Dentigerous cyst of inflammatory origin in mixed dentition: A case report and review of literature

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Abstract

A dentigerous cyst of inflammatory origin is a variant of dentigerous cyst which is commonly noticed only in the mixed dentition which differs from the developmental origin. It is slow growing in nature and has the tendency to cause bone expansion, displacement of adjacent teeth, tooth mobility, mild sensitivity, and deformation of roots of developing permanent teeth. The origin of this cyst is through the spread of inflammation from the root apex of a nonvital deciduous tooth to the follicle of a developing permanent successor. The treatment of the cyst can be done by enucleation or decompression/marsupialization methods. The larger cyst can be managed conservatively by marsupialization or decompression to avoid the damage of involved developing permanent successor and should be saved wherever possible. This is a case report of dentigerous cyst of inflammatory origin in a 12-year-old girl.

Keywords: Displacement, enucleation, marsupialization

Introduction

Dentigerous cysts are the 2nd most common oral developmental cysts of odontogenic origin which accounts for approximately 20-24% of all epithelial lined cysts of the jaws. These cysts occur with peak incidence in the 2nd to 3rd decade of life. It arises from the dental follicle of the unerupted tooth, and are relatively rare in deciduous teeth.

Benn and Altini classified it into developmental and inflammatory dentigerous cysts (IDC). Developmental type cyst occurs in permanent teeth usually as a result of impaction, while inflammatory type cyst occurs in immature teeth as a result of inflammation.

IDC is found between 6 and 12 years of age, i.e., in mixed dentition only and is 10 times more likely to occur in the mandible than maxilla. IDC occurs in association with nonvital deciduous teeth roots and crown of an unerupted permanent tooth which contributes to its occurrence in mixed dentition only.

Mandibular 2nd premolar is the most commonly involved tooth in the first decade of life. The reason for this is because the deciduous mandibular second molar has a higher susceptibility to decay and its roots are more closely approximated with the follicle of unerupted permanent mandibular 2nd premolar. The close physical relationship between deciduous mandibular 2nd molar and the follicle of its successor has been associated with a facilitated spread of infection in comparison with other deciduous teeth.

Few studies have shown that pulp therapy of infected deciduous tooth cannot prevent the development of IDC as it has been found both, where pulp treatment was not done and also in cases after pulp treatment.

Case Report

A female patient aged 12 years, reported to the Department of Oral Medicine and Maxillofacial Radiology with a chief complaint of swelling on the left side of the lower jaw since 7 months. The swelling started as a small one which was gradually increasing in size and attained the present size. The patient had undergone ayurvedic treatment for the same which did not provide any symptomatic relief.

Medical and allergic histories were found to be nothing significant. Past dental history revealed she consulted dentist 5 months back for the same problem but she did not undergo any further treatment.

Extra oral examination revealed diffuse swelling on the left side of the face measuring about 4×5 cm extending from the body of mandible crossing the midline and extending till the symphysis region on the right side as shown in Figure 1.
On palpation, the swelling was hard in consistency and nontender with intact inferior cortical border of mandible.

Left submandibular lymph node was palpable measuring about 1 cm in size, single in number, and nontender on palpation and mobile.

Intraoral examination of the swelling revealed well-defined swelling measuring about 4×5 cm extending from the 36 to 41 as shown in Figure 2a and b.

On palpation, the swelling was hard in consistency and nontender. Buccal cortical plate expansion was noticed.

Hard tissue examination revealed

Teeth present were

11, 12, 13, 14, 15, 16, 21, 22, 23, 24, 25, 26, 31, 32, 73, 74, 75, 36, 41, 42, 43, 45, 46, 47

Erupting tooth at 17 and Mild dental fluorosis were also seen.

With the above findings of association with deciduous teeth, age, and location, a provisional diagnosis of dentigerous cyst was given.

Orthopantomogram was taken which showed

Teeth present were

11, 12, 13, 14, 15, 16, 17, 18, 21, 22, 23, 24, 25, 26, 27, 28, 31, 32, 73, 33, 74, 75, 36, 37, 38, 41, 42, 43, 45, 46, 47, 48

Tooth buds at 18, 28, 38, 48

Presence of impacted 33, 34 which were displaced inferiorly to the inferior border of mandible

Dental caries was noticed at 75

Presence of well-defined radiolucency with corticated border in lower border of mandible extending from distal aspect of 43 crossing midline to distal aspect of 75 with two locules separated by septa with resorbed root at 73, 74, 75 CDE as shown in Figure 3.

Fine needle aspiration cytology (FNAC) was done in the region of swelling which gave straw colored fluid and the lesion shrunk in size after aspiration. The patient was kept under analgesics and antibiotics.

FNAC report showed cholesterol crystals having a broken cover glass appearance and presence of inflammatory cells mainly lymphocytes and RBC’s suggestive of inflammatory cyst as shown in Figure 4a and b.

Marsupialization was done and sutures were placed as shown in Figure 5 and the patient was maintained on a follow-up.

Discussion

IDCs in permanent teeth related to nonvital deciduous teeth are often observed during routine radiographic examinations or they are detected by clinical signs like bone expansion.[5]

Maintenance of primary teeth is most important to local homeostasis of the oral and general health. Thus, the primary teeth have to be monitored regarding dental caries and dental trauma, which can lead to pulp necrosis and periradicular lesions with no relevant clinical symptoms. The more earlier these lesions are detected, the less destructive the effects will be on the permanent tooth germ.

Figure 1: Extraoral picture of swelling

Figure 2: (a and b) Intraoral picture of swelling and dental fluorosis

Figure 3: Orthopantomogram showing swelling extent

Figure 4: (a and b) Fine needle aspiration cytology picture
A large inflammatory DC appears to take from 2 to 5 years to develop, depending on factors such as the type of bone, age of patient, and location of tooth.

**Histogenesis of IDC**

The exact histogenesis of the IDC is unknown, however, these cysts are always associated with an unerupted immature tooth. Al-Talabani and Smith suggested two types of IDC based on origin, i.e., extrafollicular and intrafollicular. Schematic representation of possible histogenesis of IDC was shown in Figure 6.

Main postulated that the development of cyst takes place as a result of intrafollicular spread of inflammation around the partly formed crown of a permanent tooth, from an overlying diseased primary tooth.\(^7\)

Bloch\(^8\) suggested the origin of IDC to be from the overlying nonvital necrotic primary tooth with the resultant periapical inflammation spread to involve the unerupted permanent successor tooth follicle, because of which an inflammatory exudate develops and results in formation of cyst. Rarely, IDC develops as a result of the intrafollicular spread of periapical inflammation from an overlying primary tooth.

The possibility of formation of extrafollicular IDC through eruption of crown of a permanent tooth into a radicular cyst of a primary predecessor appears to be rare because radicular cysts involving deciduous dentition are quite rare.\(^9\) Three cases of IDCs of extrafollicular origin have been reported by Wood et al. in 1988.

As the exact histogenesis of IDC still remains unclear, a genetic basis may contribute to its formation. The fact that the radicular cyst is more common in adults, whereas dentigerous cyst is more common in childhood, may point toward more genetic involvement in the etiology of dentigerous cyst, compared to radicular cyst. It is obvious that among the elderly, there is a long-term accumulation of environmental influences compared to the children.\(^10\)

**Diagnosis of IDC**

Based on correlation of clinical, radiographic and histopathological findings the final diagnosis of IDC should be made.
Clinical presentation

The cyst is usually present in the bicuspid region wherein the overlying deciduous molar is nonvital. The smaller cysts usually remain asymptomatic and detected occasionally during radiographic examination for orthodontic reasons. The cysts of more than 2 cm have the tendency to expand the bone causing bone springiness, intraoral swelling and displacement of adjacent teeth, tooth mobility, mild sensitivity, and deformation of crown of developing succedaneous teeth.

Radiographic features of the cyst

IDC appears as well-de ned unilocular radiolucency in radiographs, often with a sclerotic border, surrounding the crown of the unerupted permanent tooth. The cystic borders are properly seen on a panoramic radiograph. The cyst is attached to the cementoenamel junction of the unerupted immature permanent tooth and has a completely radiolucent internal structure except for the crown of involved tooth. Computed tomography can show the exact size and severity of the cyst in three dimensions.

Histology of the cyst

Histologically, IDC consists of a fibrous wall lined by nonkeratinized stratiform squamous epithelium of myxoid tissue, odontogenic remnants, and rarely sebaceous cells. Depending on the type and severity of in ammation there may be variations in the thickness of the lining epithelium.

Differential diagnosis

In the differential diagnosis of IDC, keratocystic odontogenic tumor (KCOT), a large radicular cyst unicystic ameloblastoma and central giant cell granuloma must be considered.

Ameloblastoma is rare in children and appears as a multilocular cyst like lesion on radiographs, although it may be unilocular with no characteristic features.

KCOT is also rare in the rst decade of life and is an aggressive lesion with high recurrence potential.

Unicystic ameloblastoma and KCOT both occur in the molar region of the mandible during the second and third decade of life.

Occasionally, a radicular cyst at deciduous tooth apex surrounds the crown of the developing permanent tooth gives the false impression of IDC associated with the permanent tooth, but as previously stated radicular cysts are extremely rare in relation to the deciduous teeth. Moreover, radicular cyst is usually small in size does not destroy much bone and very rarely causes cortical plates expansion, which is frequently noticed in the case of dentigerous cyst.

A hyperplastic follicle may closely resemble the dentigerous cyst of in ammatory origin on radiographs. The normal space of follicular space is 3-4 mm, a dentigerous cyst can be suspected when the follicular space is <5 mm. Furthermore, a cyst should be considered in cases of tooth displacement or considerable expansion of the involved bone.

Therefore, a nal diagnosis of dentigerous cyst of in ammatory origin should not be made only from clinical and radiographic features, because of its similar resemblance to other lesions in the same region. However, Kozelj and Sotosek suggested that leaking out of the cystic fluid during an extraction of a primary tooth or during decompression, respectively, conrms the clinical impression of the cyst and histopathological provides a con rmatory diagnosis.

Thus, from the above discussion, it is evident that other lesions which resemble the clinical and radiological presentation of IDC can be excluded with proper history and clinical examination. However, a histopathological examination should be performed, wherever possible, to exclude the possibility of lesions with more aggressive and high recurrence potential. It should be kept in mind that in the majority of cases there is the presence of nonvital deciduous tooth, though sometimes, the tooth may have lost because of trauma.

Treatment

The treatment of dentigerous cysts includes two surgical approaches, i.e., enucleation and decompression.

Enucleation is the procedure in which the entire cystic lining is removed along with, or without the involved tooth which is generally advocated for smaller cysts.

Marsupialization or decompression is a more conservative technique which helps in relieving intracystic pressure through the creation of an accessory cavity. This is mainly used to treat larger cysts in children, because of the close anatomic proximity of these cysts with the developing permanent tooth bud. Marsupialization is the preferred treatment during the eruptive stages of teeth.

It may be challenging in the treatment of young children with large dentigerous cyst, which is covered with only a thin layer of bone tissue and displaced tooth germs. Hence, a conservative approach with minimal injury has to be advised in these patients in order not to disturb the normal con guration and growth of bone structures and eruption of developing teeth.

In some case, orthodontic treatment may be necessary to help the tooth to erupt in its normal position. The eruption of a tooth associated with a dentigerous cyst seems to be more in uenced by its angulations and position in the alveolar bone, than by the cyst dimension and the amount of available space within the dental arch.

In this case, marsupialization of the cyst was performed to preserve the permanent tooth involved.

Complications of the untreated cysts

The cysts should to treated to prevent complications such as pathologic bone fracture, permanent tooth impaction, deformation of bone and rarely, development into ameloblastoma, squamous cell or mucoepidermoid carcinoma.
Conclusion

A diagnosis of IDC is important to limit the treatment within conservative approach. Hence, it will save the erupting permanent teeth, which may need to be sacrificed in more extensive lesions. Knowledge of the origin and the clinic-pathological findings are important for early diagnosis and adequate treatment. Therefore, a multidisciplinary team consisting of a radiologist, a pedodontist, a pathologist, and an orthodontist is important for early diagnosis and treatment.

References