CASE REPORT

Surgical Management of an Infected Radicular Cyst: A Case Report

Awal A[1], Simu NN[2], Hussain MA[3]

Abstract

Radicular cysts represent an important category of inflammatory odontogenic cysts and are generally associated with teeth affected by pulpal necrosis. They develop in response to persistent periapical inflammation and are characteristically located around the root apex of the causative tooth. Although many lesions remain clinically silent, progressive enlargement may produce swelling, discomfort, tooth displacement, or mobility. On radiographic examination, these lesions commonly present as well-circumscribed, unilocular radiolucencies surrounding the affected root apex. This report describes the clinical and surgical management of a large infected radicular cyst involving the maxillary anterior region. The lesion was managed by endodontic treatment of the associated teeth followed by surgical enucleation, apicoectomy and retrograde root-end restoration. Histopathological assessment subsequently confirmed the diagnosis of an infected radicular cyst. The patient was followed periodically after treatment, with satisfactory healing and no reported recurrence.

Keywords: *Radicular cyst, surgical enucleation, apicoectomy, endodontic treatment.*

(Pioneer Journal of Dental Research & Health Science, Vol.01, No.01.)

Affiliation

Dr. Abdul Awal
Lecturer
Kumudini Women's Medical College & Hospital Dental Unit, Dhaka, Bangladesh.

Dr. Nurun Nahar Simu
Lecturer
Department of Conservative Dentistry & Endodontics
Pioneer Dental College & Hospital, Dhaka, Bangladesh.

Prof. Dr. Md. Ashraf Hussain
Conservative Dentistry & Endodontics
Pioneer Dental College & Hospital, Dhaka, Bangladesh.

Article Information

Received Date: 02.03.2024
Accepted Date: 16.03.2024

Volume: ***Vol.01, No.01.***

Address of Correspondence:

Dr. Abdul Awal
Lecturer
Kumudini Women's Medical College & Hospital Dental Unit, Dhaka, Bangladesh.
Email: dr.simu@outlook.com

Introduction

A cyst is generally characterized as a pathological cavity enclosed by an epithelial lining and containing fluid, semisolid material, or other intracavitary contents. Odontogenic cysts arise from epithelial components associated with tooth development and may originate at different stages of odontogenesis. Their epithelial sources include remnants of the tooth germ, epithelial rests of Malassez, reduced enamel epithelium, residual dental lamina and, in some circumstances, components of the basal oral epithelium.[1]

Among inflammatory odontogenic lesions, radicular cysts are particularly common. They generally arise in association with teeth affected by longstanding caries, pulpal necrosis and subsequent periapical inflammation.[2] Radicular and residual cysts have been reported to constitute approximately 60% of jaw cysts.[3] Clinically, these lesions may remain undetected for an extended period because they are frequently asymptomatic. With continued enlargement, however, they may produce expansion of the surrounding bone, displacement of adjacent teeth, or root resorption. Radiographically, a radicular cyst typically appears as a well-demarcated, round or ovoid unilocular radiolucency associated with the apex of a non-vital tooth.[4]

Management depends on several clinical and anatomical considerations. Small and localized lesions may respond to conventional nonsurgical root canal treatment, whereas larger lesions may require an adjunctive surgical procedure. Enucleation, marsupialization and decompression are among the surgical approaches used according to the size and extent of the lesion.[5] The present case describes the successful surgical management of a large infected radicular cyst associated with endodontic treatment of the involved maxillary anterior teeth.

Case Report

A 25-year-old man presented to the outpatient department of

Kumudini Women's Medical College and Hospital with a swelling in the anterior maxillary region that had been gradually increasing in size over approximately two months. He recalled experiencing pain in the same area about one year earlier, for which he had taken medication. He reported no known systemic illness. The patient also noticed mobility involving both maxillary central incisors. At presentation, his general health was considered satisfactory, although his dietary intake was described as somewhat inadequate.

Extraoral examination demonstrated a smooth, localized swelling measuring approximately 3 × 2.5 cm. The swelling extended across the upper anterior region from the left lateral incisor toward the right incisor. It was firm and tender when palpated. Intraoral examination revealed poor oral hygiene, generalized plaque and calculus accumulation and chronic gingival inflammation. Missing teeth were noted in the posterior regions of both arches. Marked attrition was also observed involving the posterior teeth of the upper and lower arches.

Orthopantomography and periapical radiographs of the maxillary anterior teeth were subsequently obtained. Imaging demonstrated a large, well-circumscribed radiolucent lesion involving the periapical region of both maxillary central incisors and the left lateral incisor.

Aspiration of the swelling using a fine needle yielded a mixture of purulent and bloody material. Based on the clinical history, examination findings, aspiration results and radiographic appearance, a provisional diagnosis of bilateral radicular cyst was established. The treatment plan, including surgical enucleation under local anesthesia, was discussed with the patient and informed consent was obtained.

Endodontic treatment was initiated during the same treatment session under rubber dam isolation. Working length was established, followed by thorough biomechanical preparation of the involved root canals. Calcium hydroxide was placed as an intracanal medicament and maintained for one week. At the subsequent appointment, root canal treatment was completed.

Surgical management was then undertaken, consisting of cystic enucleation, apical resection and retrograde restoration of the affected teeth. A crevicular incision was extended from the distal aspect of the maxillary right canine to the distal aspect of the maxillary left canine. Following elevation of the mucoperiosteal flap, the cystic lesion was exposed and carefully separated from the surrounding tissues. The cyst and associated root fragments involving the maxillary central and lateral incisors were removed.

The apical portions of the involved roots were subsequently resected and retrograde restoration was performed using glass ionomer cement. Thorough curettage of the surgical cavity was carried out to eliminate residual cystic and granulation tissues. After achieving adequate hemostasis, the flap was repositioned and secured with 3-0 silk sutures.

The excised tissue was preserved and submitted for histopathological evaluation. Microscopic examination supported the diagnosis of an infected radicular cyst. Following surgery, appropriate postoperative instructions and ability to cooperate with treatment.[14] Nonsurgical root canal therapy may be sufficient for appropriately selected localized lesions because elimination of intracanal infection can permit resolution of the associated periapical pathology.

were provided and the patient was prescribed antibiotics and analgesics. Follow-up examinations were scheduled at 1 day, 7 days, 3 months, 6 months and 1 year after treatment to monitor healing and detect any evidence of recurrence.

Discussion

Radicular cysts, also referred to as periapical or root-end cysts, are inflammatory odontogenic lesions that develop in association with non-vital teeth. Their formation is linked to inflammatory stimulation of the epithelial rests of Malassez within the periodontal ligament, most often following pulpal necrosis and chronic periapical inflammation.[6] These cysts have been reported in approximately 0.5% to 3.3% of individuals across primary and permanent dentitions. They are encountered predominantly during the third to fifth decades of life and show a modest male predominance. The anterior region of the maxilla is also recognized as a frequent site of occurrence.[7] The demographic and anatomical characteristics of the present patient were consistent with these commonly reported patterns.

The development of a radicular cyst is generally described as a sequential process involving epithelial initiation, subsequent cyst formation and progressive enlargement.[8] In many patients, the lesion remains clinically silent and is discovered incidentally during routine dental radiography. In other cases, particularly when the lesion persists or becomes secondarily infected, patients may develop clinical manifestations such as localized swelling, discomfort, tooth mobility, or displacement of adjacent teeth.[9] The tooth associated with a radicular cyst is typically non-vital and may occasionally exhibit discoloration.[10]

The clinical appearance depends partly on the anatomical location and extent of the lesion. In the maxilla, expansion may occur toward the buccal or palatal aspect, whereas mandibular lesions more commonly produce buccal expansion and less frequently lingual involvement. Small lesions may feel firm because they remain surrounded by relatively intact cortical bone. As enlargement progresses, the cortical plate may become progressively thinner, producing a resilient or fluctuant consistency. In the present case, the extensive lesion produced a clinically detectable swelling in the anterior maxilla.

On radiographic examination, radicular cysts are generally characterized by a well-defined, round or ovoid radiolucency centered around the root apex of the involved tooth.[12] Although radiographic findings alone cannot establish a definitive histopathological diagnosis, increasing lesion size may increase the likelihood that a periapical radiolucency represents a radicular cyst rather than a chronic periapical inflammatory lesion. This distinction has been particularly discussed for lesions exceeding approximately 2 cm in diameter.[13]

Selection of treatment should be individualized according to the dimensions and anatomical extension of the lesion, its relationship to adjacent anatomical structures, presumed origin, clinical presentation and the patient's general health

Larger lesions, however, may require surgical intervention. Available surgical approaches include complete enucleation, marsupialization, decompression and combinations of these procedures with endodontic treatment.

In the present case, the considerable size of the lesion, its anterior maxillary location, the presence of infection and involvement of several adjacent teeth supported a combined endodontic and surgical approach. Root canal therapy was first completed to address the presumed endodontic source, followed by surgical removal of the cystic lesion. Enucleation allowed direct removal of the pathological tissue, while apicoectomy and retrograde filling provided additional management of the involved root ends. The procedure was completed without an intraoperative complication and histopathological examination confirmed the clinical diagnosis.

Histologically, the majority of radicular cysts are lined, either partially or throughout their circumference, by non-keratinized stratified squamous epithelium. Keratinized epithelial lining is uncommon and has been reported in approximately 2% of lesions. When keratinization occurs, orthokeratinization is generally reported more frequently than parakeratinization.[15]

Several therapeutic strategies have been described for radicular cysts, including nonsurgical endodontic treatment, surgical endodontic procedures, extraction of the causative tooth, complete cyst enucleation with primary closure and decompression or marsupialization followed by definitive enucleation. The appropriate approach should be selected according to the clinical circumstances rather than applying a single treatment method to all lesions. In this patient, surgical enucleation combined with endodontic treatment and apical surgery was selected because of the lesion's size, infection and relationship with the affected anterior teeth. The treatment was completed uneventfully and subsequent follow-up was satisfactory.

Conclusion

The present case demonstrates the successful management of a large infected radicular cyst through a combined endodontic and surgical approach. Because the optimal management of radicular cysts depends on factors such as lesion size, anatomical location, infection status and the condition of the associated tooth, treatment should be individualized. Nonsurgical endodontic therapy may provide satisfactory resolution in appropriately selected smaller lesions, whereas extensive lesions may require surgical intervention. In the present case, endodontic treatment followed by cyst enucleation, apicoectomy and retrograde restoration provided effective management of the lesion

Fig: 1 Shows extension of Flap

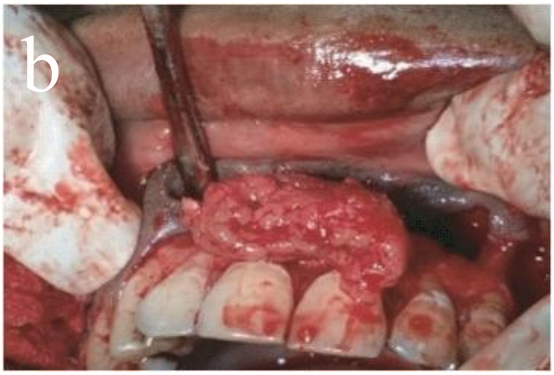

Fig: 2 Shows removable of infected Cyst

Fig:3 Shows Repositioning of flap with suture

Fig: 4 Shows the Obturation of the Root Canal

Reference

1. Shafer's textbook of oral pathology, 6thed, 487-490
2. Jones A, Craig G, Franklin C. Range and demo graphics of odontogenic cysts diagnosed in a UK population over a 30? year period. Journal of Oral Pathology & Medicine.2006;35(8):500-733
3. Joshi UK, Patil SK, Siddiqua A. Nasopalatine cyst a rare entity. International Journal of Dental Clinics. 2010;2(1):34-6. Fig: 4 Shows the Obturation of the Root Canal
4. Cawson RA, Odell EW, Porter S. Cawson`s essen tials of oral pathology and oral Medicine. 7thEd, Churchill Livingstone, Edn2002:102-21.
5. Ribeiro Paulo Domingos, Gonçalves Eduardo S., Neto Eduardo S. Surgical approaches of extensive periapical cyst. Considerations about surgical technique. Salusvita Bauru 2004; 23: 317-328.
6. Shear M. Cysts of the Oral Regions. 2nd ed. Bristol: John Wright and Sons, 1983.
7. Joshi. N, Sujan S, Rachappa M. An unusual case report of bilateral mandibular radicular cysts. Contemporary Clinical Dentistry 2011; 2(1):59-62.
8. Jansson L, Ehnevid H, Lindskog S, Blomlöf L. Development of periapical lesions. Swedish Dental Journal 1993; 17(3):85-93.
9. Mass E, Kaplan I, Hirshberg A. A clinical and histopathological study of radicular cysts associated with primary molars. J Oral Pathol Med 1995; 24:458-61.
10. Lustmann J, Shear M. Radicular cysts arising from deciduous teeth: Review of the literature and report of 23 cases. International Journal of Oral Surgery 1985; 14(2):153-61.
11. Shear M. Cysts of the oral regions. 3rd ed. Boston: Wright, 1992, 136-70.
12. Cawson RA, Odell EW, Porter S. Cawson`s essen tials of oral pathology and oral Medicine. 7thEd, Churchill Livingstone, Edn, 2002, 102-21.
13. Natkin E, Oswald RJ, Carnes LI. The relationship of lesion size to diagnosis, incidence and treatment of periapical cysts and granulomas. Oral Surgery, Oral Medicine, Oral Pathology 1984; 57(1):82-94.
14. Ribeiro Paulo Domingos, Gonçalves Eduardo S, Neto Eduardo S. Surgical approaches of extensive periapical cyst. Considerations about surgical technique. Salusvita Bauru 2004; 23:317-328.
15. Joshi.N, Sujan.S, Rachappa.M. An unusual case report of bilateral mandibular radicular cysts. Contemporary Clinical Dentistry.2011;2(1):59-62.