NON-SURGICAL MANAGEMENT OF PERIAPICAL CYSTIC LESION-
SHORT REVIEW AND A CASE REPORT

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ABSTRACT

Description: Periapical lesions develop as squeal to pulp disease. Periapical radiolucent areas are generally diagnosed either during routine dental radiographic examination or following acute toothache. Radicular cyst is the most common inflammatory cyst of the oral cavity. It is accepted that all inflammatory periapical lesions should be initially treated with conservative nonsurgical procedures. Studies have reported a success rate of up to 85% after endodontic treatment of teeth with periapical lesions.

Observations of diseases: A review of literature was performed by using electronic and hand searching methods for the nonsurgical management of periapical lesions. Various methods can be used in the nonsurgical management of periapical lesions: the conservative root canal treatment, decompression technique, active nonsurgical decompression technique, aspiration-irrigation technique, method using calcium hydroxide, Lesion Sterilization and Repair Therapy, and the Apexum procedure. Monitoring the healing of periapical lesions is essential through periodic follow-up examinations.

Clinical findings or treatment: The ultimate goal of endodontic therapy should be to return the involved teeth to a state of health and function without surgical intervention. All inflammatory periapical lesions should be initially treated with conservative nonsurgical procedures. Surgical intervention is recommended only after nonsurgical techniques have failed. Besides, surgery has many drawbacks, which limit its use in the management of periapical lesions.

Keywords: Radicular Cyst, Periapical lesion, Non-surgical management, Calcium hydroxide, Healing, Metapex.

INTRODUCTION

The term, ‘cyst’ is derived from the Greek word, ‘Kystis’, meaning, ‘sac or bladder’. It is defined as “a pathological cavity having fluid, semi-fluid, or gaseous contents and which is not created by accumulation of pus”—Kramer 1974.¹ WHO in 2005 reclassified the cysts broadly under epithelial and non-epithelial categories which further included odontogenic and non-odontogenic types. Further on odontogenic cysts are classified as developmental and inflammatory. Cysts that arise from tissue(s) that would normally develop into teeth are referred to as odontogenic cysts.²

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 an inflammatory process.³ Thus radicular cyst is an odontogenic cyst of inflammatory origin. Radicular cysts are most common odontogenic cysts of the jaws comprising of 52-68% of all cysts of the jaws and 42-44% occurring at the apical region of tooth.³

Small sized cysts are usually asymptomatic and are left unnoticed, until detected by routine radiographic examination whereas larger cyst and...
some long standing lesions may undergo an acute exacerbation of the cystic lesion and develops signs and symptoms such as pain, swelling, tooth mobility and displacement of teeth. 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 often becomes very thin and the swelling then exhibits sponginess and becomes soft and fluctuant when the cyst has completely eroded the bone.\(^4\)

Radiographically, most radicular cysts appear as round or pear shaped unilocular radiolucent lesion in the periapical region. 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.\(^5\)

Definitive diagnosis must be based upon the clinical, radiographic, and histological evaluation. Here is one such case of radicular cyst that presented as a swelling which was well managed through non-surgical approach.

**CASE REPORT**

A 39 year old male patient reported with the chief complaint of pain and swelling in lower front region of the jaw since 1 month. The patient had a history of tobacco and betelnut chewing since 20 years. The pain was insidious in onset, intermittent dull aching type, and aggravates during the night and relieves on taking medication. The patient was well oriented with time, place and as a person. He was moderately built, and nourished. On extraoral examination, a diffuse, hard and tender swelling was present on the lower third of face approx. midway between lower lip and chin. On intraoral examination a well-defined round swelling approximately 2.5x3 cm. in its greatest dimension was present in the depth of labial vestibule pertaining to the region of lower anterior teeth extending from mucogingival junction to the depth of the labial vestibule. It was present in the alveolar mucosa region from an imaginary line joining the distal aspect of 31 to the distal aspect of 42 obliterating the labial vestibule in this region. Further lower anterior teeth and canines were all severely attrited and were tender on percussion. The swelling was soft, tender and fluctuant on palpation [Figure-1].

Based on the clinical findings, provisional diagnosis of periapical cyst in relation to lower anterior teeth was made. Fine-needle aspiration cytology was performed as chair side investigation with 24 gauze needle, 2.3 ml straw colored fluid was aspirated and subjected to cytological examination, which showed inflammatory cells suggestive of an inflammatory cyst [Figure-2]. The straw coloured fluid was subjected to bright natural light which revealed brilliant golden shining cholesterol crystals [Figure-3]. Radiographic investigations included periapical radiograph and mandibular occlusal view.

Intraoral periapical radiograph revealed a well-defined unilocular inverted pear shaped radiolucency involving interradicular and periapical region with 31 and 41. Due to growth of the cyst in the interradicular region with 31, 41 it increased the interradicular distance and also caused deviation of the roots distally [Figure-4]. Mandibular occlusal view revealed slight buccal cortical plate expansion with 31 and 41 regions [Figure-5].

Access cavity was prepared with 31, 32, 41, 42 and 43 under isolation with rubberdam. Copious, clear, straw-colored fluid flowed from the canals. Working length was established coinciding with root apex. When the drainage ceased, the canals were prepared using Ni-Ti K files with copious irrigation with 1% sodium hypochlorite, 2% chlorhexidine gluconate and normal saline. The instrumentation was done slightly beyond the apex in 31 and 41. The canals were dried with sterile paper points. Appropriate oral antibiotics along with an analgesic was prescribed for 5 day. Later, Metapex, a silicone oil-based calcium hydroxide paste containing 38% iodoform was placed in the root canal and pushed periapically and tooth was temoporized with cavity. The intracanal dressing was changed monthly during four consecutive appointments and the patient was evaluated [Figure-6]. Radiographic examination taken at the end of first, second and third month revealed significant decrease in size of the periapical radiolucency. At the end of third month the canals
DISCUSSION

Radicular cysts, with an incidence of 0.5-3.3% of the total number in both primary and permanent dentition occur more commonly between third and fifth decades of life. It is usually initiated by dental caries or trauma or periodontally diseased tooth which causes the necrosis (death) of the pulp tissue. This necrotic pulp stimulates the rests of malassez within the periodontal ligament that results in the formation of epithelial lining in a Radicular cyst. It develops from a pre-existing periapical granuloma, which is a focus of chronically inflamed granulation tissue formed in bone due to the presence of chronic low grade inflammation located at the apex of a non-vital tooth. Though radicular cysts are considered a sequel to periapical granuloma only a small fraction of the periapical granulomas advance to become cysts. Radicular cysts appear as round or pears shaped unilocular radiolucent lesions surrounded by a thin radiopaque margin, extending from the lamina dura of the involved tooth and may displace adjacent teeth or cause mild root resorption. A lesion larger than 2 cm is more likely to be a cyst than a granuloma.

The cells of central portion of mass become separated further and further from nutrition in comparison with basal layer due to which they fail to obtain sufficient nutrition, they eventually degenerate, become necrotic and liquefy. This creates an epithelium lined cavity filled with fluid. The pathogenesis of radicular cysts has been described as consisting of three distinct phases: the phase of initiation, the phase of formation and the phase of enlargement. With osteoclastic bone resorbing factors, resorption of the surrounding alveolar bone occurs and the cyst expands. Other bone resorbing factors such as prostaglandins, interleukins from inflammatory cells in the peripheral portion of the cyst permit additional enlargement of radicular cyst.

It has been stated that as the cyst enlarges, adjacent teeth can become non-vital. 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. The cholesterol crystals appear as shimmering gold appearance when a fresh aspirated cystic fluid is placed on cotton gauze and seen under a bright light.

The treatment of radicular cyst dependent on the size and localization of the lesion, the bone integrity of the cystic wall and its proximity to vital structures. The surgical approach to cystic lesions of the jaws is either marsupialization or enucleation. Non-surgical management of these cysts should be adopted before advising surgery. These include long term repeated intracanal dressing, aspiration and drainage through root canal, aspiration and decompression technique.

Microorganisms are the cause of apical periodontitis and their elimination from the root canal space during root canal treatment results in predictable healing of periapical lesions. Unfortunately, the complete elimination of bacteria by instrumentation alone is unlikely to occur. Thus, some form of irrigation and disinfection is necessary to kill and remove microorganisms, their by-products, and residual tissue as well as remove the smear layer and other debris from the canal system. Such chemical (therapeutic) treatments of the root canal can be arbitrarily divided into irrigants, canal rinses, and interappointment medicaments. One of the most common and superior intracanal medicament is calcium hydroxide.

Different vehicles have been added to calcium hydroxide in an attempt to enhance to its antimicrobial activity, biocompatibility, ionic dissociation, and diffusion. The two most common employed vehicles are normal saline and silicone oil. The nonwater silicone oil vehicle promotes low solubility and slow diffusion of calcium hydroxide in the tissues.

To eliminate microorganisms and enhance healing; repeated intracanal dressing is one encompassing predictable as well as successful outcomes. We adopted most popular and trusted intracanal dressing of Metapex paste. It has...
calcium hydroxide, iodoform, 38% (antibacterial) silicone oil vehicle and barium sulphate (radiopaque material). Since the introduction of Ca(OH2) in 1920, it is the most popular and time tested intracanal medicament. Its PH is 12.5. It diffuses into calcium and hydroxyl ions. This hydroxyl ion is an oxidant free radical and exerts microbicidal activity by disruption and damage to DNA, cell membrane, protein denaturation and nullifying the effect of bacterial endotoxins. The oxidant free radical is also responsible for inhibition of tooth resorption and tissue resolving ability.9

In our case regular clinical assessment, repeated intracanal dressing along with periodic radiographs were made on timely basis which ultimately revealed significant decrease in size of the periapical radiolucency. At the end of third month the canals were re-entered, cleaned and final obturation was done. One year follow-up revealed asymptomatic teeth with radiographic signs of healing.

Thus non-surgical management of periapical lesions show a high success rate. A non-surgical approach should always be adopted before resorting to surgery. The decompression and aspiration-irrigation techniques can be used when there is drainage of cystic fluid from the canals. These techniques act by decreasing the hydrostatic pressure within the periapical lesion. Regular change of intracanal dressings of Metapex has proved to be very beneficial for reducing the size of periapical lesion.

**CONCLUSION**

A nonsurgical approach should always be adopted before resorting to surgery. The decompression and aspiration-irrigation techniques can be used when there is drainage of cystic fluid from the canals. These techniques act by decreasing the hydrostatic pressure within the periapical lesion. Regular change of intracanal dressings of Metapex has proved to be very beneficial for reducing the size of periapical lesion.

**REFERENCES**

IMAGES

Figure 1: Clinical Photographs of the patient.

Figure 2: Fine needle aspiration cytology.

Figure 3: Shining Cholesterol crystals.

Figure 4: Intraoral Periapical Radiograph.

Figure 5: Mandibular Occlusal Radiograph.

Figure 6: Metapex.

Figure 7: Post-operative intraoral periapical radiograph shows complete healing.