Solitary Dentigerous Cyst – A Revisit

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Abstract: Solitary dentigerous cysts are the second most prevalent odontogenic cyst, frequently asymptomatic and found by a routine radiography of missing tooth from the dental arch. Clinical diagnosis requires correlation with radiographic findings. The inflammatory cysts of deciduous dentition should be differentiated from the dentigerous cysts of corresponding unerupted permanent dentition. The final diagnosis can only be confirmed histopathologically, although diagnostic challenge between inflammatory origin dentigerous cyst and inflammatory odontogenic of oral cavity. The treatment of choice is enucleation and removal of the associated tooth with excellent prognosis. The review enlists the earliest and recent pathogenesis, Clinicopathological features, different diagnosis and enabling a holistic approach in treatment modalities for mixed & permanent dentition.

Keywords: Osteolytic lesion, inflammatory origin, Transitional dentition and Marsupialization

I. Introduction

Odontogenic cysts are one of the true cyst, occur banal in the oral and maxillofacial region. These cysts arise from the immature odontogenic epithelium, capable of producing dental structures. Cystic degeneration may occur late stages of amelogenesis or after amelogenesis ceases. Epithelial lined odontogenic cysts develop either in result of periodontal inflammation or in result of developmental disturbance in the course of the odontogenesis 1. “The World Health Organization (1992) Odontogenic cysts classified as developmental type or inflammatory type based on origin. Developmental odontogenic cysts encompass dentigerous cyst, lateral periodontal cyst, keratocyst, sialoodontogenic cyst, and eruption and gingival cysts”. The inflammatory type includes radicular, residual and paradental cysts. The developmental odontogenic cysts arise not often in the jaw bones as compared to inflammatory cysts 5. In 1985, Shear stated that epithelial odontogenic cysts share many clinical and radiological similarities. Histopathological examination should be essential for all the surgically removed tissue. Fewer aggressive cysts may tend to recur, for appropriate treatment plan will often ensure by early and accurate diagnosis 3.

Dentigerous Cysts (DC) has developmental odontogenic epithelial origin and is the most frequent type (10%) among the odontogenic cyst. Dentigerous cyst contributes 20-24% of all epithelial lined jaw cyst. “Dentigerous cyst can be defined as an odontogenic cyst that surrounds the crown of an impacted tooth; caused by fluid accumulation between the reduced enamel epithelium and the enamel surface, resulting in a cyst in which the crown is located within the lumen”. It is also known as follicular cyst. The term follicular cyst is a misnomer which usually refers to hair follicle cyst or follicular cyst of ovary. The most appropriate term Dentigerous (tooth bearing) cyst was stressed by Browne & Smith in 1991. The first case report of dentigerous cyst was published in 1842 by Harris C.A 4.

Development origin

The most accepted pathogenesis of the dentigerous cysts was fluid accumulation separates one or both layers of the enamel epithelium from the crown of an unerupted tooth. The impacted tooth exerts pressure on the follicle that obstructs the venous outflow and induces rapid transudation of serum across the capillary walls. Expansion of cyst is caused by increase in osmolality or internal hydrostatic pressure of the cystic fluid 5.

Inflammation origin: Studies propose that dentigerous cyst not only developmental origin, but also have inflammatory in nature. The epithelial rest cells propagate through cytokine synthesis triggered by unknown stimuli. Inflammation of non-vital teeth or periapical infection caused by bacterial endotoxins. Endotoxins stimulate cytokines ie interleukin-1,6 transforming growth factor-beta , tumor necrosis factor , platelet-derived growth factor & also mitogens for epithelial cells. The cyst wall developed from proliferative epithelial strands which serve as building blocks. Dentigerous cyst walls show acute and chronic inflammation, inflammatory exudation cause the cyst to expand. It enlarges by unicentric expansion from the hydrostatic pressure of its contents 6,7. Anderson’s study concluded that histologically the effect of inflammation on

DOI: 10.9790/0853-1904090407 www.iosrjournal
odontogenesis of permanent dentition. Type of disturbance in successor permanent tooth depends predominantly on the time of onset of periapical infection, virulence of the invading bacteria and the host immune status. There is an association between persistent, prolonged inflammation of a primary tooth and the development of an inflammatory dentigerous cyst involving the succedaneous tooth.

Clinical Presentation

Odontogenic cysts have geographic differences with regard to the demographical data. Dentigerous cysts are usually occurs in 2nd & 3rd decades of life with male predilection (3:2 ratio-M: F) in permanent dentition. Mandibular 3rd molar and maxillary permanent canine are the common site of occurrence followed by mandibular premolar and maxillary 3rd molar. In the literature reviewed, rare occurrence of these cyst associated with the primary tooth shown in Table 1 and maxillary sinus also seen.

Table 1 Shown solitary dentigerous cyst occurs in various age, site

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Age /Sex</th>
<th>Involving the primary teeth</th>
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<tr>
<td>Delbem ACB et al</td>
<td>2006</td>
<td>10yrs/M</td>
<td>Mandibular left second molar</td>
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<td></td>
<td></td>
<td>8yrs/M</td>
<td>Mandibular Right lateral incisor</td>
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<tr>
<td>Kirtanya BC et al</td>
<td>2010</td>
<td>7yrs/M</td>
<td>Mandibular left canine, first and second molars</td>
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<tr>
<td></td>
<td></td>
<td>10yrs/F</td>
<td>Mandibular Right lateral incisor, canine and first molar</td>
</tr>
<tr>
<td>Singh S et al</td>
<td>2014</td>
<td>13yrs/M</td>
<td>Mandibular left second molar</td>
</tr>
<tr>
<td>Manekar VS et al</td>
<td>2014</td>
<td>9yrs/F</td>
<td>Mandibular left First molar</td>
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<tr>
<td></td>
<td></td>
<td>9yrs/M</td>
<td>Maxillary Right Second molar</td>
</tr>
<tr>
<td>Demiriz L, et al</td>
<td>2015</td>
<td>5yrs/F</td>
<td>Mandibular Right First molar Region</td>
</tr>
<tr>
<td>Sandhyaranji B et al</td>
<td>2016</td>
<td>11yrs/F</td>
<td>Mandibular Right Second molar</td>
</tr>
</tbody>
</table>

Cases have been reported associated with supernumerary teeth in premaxillary region. It usually has a unilateral presentation, but bilateral and multiple dentigerous cyst have also been reported. The second most common odontogenic cyst are Solitary / Unilateral dentigerous cysts. Bilateral cyst is commonly associated with a developmental syndromes and systemic diseases i.e cleidocranial dysplasia. In the absence of a syndrome associated bilateral dentigerous cysts in mandible were also reported. In the absence of a syndrome associated bilateral dentigerous cysts in mandible were also reported. Jeon et al reported dentigerous cyst in all four quadrants. The expansion of cyst results to clinical facial asymmetry, displacement of tooth, resorption of adjacent teeth root and failure in teeth eruption. The resorption of cementum and dentine of adjacent teeth play a vital role of PGE2 and PGE3, released from the dental follicle. Pain is a symptomatic feature in case of an infected cyst. The pathological fracture of jaw bones occurs due to rapid expansion of dentigerous cyst. In the literature also mentioned, inflammatory disturbance of cyst varies from common findings such as Turners hypoplasia, enamel hypomineralization, pigmentations, dilacerations of crown/root, ghost teeth, premature eruption and crater like bone loss. It may also lead to discrepancies such as temporary arrest of root/tooth development, delayed eruption of successional permanent teeth and even dentigerous cyst formation in the permanent tooth. These developmental origin is more common in second & third decades, inflammatory dentigerous cysts occurs in the first and early part of the second decades of life.

Imaging features:

In mixed dentition, radiolucency present periapical region of deciduous tooth & pericorneal radiolucency associated with the permanent tooth diagnostic challenge. Seward reported that radiologically lesions more than 5cm in diameter. It is usually diagnosed incidentally by radiographs in which it characterized well-defined with sclerotic margins, uniocular radiolucency around the crown of unerupted teeth. Radiologically, it is of three types-Central, Lateral, Circumferential. Radiological imaging ie OPGs, CT and MRI helps to distinguish dentigerous cysts from other cystic lesions of the jaws. The key diagnostic feature of dentigerous cyst is enveloping the crown of unerupted tooth / the crown intrudes into lumen macroscopically. It can confirmed either by FNAC -Cystic lumen containing cystic fluid which is thin, watery, or blood tinged and also biopsy. Lining epithelium is made of 2-3 layers of flattened cells devoid of rete ridges and dental follicle forms the connective tissue consist of young fibroblast and mucopolysaccharides ground substance. Odontogenic epithelial remnants may be seen in the connective tissue. Mucous metaplasia, mural thickenings or nodules can also frequently seen. Occasionally sebaceous cells may be found on the epithelial lining. Dentigerous cyst with sebaceous gland differentiation- five cases were reported by Chi et al.

Differential diagnosis

The most difficult differential diagnosis is between hyperplastic dental follicle and a small dentigerous cyst. The size of the Pericoronal radiolucency can be helpful in distinguishing between the two and if the diameter of the radiolucency is more than 5 mm, a dentigerous cyst is more likely. Radiologically, Radicular cyst arising from primary teeth mimics a dentigerous cyst of the permanent successor. The growth potential, DOI: 10.9790/0853-1904090407
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differentiation and degeneration of dentigerous cyst are more comparing to a radicular cyst. The histopathological features of non infected dentigerous cyst are similar to that of odontogenic fibroma, odontogenic myxoma owing to the fact that all three lesions are derived from tooth-forming epithelial residues. Infected dentigerous cyst exhibits anastomosing rete ridges mimicking radicular cysts. Radiographically, the infected cyst appears ill-defined margins. Epithelial cell-proliferation assay indicated that significantly higher concentrations of endotoxin and the cytokines had a mitogenic effect on epithelia of radicular cyst 26, 27.

Potential Complications

The disposition for neoplastic epithelial proliferation is high marked in the dentigerous cyst. A case report of ameloblastoma 29,30, Adenomatoid odontogenic tumor31 and complex odontomas arises from the wall of a dentigerous cyst 32. Transformation to intraosseous mucoepidermoid Carcinoma and epidermoid carcinoma have also been reported by Agnieszka et al33 and Matsuzaki et al34.

Treatment

Dentigerous cysts are treated by enucleation in case of the smaller cysts. However, extensive lesions are treated with cyst enucleation and extraction of the associated teeth 35. The enucleation may be damaged tooth germs and teeth may lose its vitality in case of mixed dentition. In young patients, the treatment of options recommended is Cyst enucleation without extraction and decompression in order to preserve the involved dentition 36. Marsupialization and decompression are the conservative treatment of choice in the mixed dentition 37,38. Irla Karlinne et al reported a case of conservative treatment of dentigerous cyst that contributed to spontaneous eruption of premolars in a 10 year old patient 39. A case of spontaneous regression of bilateral dentigerous cyst was reported in association with impacted third molars 40. Noriaki Aoki et al emphasized the success of a multidisciplinary approach to managing a dentigerous cyst and stimulating new bone formation in the surgical field after Marsupialization 41. Recurrence is uncommon if excision is done completely. In case of recurrence or malignant transformation Hemi Mandibulectomy is the treatment of choice 42.

II. Conclusion

An attempt has been made in this article highlighted the subtle differences seen microscopically between these two lesions especially mixed dentition and also various treatment options have been proposed for the management of these cyst.

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DOI: 10.9790/0853-1904090407
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