Conservative non-surgical management of an infected radicular cyst

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Abstract

The radicular cyst arises from epithelial remnants stimulated to proliferate by an inflammatory process originating from pulpal necrosis of a non-vital tooth. Radiographically, the classical description of the lesion is a round or oval, well-circumscribed radiolucent image involving the apex of the tooth. Radicular cyst is usually sterile unless it is secondarily infected. This article presents a successful case of conservative non-surgical management of an infected radicular cyst associated with an immature permanent mandibular second molar (47) in a 14-year-old child.

Keywords: Endodontic therapy, mineral trioxide aggregate, open apex, 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 non-vital pulps. Over the years, the cyst may regress, remain static or grow in size. The treatment of the cysts can be either non-surgical 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.

The purpose of this article is to present a case of successful conservative non-surgical management of an infected radicular cyst associated with an immature permanent mandibular second molar (47) in a 14-year-old child.

Case Report

A 14-year-old male child patient reported to the Department of Pedodontics and Preventive Dentistry, K. D. Dental College and Hospital, Mathura, with a complaint of pus discharge from the lower part of the right side of face since 2 months. Past history revealed that the child had an obvious swelling on the right side of the face 2 months ago, which continued till the present condition. During examination, the child was found to be in good general and physical health. Extraoral examination revealed the presence of a sinus tract and pus discharge in relation to lower border of the right side of the mandible. The surrounding skin was found to be crusty in appearance [Figure 1].

On intraoral examination, right mandibular 2nd molar (47), right mandibular 1st molar (46), left mandibular 2nd molar (37) and left mandibular 1st molar (36) were found to be decayed [Figure 2]. 47 was found to be grossly decayed, and after excavation of caries, no pulp exposure was
encountered. Orthopantomogram revealed radiolucency involving enamel, dentine and approximating pulp in relation to 47. A well-circumscribed periapical radiolucency of about 2’ 2½ cm in dimension, involving both the mesial and distal roots of 47 along with a thin radiopaque border and an open apex was noticed, suggesting a cystic lesion [Figure 3].

Based on the history, clinical examination and radiographic examination, a clinical diagnosis of infected radicular cyst in relation to right mandibular 2nd molar (47) was made and a treatment plan was formulated to manage the case through conservative non-surgical approach.

Under local anesthesia, access opening was made in relation to 47 and the necrotic pulp tissue was extirpated followed by copious irrigation with sodium hypochlorite, hydrogen peroxide and normal saline. Working length was determined and the root canals were reasonably dried using paper points and filled with metronidazole solution (Metron, Aishwarya Health Care, India) and the access cavity was sealed for a period of 1 week with an intermediate restorative material (IRM, Dentsply, USA). After 7 days, extraoral examination revealed regression of the sinus tract and formation of granulation tissue, indicating signs of healing [Figures 4, 5]. In the same appointment, the root canals were filled with a mixture of calcium hydroxide (I-Dent, India), glycerine (Deepti Pharmaceuticals, Nagpur, India) and camphorated phenol (Camphenol, Vishal Dentocare, Ahmedabad, India) after replacing metronidazole solution. The tooth was kept under observation and the calcium hydroxide mixture was replenished within the root canals at monthly interval. Intraoral periapical radiograph of 47 after 3 months postoperatively revealed mixed radiolucent and radiopaque periapical lesion, suggesting regression of the cystic lesion.

After 6 months of follow-up, intraoral periapical radiograph of 47 showed almost resolved radiolucent pertaining to the cystic lesion [Figure 6]. At the same appointment, calcium hydroxide mixture was flushed out, canals were dried using paper points and mineral trioxide aggregate (MTA; Angelus, Brazil) was packed into the apical third of all the root canals using finger pluggers so as to create an apical plug and the access cavity was sealed with glass ionomer cement (GC Corp. Japan) [Figure 7]. In the subsequent appointment (3 months after placement of MTA), obturation was done using lateral condensation technique [Figure 8]. Post-obturation intraoral periapical radiograph of 47 revealed complete resolution of the cystic lesion [Figure 8]. The tooth

Figure 2: Intraoral photograph showing decayed 36, 37, 46 and 47

Figure 3: Cropped image of orthopantomogram showing well-defined periapical radiolucency involving both mesial and distal roots of 47 along with a thin radiopaque border

Figure 4: Extraoral photograph after 1 week showing formation of granulation tissue

Figure 5: Intraoral periapical radiograph of 47 after 7 days
was prepared and a stainless steel crown was cemented. Extraorally, the sinus tract had healed completely leaving behind a scar which needs some attention in the near future [Figure 9].

**Discussion**

A cyst is an abnormal, closed sac-like structure within a tissue that can occur anywhere in the body and vary in size. In this case, it was formed in the mandible and the origin was from tooth-related tissues. The cyst can be filled with fluids such as blood and seroma or semisolid or gaseous content, but is not normally filled with pus, unless it is infected.

Radicular cysts are odontogenic cysts that are derived from the inflammatory activation of epithelial root sheath residues (cell rests of Malassez). They are inflammatory in nature and usually arise within a periapical granuloma relating to stimulation resulting from a necrotic tooth.[3-5] They are most commonly associated with permanent teeth and are rare in the primary teeth.[6]

Cysts constitute about 17% of all the tissue specimens submitted to oral pathology biopsy services. The periapical cyst is the most common odontogenic cyst (52.3–70.7% of all odontogenic cysts) followed by the dentigerous cyst (16.6–21.3% of all odontogenic cysts) and odontogenic keratocyst (5.4–17.4% of all odontogenic cysts).[1] The choice of treatment may be determined by factors such as the extension of the lesion, relation with noble structures, origin, and clinical characteristics of the lesion, and cooperation and systemic condition of the patient. The treatment of these cysts is still under discussion and many professionals opt for a conservative treatment by means of endodontic therapy. However, in large lesions, the endodontic treatment alone is not efficient and it should be associated with decompression or marsupialization or even enucleation of the cyst.[7-10] In this regard, it is suggested that the treatment of the apical periodontal cysts should be defined according to the clinical and radiographic evaluations of each case.[11]

In the present case, the radicular cyst was in association with an immature right mandibular 2nd molar, thus warranting conservative treatment by means of endodontic therapy rather than through surgical approach. MTA is a powder consisting mainly of lime, silica and bismuth oxides, which transforms from a gel of pH 12.5 to a rigid mass when exposed to moisture and allowed to set for approximately 4 hours.[12] MTA has been advocated as root-end filling
material for endodontic therapy, and because of its minimal cytotoxicity, promotion of hard tissue induction in the periodontal tissues, stimulation of dentin bridge formation adjacent to dental pulp and superior sealing capability, its use has been extended to a) repair of root canal perforation, b) direct pulp capping, c) barriers during internal bleaching of root canal treated teeth and d) apexification procedures.

**Conclusion**

The clinical case report presented in this article was managed successfully by endodontic therapy with emphasis on thorough debridement, disinfection and obturation of the root canal system. However, in specific situations where the size and extent of the lesion is of critical importance, surgical management is a viable option.

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