



**SURGICAL MANAGEMENT OF INFECTED RADICULAR CYST IN MAXILLARY
ANTERIOR REGION: A CASE REPORT**

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ABSTRACT

Radicular cysts or periapical cysts are the most common cystic lesions in the jaws. They arise from the epithelial remnants in the periodontal ligament as a result of the stimulus from periapical infection following pulpal necrosis. They found mostly near apex of the teeth. Most radicular cysts are of smaller size of around 1.5 cm, but they can even extend up to 5-6 cm. In the maxilla, sometimes, a cyst may involve the entire maxillary sinus. Radiographically most radicular cyst appears as a pear shaped unilocular radiolucent lesion in the periapical region attaching the affected tooth root. This case report presents the successful surgical and endodontic management of large infected radicular cyst involving over half of the palate in anterior maxilla. Pathogenesis, clinical features, and treatment options are discussed.

INTRODUCTION

“Cyst is a pathological cavity that may be filled with fluid, semi-fluid or gaseous contents, but never pus and it may or may not lined by epithelium.” It is a space-occupying lesion with an outer wall of fibrous connective tissue that surrounds a central cavity called the cyst lumen. On the inner aspect of the wall, whenever there is a lining of the epithelium, it is mostly stratified squamous epithelium.

The maxillofacial region is affected by a greater number of cysts. Cysts can occur within the bone or soft tissue with and without symptoms. When found in bone, they are called as central cysts and when found in soft tissue, they are called as peripheral cysts. They are broadly classified into odontogenic and nonodontogenic origin with inflammatory and non-inflammatory origin.^[1]

Odontogenic cysts are those which arise from the epithelium associated with the development of teeth. The source of epithelium is from the reduced enamel epithelium, enamel organ and the cell rests of Malassez or the remnants of the dental lamina. Radicular cysts are the most common inflammatory origin odontogenic cystic lesions of the oral cavity.

They are also called as periapical cysts or lateral periodontal cysts. They are most commonly found at the root apices of the pathologically affected teeth at any age affecting any gender. Maxillary arch is more affected than mandibular arch. Radicular cysts are direct sequel to chronic apical infection, but not every time. Since least literature is available about the natural history of radicular cysts, it's not clear that why and what proportion of radicular cysts regress and grows.^[2]

Most of the radicular cyst are symptomless and are discovered when periapical radiographs are taken of the teeth with nonvital pulps. The formation of the cyst takes place in two stages; first, the epithelial cells proliferate and later undergo degeneration and liquefaction. It was pressure exerted by the liquefaction material, which makes the cyst spherical and ultimately expansion of the same occurs. Further, it results in the resorption of the root of adjacent teeth and displacement of the same.

Further progress of cyst may produce expansion of cortical plates too. On a radiograph, the cyst appears as a unilocular or multilocular with radiopaque periphery of dense sclerotic bone. Patient often complains of slowly enlarging swellings. The treatment options for radicular cyst can be conventional root canal therapy when lesion

is localized and small and surgical treatment like enucleation when lesion is large.^[4]

This case report presents the successful surgical management of large infected radicular cyst with endodontic treatment of adjacent teeth for a better prognosis.

CASE REPORT

A 30-year-old male patient reported to the Dr. Ankit Gupta orthodontic and Implant center with the chief complaint of pain and gradually increasing intraoral swelling since 1 month. There was a history of trauma to the upper anterior teeth before 6 years. Intraoral clinical examination revealed an oval swelling located largely over left palatal region crossing the midline from 11 to 25 regions. On palpation, the lesion was around 3.5 cm × 5.5 cm, soft to firm in consistency, and tender. The mucosa overlying the swelling is normal in color and texture (Figure 1).



Figure1. Intraoral Swelling above the right lateral incisor.

Electric and thermal pulp vitality testing showed a negative response in 21, 22, 23, 24. Teeth were painless to percussion. The intraoral periapical radiograph and orthopantomogram presents oval shape large periapical radiolucency about 4.5 cm × 5.5 cm associated with 21-25 teeth and causing upward displacement of the maxillary sinus lining (Figure 2).

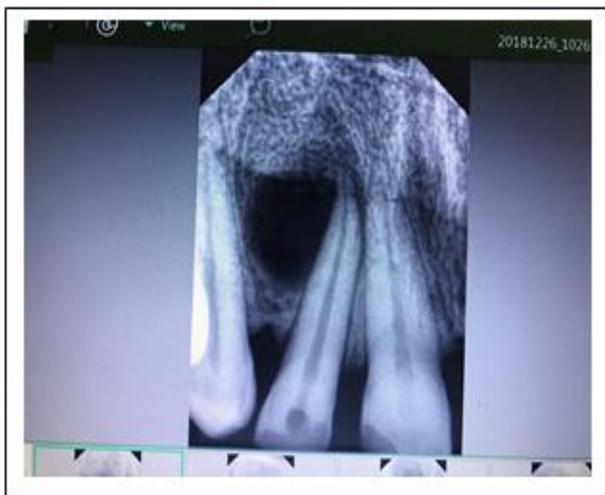


Figure2. Radiographic image.

On aspiration with sterile syringe needle, dirty white turbid fluid was obtained. On the basis of history and clinical finding, a provisional diagnosis was considered as periapical cyst and the cyst enucleation with extraction of 22 was planned under local anesthesia with root canal treatment in 21, 23, 24, 25.

There was no significant medical history that influences the procedure and prognosis. Root canal opening was done in all affected teeth prior to the surgical procedure. For enucleation, greater palatine, and nasopalatine nerve blocks were administered with 2% Local anesthesia with adrenaline (1:200000) Crevicular incision was given and the palatal full thickness mucoperiosteal flap was elevated to expose the area of lesion (Figure 3).



Figure 3: Flap elevation of affected area.



Figure 4: Suture placed.

Existing cortical bone window was expanded and underlying pathology was exposed and sufficient space was made for thorough curettage. Care was taken in separating the lesion from the nasopalatine nerve and artery. Irrigation with betadine and normal saline done. Primary closure was done with 3-0 black silk. Post-operative instructions were given and the patient was prescribed antibiotics and anti-inflammatory drugs. After 1-week patient was recalled. Histopathological examination gives diagnosis of infected radicular cyst. Root canal treatment was completed in other associated teeth and composite restoration was done. Follow-up was

done after 2 months which shows a normal palatal contour with no other complaints.

DISCUSSION

Varieties of cysts and tumor may occur in the maxillofacial region, and their detection may be difficult. The most important of these are maxillary cysts. A cyst is a pathological cavity with a defined wall of connective tissue and an epithelial carpet filled with liquid, semi-liquid or gaseous contents. Growth of a cyst is typically slow, centrifugal, and infiltrative. Radicular cyst are thought to arise from epithelial cells rest of Malassez in the periodontal ligament, and they are believed to proliferate as a result of periapical inflammation caused by infection of the root canal system. Radicular and residual cysts are the most common cystic lesions in the jaws. In the Sheffield case series, 51.5% were men and 48.5% were women, but this gender difference was not significant. They occur in all tooth-bearing areas of the jaws especially high frequency in the maxillary anterior zone.^[3,4]

The pathogenesis of radicular cysts involves the phase of initiation, cyst formation, and the phase of enlargement. Initiation is mostly from the odontogenic epithelium. Cell rests of Malassez in the periapical PDL got stimulation from the pulpal infection and they cause proliferation of the epithelium and form cellular arcades at periapical region. A key factor, which may initiate the inflammation and immune response and may directly cause epithelial proliferation, is now thought to be bacterial endotoxins released from the necrotic pulp.

The next phase in the pathogenesis of a radicular cyst is the process by which a cavity comes to be lined by the proliferating odontogenic epithelium. Two possibilities have been generally recognized, both of which are feasible and which may operate independently of one another.

One concept proposes that the epithelium proliferates and covers the bare connective tissue surface of an abscess cavity or a cavity, which may occur as a result of connective tissue breakdown by proteolytic enzyme activity. The other and perhaps more widely supported theory, postulates that a cyst cavity forms within a proliferating epithelial mass in an apical granuloma by degeneration and death of cells in the center. The third phase in the pathogenesis of the radicular cyst, its enlargement, has been the focus of considerable experimental work. Toller's studies provided evidence for the hypothesis that osmosis makes a contribution to the increase in the size of cysts. Lytic products of the epithelial and inflammatory cells in the cyst cavity provided the greater numbers of smaller molecules which raised the osmotic pressure of the cyst fluid. Almost all radicular cysts are symptomless and are discovered accidentally, when periapical radiographs are taken of nonvital teeth. Patients usually complain of slowly enlarging swellings. Initially, the swelling remains hard

but as the cyst increases in size, the covering bone becomes very thin and indented with pressure. Afterward, the fragile outer cortical bone cracks and causes "springiness" or "egg shell crackling." It will become fluctuant when it completely erodes the bone. Radicular cysts are usually symptomless unless infected. Expansion of the cyst causes erosion of the floor of the maxillary sinus with initial displacement of the maxillary sinus lining as noted in our case.^[5,6]

Numbers of studies have shown that it is difficult to differentiate radiographically between radicular cysts and apical granulomas. One cannot rely on the size of the lesion to establish a diagnosis except where the radiographic lesion is 2 cm in diameter or larger. It may be feasible to differentiate between radicular cysts and periapical granulomas on the basis of radiographic density. The radiographic presentation of radicular cyst is round or ovoid radiolucency with a well demarcated radiopaque margin. In infected and rapidly enlarging cysts, the radiopaque margin may be absent. The cyst involving maxillary sinus may displace the floor of the sinus. The internal structure of the cyst is homogeneous and radiopaque relative to the sinus cavity.

The contents of radicular cysts have usually a soft brown or yellow cheesy appearance representing cholesterol crystals. Radicular cysts are lined by non-keratinized stratified squamous epithelium.

Treatment for large lesion involves tooth removal and surgical curettage of the apical area. According to the location of the swelling, surgical approach is made. The Caldwell Luc approach is indicated for large cysts that causes excessive displacement of the floor of the sinus. Radicular cysts get resolved if the tooth and the periapical lesion are removed. Sometimes if the tooth is removed without cyst removal, it involutes due to the elimination of the inflammatory focus. Sometimes, the lesion will retain its cystic stimulation probably by continuing inflammation in the cyst wall. This is called as a residual cyst.^[7]

In this case on proceeding with the investigation, the radiograph revealed a well-circumscribed radiolucency in the periapical region of the central incisor to second premolar. Considering the size of the lesion and age of the patient we directly removed the lesion and extraction of the affected lateral incisor was done with endodontic treatment of other associated teeth.^[8]

CONCLUSION

A radicular cyst is a common condition found in the oral cavity. However, it usually goes unnoticed and rarely exceeds the palpable dimension. This case illustrates the successful management of a radicular cyst with enucleation and endodontic treatment. It is suggested that the treatment of the radicular cysts should be defined according to the clinical and radiographic evaluations according to each case.

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