CASE REPORT

Radicular cyst of primary tooth associated with maxillary sinus

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SUMMARY

Radicular cyst is one of the most common odontogenic cystic lesions found in the jaws. It is inflammatory in nature and found mostly in relation to a non-vital tooth. It usually presents at a later stage in life because the formation of the cyst is the last step in the progression of inflammatory events after a periapical infection. The cyst usually goes unnoticed because of its painless nature and small size. We present the clinical, radiographic and histological characteristics of a radicular cyst along with its management. Cystic sac was removed surgically under general anaesthesia after the elevation of the mucoperiosteal flap. Histopathologically, the cystic sac was consistent with the features of a radicular cyst. Follow-up period of 21 months showed improved radiographical appearance on Coned Beam CT. Vestibular deepening was planned as a future treatment in the same region.

BACKGROUND

Odontogenic cysts are the most common tissue-damaging lesions of the maxillofacial region. These cysts can be broadly divided into developmental and inflammatory based on their aetiology. The most frequent odontogenic cysts of the tooth-bearing area are the radicular cysts, also called periapical cysts. Radicular cysts are, however, rare in the primary dentition, representing only 0.5–3.3% of the total number of cysts, associated mostly with mandibular molars.^{1 2} Small cystic lesions frequently heal simply with endodontic therapy; however, larger lesions may need additional treatment. Untreated cyst may expand, causing local tissue destruction and deformities.³ In the present case, we discuss the diagnosis and management of a radicular cyst associated with maxillary sinus, with accompanying buccal cortical plate expansion.

CASE PRESENTATION

A 7-year-old girl reported to the department of pedodontics with symptoms of painless swelling on the right side of the face (figure 1) over the past 2 months. The patient's dental history revealed that she had undergone the extraction of grossly carious tooth primary maxillary right first molar (54 tooth) in the same region 1 year previously. Extraoral examination revealed a roughly oval, diffuse, non-tender swelling on the right side of the face. On intraoral examination, a firm swelling in relation to the alveolar process of the maxilla was seen, extending from tooth primary maxillary right lateral incisor (52 tooth) to permanent maxillary

right first molar (16 tooth). Diagnostic maxillary occlusal radiograph and an orthopantomogram radiograph showed a radiolucent lesion in the alveolar process of the right maxilla (figure 2). The lesion was well-defined measuring approximately 3.5 cm×4 cm in size. Primary maxillary right canine (53 tooth) and 54 tooth were associated with the lining of the cyst and the unerupted permanent maxillary right canine (13 tooth) was displaced up to floor of the orbit.

INVESTIGATIONS

The contents of the swelling were aspirated and sent for investigation, the results of which were consistent with the diagnosis of a cystic lesion. After clinical and radiological examination, a provisional diagnosis of dentigerous cyst was made. Prior to surgery, routine blood investigations were advised which were within normal limits.

TREATMENT

Surgical enucleation of the cyst was chosen as the treatment of choice. Written consent form was obtained prior to surgery. The surgery was performed under general anaesthesia and under antibiotic coverage. The lesion was found to extend into the antrum through the entire maxilla on the right side. The lesion wall was hypertrophic and was adhering to the mucosa of the base of the maxillary sinus. Buccal cortical plate, which was thin and expanded, was removed (figure 3A).

Enucleation of the cystic lesion and extraction of 52 tooth, 53 tooth and root stump of 54 tooth were carried out. The surgical defect was packed with ribbon gauge soaked in betadine. A primary closure was attempted following haemostasis (figure 3B).

The tissue was sent for histological examination, which revealed the lining of a thin layer of non-keratinised stratified squamous epithelium, with mixed inflammatory infiltration present in the connective tissue wall as well as in the epithelium. The cystic wall was composed of regularly arranged collagen fibres, fibroblasts and blood vessels (figure 4). These features were consistent with the clinical diagnosis of radicular cyst.

OUTCOME AND FOLLOW-UP

Radiographic examination after 6 months (figure 5A) and 21 months (figure 5B) showed good healing of the lesion. On Coned Beam CT (CBCT) examination, the destructed wall of the maxillary antrum was not fully formed after 21 months (figure 6A).

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Figure 1 Clinical photograph showing extraoral swelling.

A depression was observed, appearing like the scraped area of bone (figure 6B,C) with a very thin bony appearance (figure 6D). Though the patient was completely asymptomatic and normal after surgery, a long-term follow-up is needed for the complete formation of the wall of the maxillary antrum.

DISCUSSION

Radicular cysts originating from primary teeth are considered rare. Very few cases of radicular cyst are seen in the first decade of life, after which there is a steep rise with a peak frequency in the third decade. Over a 25-year period, of 13 000 radicular cysts, only 7 (0.5%) were associated with primary teeth.⁴ In an extensive review of the literature from 1898 to 1985, only 28 cases of radicular cysts are reported in primary teeth.⁴ Savage *et al*⁵ reported 12 cases after pulp therapy, suggesting that the medication used for pulp therapy was responsible for rapid growth of the cysts. Most lesions are reported in association with mandibular primary molars and approximately 30% are associated with previously endodontically treated teeth.⁵

Figure 2 Occlusal radiograph and an orthopantomogram radiograph showing cyst infiltrating the maxillary sinus.

Figure 3 Clinical photograph showing (A) cystic cavity involving complete maxillary sinus and (B) primary suturing.

There are several differences between radicular cysts originating from primary teeth and those originating from permanent teeth. The mandibular primary teeth are affected more frequently than the maxillary teeth, in contrast to a maxillary predominance in the permanent dentition.¹ The difference in site distribution of radicular cysts in the primary and permanent dentitions may be explained by different aetiological factors. In the primary dentition, caries is the most frequent aetiological factor, and the mandibular molars are the most frequently affected teeth. In the permanent maxillary incisors, the high frequency of radicular cysts results from trauma, caries and old silicate restorations.¹ Most cysts associated with primary molars are located in the inter-radicular area and around the roots, whereas cysts related to permanent molars are usually located adjacent to the apex. This may be explained by the short and sometimes partially resorbed roots and the existence of accessory canals in the pulpal floor of primary molars. Thus, the term periradicular cyst in primary molars is more appropriate than periapical or radicular cyst.

Histological studies reveal almost no difference between cysts originating from primary and permanent teeth, except for the rarity of cholesterol crystal slits in the cysts of primary dentition.^{1 2 6-8} Cholesterol crystal slits are found in about 30% of radicular cysts of the permanent dentition, but rarely in the primary dentition. In the permanent dentition, the frequency of periapical granuloma is higher than that of peri-apical cysts. Radicular radiolucencies related to primary teeth tend to be neglected and mostly resolve after the removal of the tooth.¹

Figure 4 Histological examination of cystic lining.

Figure 5 Postoperative occlusal radiograph and an orthopantomogram radiograph (A) after 6 months and (B) after 21 months.

Moreover, pulpal and radicular infections in these teeth tend to drain more readily, either through a sinus tract or through the marginal gingiva, thus causing less severe symptoms, which may remain untreated.

The most common clinical and radiographic features of radicular cyst in primary molars are well-defined unilocular radiolucency, mandibular buccal cortical plate expansion, displacement of succedaneous teeth, thin reactive cortex and misleading preoperative diagnosis.⁹ Radicular cyst arising from primary teeth may also mimic dentigerous cyst radiologically. In the present case, clinical and radiographical examination misled the preoperative diagnosis as dentigerous cyst. After the histopathological examination, the case was given a confirmatory diagnosis of radicular cyst. The healing potential in children is faster as noticed in many studies. The same was noticed in our case at regular follow-up visits of 21 months; however, CBCT examination showed that healing was not complete and also requires bone remodeling in the same region.

Learning points

- ▶ Radicular cysts are rarely found in the primary dentition, mostly in association with mandibular primary molars, with a high prevalence in endodontically treated teeth.
- ▶ In children, healing of the postsurgical osseous defect is always good as they have a high propensity for bone regeneration, as observed in the base area of the antrum in the present case. The walls of maxillary antrum, however, were showing slow and less than normal osseous healing.
- ▶ Long-term follow-ups are needed and further research is still required in the field of oral and maxillofacial paediatric surgery for better management of rarely occurring radicular cysts.

Figure 6 Coned beam CT after 21 months showing (A) incomplete healing, (B) affected area of the antrum, (C) antrum on unaffected side and (D) thin and expanded area of bone on affected side.

Competing interests None.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

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