Radicular Cyst, a Case Report and its Histopathological Analysis

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ABSTRACT

The radicular (periapical) cyst is the second most common pulp-periapical lesion. It is most common of all odontogenic cysts. The radicular cyst is classified as an inflammatory cyst because it is a known fact that inflammatory products initiate the growth of the epithelial component. Radicular cysts arise from the epithelial residues in the periodontal ligaments as a result of inflammation usually following pulp death. The present case report is of a 16-year-old male patient with the complaint of pain in the upper front tooth region of jaw since 3-4 days. The present case report discusses the histopathological changes in detail about the previous literature available so far.

Keywords: Epithelial, Inflammation, Odontogenic cyst, Periapical cyst, Periodontal ligament, Radicular cyst

INTRODUCTION

A radicular cyst is one of the most common odontogenic cystic lesions, inflammatory in origin, which arises from epithelial residues in the periodontal ligament. They develop as a progression of untreated dental caries with pulp necrosis and periapical infection.¹ Around 60% of all jaw, cysts are radicular or residual cysts. Many of the studies have shown poor correlation between the size of radiolucencies and histological findings of radicular cysts.² These cysts can occur in the periapical area of any teeth, at any age but are rarely associated with primary dentition.³ It is more frequent in maxillary than mandibular teeth. They are the most common found at the apices of the involved teeth, however, they may occur on the lateral aspects of the roots in relation to lateral accessory root canals. Radicular cysts are direct sequel to chronic apical periodontitis but not every chronic lesion develops into a cyst.⁴

The radicular cyst is usually symptomless and detected incidentally on plain orthopantomogram (OPG) while investigating for other diseases. However, as some of them grow, they can cause mobility and displacement of teeth and once infected, lead to pain and swelling, after which the patient usually becomes aware of the problem. The swelling is slowly enlarging and initially bony hard to palpate which later becomes rubbery and fluctuant.⁵ Radio graphically, most radicular cysts appear as round or pear shaped unilocular radiolucent lesion in the periapical region. The cyst may displace adjacent teeth or cause mild root resorption and can even cause nerve compression. The treatment options for radicular cyst can be conventional nonsurgical root canal therapy when lesion is localized or surgical treatment such as enucleation, marsupialization, or decompression when the lesion is large.⁶ This case report presents the histopathological analysis and the treatment plan of an infected radicular cyst.

CASE REPORT

The 16-year-old male patient from Udaipur Rajasthan was presented to the Department of Oral Pathology, Darshan Dental College Udaipur with complains of pain in the upper front tooth region of jaw since 3-4 days (Figure 1). The pain was sudden, severe, sharp and continuous, occurs on chewing food, radiates to the forehead at night. Pain aggravated on eating and relieved after taking a tablet and subsided for 6-8 h. There was no relevant Medical, dental, and family history. Personal history included brushing habit once daily and had a mixed diet. Intraoral examination revealed that pain was present on palpation of palatal mucosa in relation to 21,
22. There was no extra oral swelling and intraorally the palatal mucosa was firm and palpable in 21, 22 root apex (Figure 2). On inspection of the swelling, it was one in number, present in the maxillary front region, pink color, margins irregular, smooth surface, and pulsation absent. On palpation temperature was afebrile, shape ovoid, size 1 cm × 1 cm, tender, soft in consistency and fluctuation absent. Vitality test conducted revealed no response in 21, 22 teeth. Affected teeth were slightly tender on percussion and showed Grade I mobility. The cyst was curetted by raising the flap and tissue was submitted for histopathological examination. The provisional diagnosis was suggested as palatal abscess with 21. With the differential diagnosis of the radicular cyst, periapical granuloma, globulomaxillary cyst, the hematological investigations were done. Hemoglobin-11.8 g/dl and total leukocyte count-7700/cumm were observed.

Intraoral Periapical and Intraoral Maxillary Occlusal Radiograph

It shows well-defined cortical border with the radiolucency at the apical region wrt 21, 22 measuring about 1 cm × 1 cm. Bone resorption adjacent to the lesion was seen (Figure 3a and b).

Histological Analysis

The presence of varying thickness of epithelium fibro cellular connective stroma. In scanner view, one-bit of tissue with epithelium and underlying connective tissue stroma (Figure 4).

Low power view, showed stratified squamous hyperplastic epithelium with arcing pattern of rete ridges and underlying dense fibro cellular connective tissue stroma consisting of sparsely arranged collagen fibers, fibroblasts and few vascular spaces with extravasated red blood cells (Figure 5).

High power view showed diffuse and dense infiltration of chronic inflammatory cells along with vacuo-lations. Connective tissue showed dense infiltration of lymphocytes and plasma cells with few macrophages (Figure 6).

The clinical, radiographic, hematological and histological examination concluded Radicular cyst with 21 as the final diagnosis. Therefore, the treatment plan included oral-antibiotics and analgesics, personal oral hygiene and diet counseling, oral prophylaxis, RCT wrt 21, 22. The Surgical treatment included enucleation of cyst/marsupialization and plasma rich protein graft.

DISCUSSION

The radicular (periapical) cyst is the second most common pulpoperiapical lesion. It is classified as an
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odontogenic cyst because of its origin in the cell rest of mallasez in the periodontal ligament cells, which are remnants of the Hertwig root sheath; the latter, in turn, is a product of the odontogenic epithelial layers (the inner and outer enamel epithelium). Quite often a radicular cyst remains behind in the jaws after removal of the offending tooth, and this is referred to as a residual cyst.

The pathogenesis of radicular cysts has been described as comprising of three distinct phases: The phase of initiation, the phase of cyst formation, and the phase of enlargement.

The initial swellings of these radicular cysts are usually bony hard, but as they increase in size, the covering bone may become very thin despite initial sub-periosteal bone deposition. Finally, with progressive bone resorption, the swellings exhibit “springiness” or “egg shell cracking.” The associated teeth are always non-vital, and may show discoloration. Although the associated teeth usually show no root resorption, there may be smooth resorption of root apices.

Histologically, the lesions fulfilled the criteria adopted for radicular cysts. They consisted of a cystic wall lined by stratified non-keratinized squamous epithelium, sometimes arranged in often interconnecting rings, which exhibited spongiosis and exocytosis and was hyperplastic or atrophic. Chronic inflammatory infiltrate, multinucleated giant cells and neutrophils were also observed in the cysts. These features are comparable to those described previously. The histopathological studies show that the epithelial lining of almost all radicular cysts is whole or in part lined by stratified Squamous Epithelium and range in thickness from 1 to 50 cell layers. Keratinization was not found in the present case.

In approximately 10% of cases of radicular cysts, Rushton’s Hyaline bodies are found in epithelial linings. Rushton bodies or hyaline bodies exhibiting a wide variety of shapes, including linear, round, lamellar or amorphous structures, were found in the epithelium of RCs. The presence of these structures depends on the sectioning plane of the material, with their incidence ranging from 2.6% to 10.3%. In the present study, Rushton bodies were detected in only a few cells. They presented a lamellar shape without calcifications.

Another observant feature is the deposition of cholesterol crystals found in many radicular cysts through degeneration and disintegration of lymphocytes, plasma cells and macrophages taking part in the inflammatory process. With the acute inflammatory cells present when epithelium is proliferating, chronic inflammatory cells are present in the connective tissue immediately adjacent to the epithelium.

These cysts can occur in the periapical region of any teeth, at any age but seldom seen associated with the primary dentition. Few studies in the UK and the South African population have shown that radicular cysts occur more commonly between the third and fifth decades of life, more common in males than females, and more frequently found in the anterior maxilla than other parts of the mouth. Its size rarely exceeds 1 cm and is often seen in patients between 30 and 50 years old with the higher incidence in the maxillary anterior region.

In the present case, the patient was in the second decade, and the size was 1 cm × 1 cm present in the anterior maxillary region.

The treatments of these cysts are still under discussion, and many professionals opt for a conservative treatment using the endodontic technique. However, in large lesions the endodontic treatment alone is not efficient, and it should be associated to a decompression or a marsupialization or even to enucleation. In the present case, endodontic treatment along with enucleation was suggested.

The radicular cyst is usually symptomless and detected incidentally on plain OPG while investigating for other diseases. However, as some of them grow, they can cause mobility and displacement of teeth and once infected,
lead to pain and swelling, after which the patient usually becomes aware of the problem. The swelling is slowly enlarging and initially bony hard to palpate which later becomes rubbery and fluctuant\(^\text{18}\) similar to our clinical findings.

CONCLUSION

A radicular cyst is a common condition, and it usually goes unnoticed and rarely exceeds the palpable dimension. Untreated cases may lead to tissue destructions and facial deformity. Hence this case, however, occurs in an uncommon age group, but clinical and histopathological findings were similar to previous literature and were successfully treated endodontically followed by surgical enucleation.

REFERENCES


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