INFECTED RADICULAR CYST IN POSTERIOR MAXILLA - A CASE REPORT

ABSTRACT

Radicular cyst is the most common cyst of the oral cavity. The radicular cyst is an inflammatory cyst associated with the root apex of a non-vital tooth. The cyst may cause displacement of surrounding structures. These cysts often get infected due to chronic infection. In the posterior part of the maxilla, a massive radicular cyst can displace the floor of maxillary sinus. Careful diagnosis is very important in such situations so that exact origin of the pathology is determined correctly. Panoramic radiographs and CT scans are valuable tools for achieving correct diagnosis. The purpose of this article was to report the case of an infected large radicular cyst that had displaced the floor of the maxillary sinus.

Key words- Radicular cyst, infection, maxilla

INTRODUCTION

Radicular Cyst is the most common inflammatory cyst which accounts for more than 50% of all the cysts of the jaws. It can be found in tooth bearing areas of oral cavity with maxillary anterior region being the most common site. Epithelial rest cells of Malassez, which are remnants of Hertwig’s epithelial root sheath, are believed to give rise to this cyst. These cells proliferate in response to inflammation caused by chronic periapical infection. Clinically these cysts present as periapical lesions, ranging from 0.5 to 1.5 cm in size. Radicular cysts are usually asymptomatic and increase in size slowly so they may remain undiagnosed until they reach a size that becomes clinically evident. Most of the time they are diagnosed on routine periapical radiography as oval, unilocular, well circumscribed radiolucency attached to tooth root. For larger lesions, panoramic radiographs and computed tomography scan are better diagnostic modalities. Differential diagnosis of radicular cysts includes periapical cement-osseous dysplasia, odontogenic keratocystic tumor, mucocele of maxillary antrum, dentigerous cyst, lateral periodontal cyst and traumatic bone cyst. Smaller periapical cysts can often be treated conservatively by nonsurgical endodontic therapy. Proper endodontic therapy of the involved teeth removes irritants in the canals by chemomechanical instrumentation.
As the root canal is completely sealed, all cell components, inflammatory cells, endothelial cells and fibroblasts in the periapical lesion participating in inflammatory reaction are gradually deleted by apoptosis or programmed cell death. However surgical removal following endodontic treatment is required for cases not amenable to conservative therapy. Radicular cyst associated with molars or premolars can reach large dimensions, so that it may displace the lining of maxillary sinus and reduce it to a small cavity. Such large cysts demand surgical enucleation. This article reports a case of large radicular cyst in maxilla. The diagnostic and therapeutic options are discussed herewith.

CASE REPORT

A 29-year-old male reported to the Department of Oral and Maxillofacial Surgery, S.G.R.D Institute of Dental Sciences for evaluation and treatment of swelling on the right cheek. History of present illness dates back to 3 years when patient experienced pain in right upper posterior teeth, for which he was advised root canal treatment by a private practitioner. Endodontic treatment in right maxillary first molar was done and second premolar was restored. Patient remained asymptomatic for 2 years after initial treatment. One year back, restoration in right maxillary first molar got dislodged and the patient started having pain on chewing and slight swelling on right side of face which gradually increased over a period of time. Extra oral examination revealed painless swelling in the right infra orbital region which extended till the corner of mouth. Nerve sensitivity was not altered and no lymphadenopathy was found. Intraoral examination revealed well-defined swelling extending from distal surface of right maxillary canine to the mesial root of right maxillary second molar with expansion of buccal cortical plate (Fig 1). The swelling was hard in consistency, non-fluctuant and nontender on palpation. The temperature of overlying skin was normal. The overlying mucosa was non-ulcerated and normal in color. Right maxillary first molar and second premolar were non vital. The palatal mucosa was intact and there was no evidence of oro-nasal and oro-antral communication. Panoramic radiograph revealed a large oval shaped, unilocular radiolucency with well-defined radiopaque border measuring 3.5×3 cm in size (Fig 2). Computed tomography scan revealed well-defined cystic expansile lesion along the alveolar margin of right side of maxilla projecting into lumen of right maxillary antrum along its posterior wall (Fig 3). Cystic fluid was aspirated with 18 guage needle that appeared creamish white in color and was sent for cytochemical examination. Fluid contained cholesterol crystals and numerous inflammatory cells. On the basis of clinical, radiological and aspiration findings a provisional diagnosis of infected radicular cyst was made. Routine Laboratory investigations were within normal limits. The lesion was enucleated and the offending teeth were extracted (Fig 4, 5) under general anaesthesia followed by primary repair of sinus membrane and closure of the surgical...
defect. Histopathological examination revealed cystic cavity lined by scanty, disrupted, non-keratinized, two to three layered odontogenic epithelium. The cystic capsule was fibrocellular, composed of delicate to dense collagen fibers with areas of haemorrhage and was infiltrated with chronic inflammatory cells and vascular channels, suggesting the definitive diagnosis of radicular cyst. Postoperative healing was uneventful and there was no sign of recurrence one year later.

**DISCUSSION**

Radicular cysts are the most common inflammatory cysts; they develop following pulpal necrosis, which stimulate the epithelial rest cells of Malassez in the periodontal ligament to proliferate.² ³ ⁴ ⁵ ⁷ ⁸ Apical periodontitis the root cause of many radicular cysts but not all are affected by the same.² ⁵ ⁷ ⁸ ⁹. Trauma being the other cause.¹⁰ Their prevalence is highest in the third decade of life and are more commonly seen in males than females.¹¹ About 60% of the radicular cysts are found in the maxilla and 40% in the mandible with expansion of buccal or palatal cortical plate. There is a particularly high frequency in the maxillary anterior region.¹² ¹³ Since maxillary anterior teeth receive most of the trauma owing to their position and thus develop pulp necrosis. This may be the possible explanation for their prevalence in males and in maxillary anterior region.² ³ ⁸

Our patient gave history of chronic infection in maxillary first molar, which could have been the possible cause of initiation of cyst formation.¹⁵ The products of pulpal infection and necrosis spilt out into the periapical tissues, inciting an inflammatory response. The inflammatory cells secrete a host of lymphokines to neutralize, immobilize, and degrade bacteria. They also induce bone resorption through the elaboration of interleukin-1 and osteoclast-activating factors.¹⁰ Different cytokines have been identified in periapical lesions which include interleukin 1 (IL-1), IL-4, IL-6, IL-8, IL-10, IL-12, interferon-gamma (IFN-γ), and tumor necrosis factor alpha.¹⁰ These cells are thought to elaborate many other factors that either directly or indirectly acts as epithelial growth factors, stimulating the proliferation of the rests of Malassez in the periapical granuloma. As the size of the lesion increases, there is breakdown of central cells and connective tissue of the lesion owing to reduced blood supply, thereby forming a cystic cavity.² ⁷ The cyst continues to enlarge by epithelial proliferation in the lining and by generation of osmotic pressure in the cyst lumen.² ³ ⁴ ⁵ ⁷ ⁸ ⁹ ¹⁰ Raval et al provided evidence that the osmotic gradient favors transudation of fluid into the lumen, which increases pressure on surrounding bone triggering osteoclastic activity as suggested by Toller.¹¹ As the cyst grows in size by resorption of the surrounding periapical bone, it causes localized jaw swelling. Pain and pus discharge are the presenting features of an infected radicular cyst.¹⁵ Very few cases of radicular cysts involving extensive part of maxilla are reported in the literature.¹⁶ These cysts often extend into the maxillary sinus and soon occupy its major portion.¹⁶ The probable explanation of this fact would be the relatively thin and cancellous nature of maxillary bone as compared to the dense cortical bone of mandible.² ³ ⁸

Hoenet al¹¹ suggested aspiration of the cystic fluid as an important diagnostic adjunct. Aspirate provides the basis for biochemical and cytological analysis which can help in formulating the diagnosis accurately.¹² Patidar et al reported that radicular cysts contain higher levels of β and δ globulin indicating the presence of inflammatory changes in the cyst wall.¹³

The treatment of radicular cyst consists of eradicating the microbial load and inflammatory mediators from the canals and periapical tissue.¹⁵ In cases of endodontic failure due to incomplete restoration or pulpal leakage, as observed in the present case, the apical radiolucency may enlarge, indicating the transformation of the granuloma to a radicular cyst. Such cases may need retreatment for accessory canals that were left previously. Small radicular cysts are definitively resolved if the tooth along with apical lesion are removed.¹⁴ ¹⁵ ¹⁶ However cases which do not respond to conservative management require surgical intervention. The surgical treatment for radicular cysts include total enucleation, marsupialization or a combination of these techniques.² ³ ⁴ ⁵ ⁶ The size and location of the lesion, the integrity of the cystic wall and its proximity to vital structures determine the type of surgical intervention required.¹⁷ Enucleation is an extensive procedure that may damage adjacent anatomical structures whereas conservative surgical methods include marsupialization and a relatively innovative technique of endoscopically assisted enucleation.¹⁸ Endoscopic approach appears to be less invasive with reduced healing time and very low morbidity.¹⁹ Deshmukh et al advocated that ideal treatment for large, chronically infected radicular cysts, is surgical enucleation with extraction of the offending teeth.¹⁵ Treatment is dictated by the Caldwell Luc approach as indicated for large cysts that displace the floor of the sinus.¹⁵ In order to hasten the repair of periapical tissues guided bone regeneration can also be used.¹⁶ In the present case surgical enucleation with extraction of the offending teeth was done to ensure the removal of entire cystic lining.

Post-surgical period was uneventful, the cystic lesion was sent for histopathological examination. Histopathological examination was consistent with the clinical diagnosis of
Radicular cysts are the common lesions found in oral cavity. Being symptomless they go unnoticed till they achieve such a size that becomes clinically evident. In cases of massive radicular cysts differential diagnosis with other cystic lesions becomes difficult. Treatment of radicular cyst should be defined for each case individually according to the presenting clinical and radiographic features.

REFERENCES
1. Shear M, Speight P. Cysts of the Oral and Maxillofacial Regions.