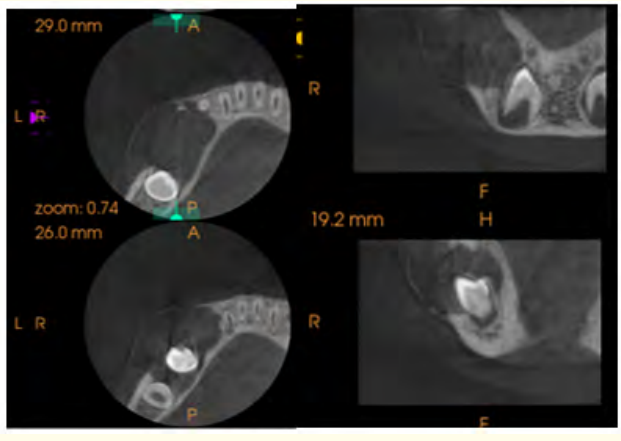

Figure 6: AXIAL sequential section of CBCT and sequential Sagittal section of CBCT.

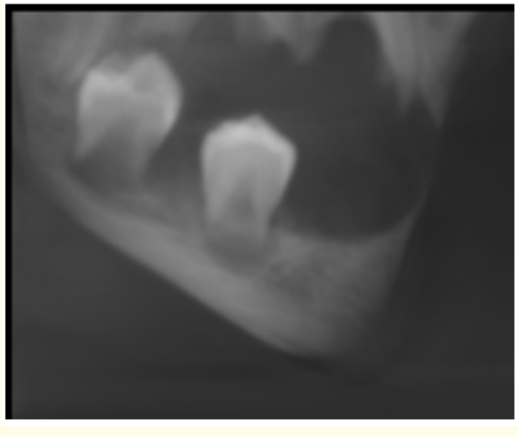

Figure 7: Coronal CBCT.

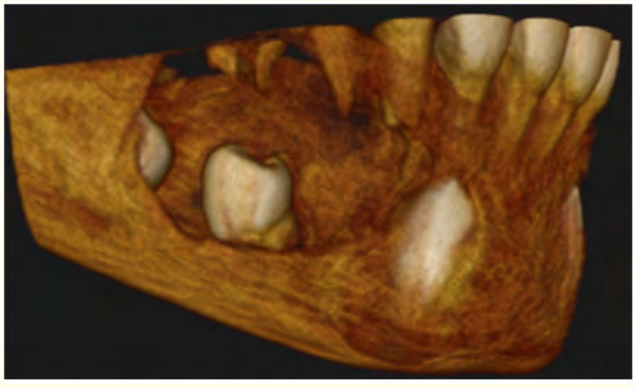

Figure 8: 3-D reconstruction root resorption irt 83.very clearly visible Buccal cortical plate bony defect.

Figure 9: Area of bony expansion with mental nerve involvement was visualized on the buccal aspect.

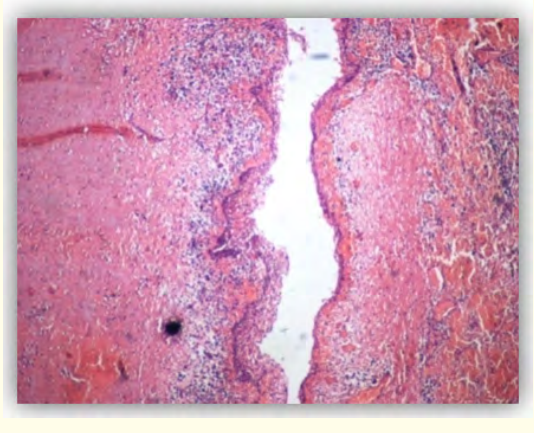

Figure 10: H&E section 2 to 3 layered stratified squamous, non keratinized epithelium. Flat epithelial connective tissue interface with rete peg formation. Connective tissue is fibrocellular with chronic inflammatory cells with lymphocytes, plasma cells and endothelial lined blood vessels.

Figure 11: Eight month follow up intra oral view showing no swelling.

Figure 12: Immediate post-operative picture after 1 month follow up.

Figure 13: Eight month follow-up OPG showing almost complete bone healing.

Conclusion

Although benign, dentigerous cysts can cause significant developmental disturbances in paediatric patients. Prompt diagnosis and intervention are crucial to prevent long-term consequences such as tooth displacement, bone destruction, or cyst recurrence. This case emphasizes the value of thorough clinical evaluation, advanced imaging via CBCT, and histological confirmation for effective treatment planning. Long-term follow-up is essential to ensure favourable outcomes and monitor bone healing.

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