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Management Of Radicular Cyst Of Mandible In Pediatric Patients: A Case Series

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Abstract:
Radicular cyst is a pathologic cavity partially or completely lined by epithelium in an area of apical periodontitis that is the result of root canal infection of a tooth. The radicular cysts are most likely caused by the inflammatory proliferation of Malassez's epithelial cell resting in the periapical tissues that are irritated. It rarely occurs in conjunction with deciduous teeth and is typically linked to permanent dentition. This article describes a case series of two male children, ages five and seven, who had an apical periodontal cyst in the mandibular posterior region of the jaw, which was connected to their deciduous teeth. Conservative treatment might have been the outcome of an early diagnosis of the lesion. The goal of this paper is to highlight the pedodontist's contribution in the early analysis of such lesions.

Keywords: *Mandible, cyst enucleation, radicular cyst*

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I. Introduction:

Cyst is a pathological cavity containing a fluid, semi-fluid or gaseous content that is not created by the accumulation of pus and is frequently but not always lined by an epithelium. Radicular cyst also known as periapical cyst, apical periodontal cyst, root-end cyst, or dental cyst; originates from epithelial cell rests of Malassez in periodontal ligament as a result of inflammation due to pulp necrosis or trauma. Radicular cysts are rare in the primary dentition, with an incidence of 0.5-3.3% of the total number in both primary and permanent dentition[1].

Most radicular cysts seen in the primary dentition are associated with mandibular molars[2].

The majority of cases are asymptomatic and present with no clinical evidence of their presence and are accidentally found on the radiograph on routine general examination and present with no clinical evidence of their presence[3]. Some long standing lesions may undergo an acute exacerbation of the cystic lesion and develops signs and symptoms such as swelling, tooth mobility and displacement of an unerupted teeth[4]. It clinically exhibits as a buccal or palatal enlargement in maxilla, whereas in mandible it is usually the buccal and rarely lingual. At first, the enlargement is bony hard; but as the cyst increases in size, the bony covering becomes very thin and the swelling then exhibits springiness and becomes flucluant when the cyst has completely eroded the bone[5]. The radiographic findings include a radiolucent area with radio-opaque border associated with the apical region of the involved tooth.

The treatment includes conventional nonsurgical root canal therapy or extraction if the tooth cannot be preserved due to carious involvement and periapical surgery followed by curettage. Very rarely can the treated radicular cyst give rise to residual cyst[6].

II. Case Reports:

Case 1

A 5 year old male patient, reported to the Department of Pedodontics, P S M College of Dental Science and Research, Akkikavu, Thrissur, Kerala with a chief complaint of pain and swelling in the lower left back

tooth region since one month. The patient's parent gave a history of endodontic treatment in the lower left back tooth one year back. Past dental history revealed that the pain was severe, sharp shooting, intermittent in nature and aggrevated on chewing food and relieved on taking medication. The swelling was present in lower left molar region since 3 weeks which gradually increased and reached the present size.

On extra oral examination, there was no visible swelling and no apparent asymmetry. On intraoral examination, a single swelling was seen in the lower left posterior region associated with tooth number 74 and 75. The swelling measured approximately 2 x 1 cm in size and was roughly oval in shape with a smooth surface and diffuse margin. The swelling was of soft consistency and was tender on palpation (Figure 1).

As a part of investigation, OPG and CBCT were taken. OPG revealed well defined, non-corticated cystic lesion with size approximately 2 x 1.5cm seen in the left mandibular region with respect to 75. Internal structure appears radiolucent with radio opaque mass seen on the anterior wall of the cyst (Figure 2). CBCT shows unilocular, hypodense area of approximate dimensions 24.15mm x 14.70mm x 17.8mm was noted with respect to the periapical region of 74 and 75. Internal structure is completely hypodense except for two separate hyperdensities which indicates the possibility of spilled root canal filling material. There was expansion and thinning of buccal and lingual cortex along with displacement of tooth bud of 35 till the lower border of the mandible (Figure 3).

Provisional diagnosis of radicular cyst was made taking into account patient's history and clinical examination. Informed consent was taken from the parents for the procedure and impression of upper and lower arches were taken for splint fabrication. Surgical enucleation of the lesion under general anesthesia was performed along (Figure 4) with extraction of 74 and 75. Tooth bud of 35 was also removed (Figure 5). Intra oral splint was cemented on the lower arch (Figure 6 & figure 7) and the specimen was sent for histopathologic evaluation.

Histopathology study shows cystic lesion lined by discontinuous non keratinized stratified squamous epithelium. The connective tissue stroma was densely collagenous with diffuse and intense inflammatory cell infiltrate; predominantly lymphocytes, plasma cells and foamy macrophages. Evaluation was suggestive of radicular cyst (Figure 8). Intraoral splint was removed in the second post-operative follow up and healing was found to be satisfactory.

Figure 1: Intraoral view showing diffuse swelling in lower left posterior region of

Figure 2: Orthopantomogram (OPG)

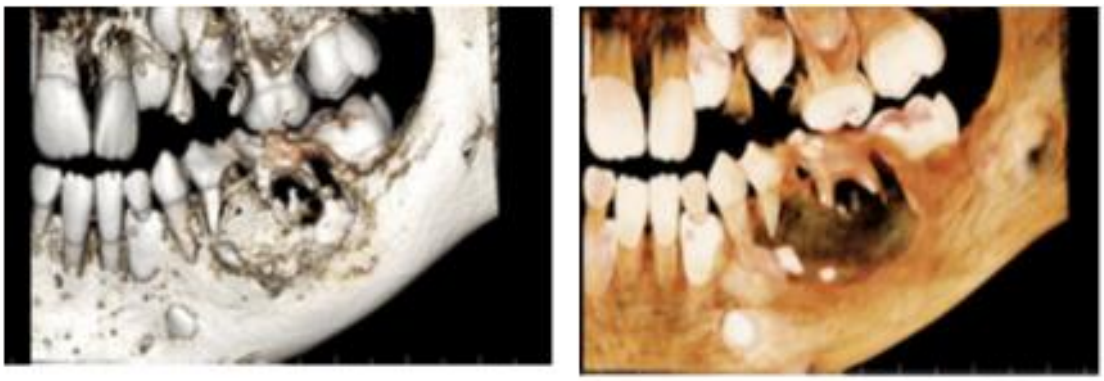

Figure 3: Cone beam computed tomography (CBCT)

Figure 4: Surgical enucleation of cyst

Figure 5: Extraction of 74,75 & tooth bud of 35

Figure 6: Intraoral splint fabrication

Figure 7: Intraoral splint cementation

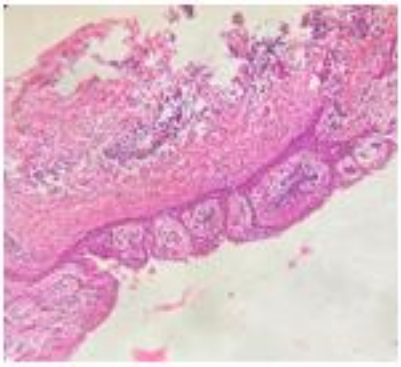

Figure 8: Histopathological examination shows epithelium with underlying connective tissue containing numerous inflammatory cell infiltrates.

Figure 9: 2 months post-operative follow up and splint removal

Case 2

A 7 year old male patient, accompanied by his parents, visited the Department of Pedodontics, P S M College of Dental Science and Research, Akkikavu, Thrissur, Kerala with the chief complaint of swelling and occasional pain in the lower right back tooth region since one 3 weeks. The parent gave history of endodontic treatment on the concerned tooth few years back. The pain was sharp and intermittent, worsened during chewing food and relieved with medication. The swelling in the lower right molar region had been progressively increasing in size and reached the present size.

On extra oral examination no apparent facial asymmetry was noted. On intra oral examination, a single swelling of approximately 1.5 x 1 cm in size was seen in the lower right molar region associated with 84 and 85. The swelling had a roughly oval shape with a smooth surface, diffused margin and soft in consistency. But the swelling was non tender on palpation. Given all the clinical features and history, the provisional diagnosis of radicular cyst involving 84 and 85 was made.

The orthopantomography (OPG), shows a well-defined radiolucency in the periapical region of the 85 measuring approximately 1.5 x 1.5 cm in size. It was roughly oval in shape and had non corticated margin (Figure 1). The second level radiographic examination (CBCT) (Figure 2) revealed unilocular, expansile, hypodense cystic lesion with size 14.9 x 15.9 mm (Figure 3) seen in the right mandibular periapical region with respect to 85. Restorative material (radiopacity) in the pulp chamber with resorption of roots in relation to 85 was seen. Expansion with perforation of buccal cortical plate and displacement of tooth bud of 45 distally was also noted.

Informed consent was taken from the parents and surgical enucleation under general anesthesia was performed (Figure 4) along with extraction of 85 and premolar tooth bud of 45 (Figure 5). The specimen was sent for histopathologic evaluation. The histopathologic examination confirmed the provisional diagnosis of a radicular cyst. The H & E sections shows a cyst lined by discontinuous stratified squamous epithelium. Certain areas show arcading pattern of epithelium proliferating into underlying moderately collagenous connective tissue. Chronic inflammatory cells are diffusely arranged in the connective tissue.

Figure 1: The orthopantomography (OPG), showing well-defined radiolucency in the periapical region of the 85

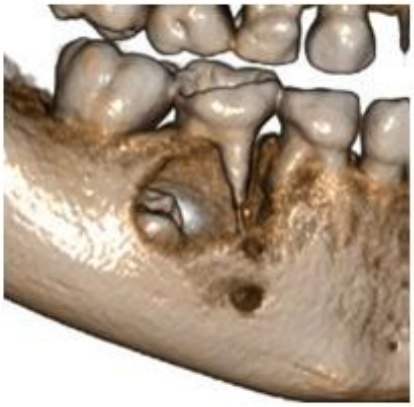

Figure 2: 3D view (CBCT)

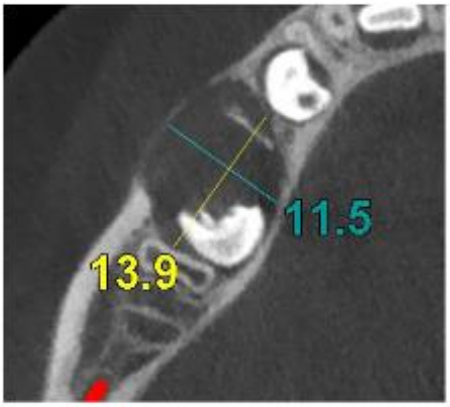

Figure 3: Axial section showing radiolucent lesion irt 85 and its measurement

Figure 4: Surgical enucleation of cyst

Figure 5: Extraction of 85 & tooth bud of 45

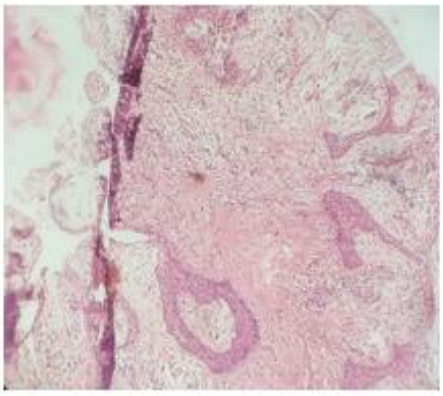

Figure 6: Histopathological examination showing arcading pattern of epithelium proliferating into underlying connective tissue with chronic inflammatory cells

Figure 7: Post-surgical review after 3 months

Figure 8: OPG of 3 months post-surgical review

III. Discussion:

According to the World Health Organization, cysts in the jawbone can be classified as developmental, neoplastic, and inflammatory origin[7]. Radicular cyst is of inflammatory origin and believed to be formed by inflammatory proliferation of epithelial cell rests of Malassez in the area of apical periodontitis of a tooth having an infected necrotic pulp[8]. A radicular cyst also known as a periapical cyst or dental cyst is more predominant in males than females. Its incidence in maxillary dentition is more than mandibular dentition. They often go unnoticed and are especially neglected in primary dentition due to their rare occurrence[9]. They are expected to resolve once the primary tooth falls off or is extracted and thereby is left untreated. The radicular cysts are usually asymptomatic unless secondarily infected[10]. In the present case reports, there was a radicular cyst associated with deciduous teeth in the mandibular posterior region of the jaw.

Grundy et al. described a series of radicular cysts associated with deciduous teeth that were treated endodontically with material containing formocresol, which is antigenic and has been demonstrated to trigger a humoral and cell-mediated immune response when combined with tissue protein[9]. In case 1, a radicular cyst of size 2x1 cm along with buccal and lingual expansion was seen. Whereas in case 2, a radicular cyst of size 1.5x1cm along with lingual expansion was seen. However, a radicular cyst rarely exceeds 1 cm in size, but if larger it might show buccal or lingual cortical plate expansion and can thin the bone around the tooth[6]. Although radicular cysts in primary teeth are rare, in the present case series it was seen in a five and seven-year-old children. In a wide-ranging survey of 1300 periapical cysts with deciduous and permanent dentition, the prevalence of radicular cysts associated with primary teeth was only 0.5%[11].

Radiographically most radicular cysts appear as round or pear-shaped unilocular radiolucent lesions in the periapical region. The cysts may displace adjacent teeth or cause mild root resorption[12]. Almost all radicular cysts are lined wholly or in part by nonkeratinized stratified squamous epithelium. These linings may be, discontinuous in part and range in thickness from one to 50 cell layers. The majority are between six and 20 cell layers thick. The epithelial linings may be proliferating and show arcading with an intense associated inflammatory process or be quiescent and fairly regular with a certain degree of differentiation. The inflammatory cell infiltrate in the proliferating epithelial linings consists predominantly of polymorphonuclear leucocytes whereas the adjacent fibrous capsule is infiltrated mainly by chronic inflammatory cells[5].

Surgical treatment of apical periodontal cysts is almost always enucleation and it is mostly recommended that the permanent teeth associated with the lesion should be preserved whereas the preservation of deciduous teeth may vary according to the situation. The complete removal of cystic lining reduce the possibility of recurrence[13]. So in both the case discussed above, premolar tooth buds were removed as they were closely associated with the lining of the cyst. Other most commonly performed surgeries are marsupialization (Partsch method), enucleation with primary packing, or marsupialization followed by enucleation (Waldron's technique). In the present case series, it was decided to surgically enucleate the lesion under general anesthesia and then suture using non absorbable silk sutures. In case 1, a fixed acrylic splint was cemented on the mandibular arch to stabilize and prevent fracture of mandible which was removed 2 months later. However in case 2, splinting was not done and the patient was then recalled after seven days for removal of the sutures and hence granulation tissue was successfully formed and the wound healed by primary intention. Treating patients with radicular cysts in deciduous dentition is a tedious task and hence needs a lot of patience and patient compliance for the treatment to be successful and have a full-term recovery[14, 15].

IV. Conclusion:

To sum up, radicular cysts are a common oral condition that go undiagnosed and might potentially harm the primary and permanent dentition. Children generally repairs well from post-surgical osseous abnormalities since they have a strong propensity for bone regeneration, but there is always a risk of cystic potential, particularly in cases with deciduous dentition.

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