Management of Radicular Cyst

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ABSTRACT

Radicular cysts are the most common cystic lesions which affect the jaw with incidence of 52 to 68% of the entire jaw cysts. A radicular cyst arises from epithelial remnants stimulated to proliferate by an inflammatory process originating from pulpal necrosis of a nonvital tooth. They are generally asymptomatic and are diagnosed during routine radiologic investigations. The treatment of radicular cysts includes conventional nonsurgical root canal therapy when lesion is localized or surgical treatment, like enucleation, marsupialization or decompression when lesion is large. This case report discusses the management of radicular cysts associated with maxillary anteriors (maxillary right central and lateral incisors) after performing apicoectomy with mineral trioxide aggregate (MTA) as a retrograde filling material.

Keywords: Apicoectomy, Enucleation, Mineral trioxide aggregate, Periapical lesion, Radicular cyst.

INTRODUCTION

A radicular cyst is generally defined as a cyst arising from epithelial residues (cell rests of Malassez) in the periodontal ligament as a consequence of inflammation, usually following the death of the dental pulp. Radicular cysts are the most common odontogenic cystic lesions of inflammatory origin affecting the jaws. They are most commonly found at the apices of the involved teeth; however, they may also be found on the lateral aspects of the roots in relation to lateral accessory root canals. Many radicular cysts are symptomless and are discovered when periapical radiographs are taken of teeth with nonvital pulps. Over the years, the cyst may regress, remain static or grow in size. The treatment of the cysts can be either nonsurgical management or surgical management being either marsupialization or enucleation. The treatment of choice is dependent on the size and localization of the lesion, the bone integrity of the cystic wall and its proximity to vital structures. Nevertheless, no matter what choice it might be, the treatment option should be kept as conservative as possible.

Apical surgery for radicular cysts generally involves apical root resection and sealing with endodontic material. Currently, the preferred root-end filling material is mineral trioxide aggregate (MTA) because it has some biological properties, such as induction of calcification that enables biological sealing. Mineral trioxide aggregate, when used as a root-end filling material, showed evidence of healing of the surrounding tissues. Studies have shown that osteoblasts have favorable response to MTA as compared to intermediate restorative material (IRM) and amalgam. With longer duration, new cementum was found on the surface of the material. Mineral trioxide aggregate is a widely accepted retrograde filling material which is biocompatible, has antibacterial action and reduces microleakage. Mineral trioxide aggregate plugs of 4 mm thickness have been shown to be the most efficient with respect to root canal sealing ability and resistance to displacement.

The present case report discusses management of a large maxillary radicular cyst by apicoectomy using Pro-Root MTA as a root end filling material.

CASE REPORT

A 24-year-old male patient reported to the department of conservative dentistry and endodontics with a chief complaint of swelling in the upper front region of jaw since last 1 year. Patient gave history of trauma in upper anterior teeth, 3 to 4 years back. Extraorally, no abnormality was detected. On intraoral examination, a diffuse swelling was observed extending from right maxillary central incisor to right maxillary first premolar measuring 2 × 5 cm (Fig. 1). There was no mobility of the involved teeth. Tooth discoloration evident with right maxillary central incisor. Purulent discharge was present. Electrical pulp testing (using C pulse pulp tester by Coxo Medical Instrument Co. Ltd.) revealed...
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nonvital right maxillary and lateral incisor. Intraoral periapical radiograph showed a well-defined unilocular radiolucency in the periapex of right maxillary central and lateral incisors, extending from the mesial aspect of right maxillary central incisor till the mesial aspect of right maxillary canine (Fig. 2). Hematological examination revealed values within normal limits.

From the history, clinical examination and investigations, a provisional diagnosis of radicular cyst was made in respect to right maxillary central and lateral incisors.

Treatment plan was formulated, explained and the informed consent was obtained from the patient. Root canal opening was done under rubber dam application. After determination of working length and biomechanical preparation, calcium hydroxide intracanal medicament was placed for 1 week. In next appointment, obturation was completed. Patient was prepared for surgery in next visit, which included surgical enucleation of cyst, apicectomy and retrograde filling of involved tooth.

After administration of local anesthesia (infraorbital nerve block, nasopalatine nerve block and local infiltration using 2% lignocaine hydrochloride and adrenaline solution), crevicular incision was made in labial region extending from left maxillary central incisor till right maxillary first premolar with vertical releasing incisions. A full thickness mucoperiosteal flap was reflected extending from mesial of left maxillary central incisor to mesial of right maxillary first premolar and a plane of cleavage was established between cystic epithelial lining and the surrounding bone (Fig. 3). Bony window was created and the lesion was exposed (Fig. 4). Complete curettage, along with granulation tissue removal and enucleation of cystic lesion was done and it was sent for histopathological evaluation (Fig. 5).

Root end of maxillary right central and lateral incisors was resected and retrograde filling was done with ProRoot MTA, (Fig. 6) and primary flap closure was done with 3-0 silk sutures through simple interrupted suturing technique. Coe-pak was placed and proper postoperative instructions were given. Patient was kept on antibiotics and analgesics. Patient was recalled after 1 week for suture removal. Currently, the patient is asymptomatic.
and he is under follow-up since 1 year. Follow-up radiograph shows appreciable uneventful healing (Fig. 7).

The excised tissue was sent for histopathological examination which showed a lining epithelium, a cystic cavity and a fibrous capsule. The lining epithelium was stratified squamous and nonkeratinized showing characteristic arcading pattern. The connective tissue was fibrous with dense infiltrate of inflammatory cells. The inflammatory cells were predominantly lymphocytes and plasma cells suggestive of chronic nature of the lesion. Upon clinic-pathologic correlation, the diagnosis of radicular cyst was confirmed (Fig. 8).

DISCUSSION

The term, ‘cyst’ is derived from the Greek word, ‘Kystis’, meaning, ‘sac or bladder’. Cyst is defined as a pathological cavity that is usually lined by epithelium and which has a centrifugal, expansive mode of growth.

Radicular cysts are the most common cystic lesions which affect the jaw. They are most common of all the jaw cysts and comprise about 52 to 68% of all the cysts which affect the human jaw. They arise from epithelial remnants which are stimulated to proliferate, by an inflammatory process which originates from pulpal necrosis of a nonvital tooth.

Simon discovered two distinct types of radicular cysts, namely those containing cavities completely enclosed in epithelial lining or true cysts, and those containing epithelium-lined cavities that are open to the root canals.

Most radicular cysts develop slowly and do not become very large cavities. Patients do not experience pain unless inflammatory exacerbation is present. Large cysts may lead to mobility and not respond to electrical pulp test in affected tooth.

They are most commonly found at the apices of the involved teeth. However, they may also be found on the lateral aspects of the roots in relation to lateral accessory root canals. They are symptomless and are diagnosed during routine radiologic investigations. The treatment for radicular cysts includes conventional nonsurgical root canal therapy when lesion is localized or surgical
Radicular cysts generally originate after trauma or dental caries. Dental caries cause inflammation of the pulp cavity, leading to pulp necrosis. The infection then spreads to the tooth apex of the root, causing periapical periodontitis, which leads to either an acute abscess or a chronic granuloma. Persistent chronic infection can lead to formation of a periapical cyst. In the current case, patient had given a history of trauma previously; it could be the probable etiology. Cortical expansion and root resorption of the affected tooth and displacement of the adjacent teeth are common features of radicular cysts. In the current case, there was cortical perforation and adjacent teeth in relation to the cyst were nonvital, which is not common. It has been stated that as the cyst enlarges, adjacent teeth can become nonvital. The use of root canal dressings between sessions in root canal treatment of teeth with chronic periapical lesions is important, for reducing bacteria which are unreachable by instruments or irrigation solutions, such as dentinal tubules and ramifications. Takahashi et al, after analyzing the pH irrigation solutions, such as dentinal tubules and bacteria which are unreachable by instruments or irrigation solutions. However, depending on size and extent of lesion, surgical management might be necessary, for achieving success. Current case was managed successfully by performing endodontic therapy with thorough irrigation, cleaning and shaping and obturation of the canal space, followed by apicectomy and retrograde filling with ProRoot MTA.

REFERENCES


