



SURGICAL MANAGEMENT OF RADICULAR CYST : A CASE REPORT

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ABSTRACT

Radicular cysts of the jaws are the most commonly occurring odontogenic cyst encountered in dental clinics. It generally develops in the periapical granulomas that originate as a sequelae to the persistent inflammation and necrosis of the dental pulp. They are generally asymptomatic and may be diagnosed during routine radiologic investigations. In the past, all cystic lesions were treated by surgical approach. But in the recent years the trends have shifted to the conservative nonsurgical management. When apical radiolucency appears to be small, routine endodontic treatment will usually cause complete resolution of the pathology and bone loss. Larger lesions involving multiple teeth need surgical approaches like decompression, marsupialisation and enucleation. Advent of newer concepts, techniques and materials have decreased the need of surgeries to a large extent and increased the success of surgical approach. We hereby report a case of a radicular cyst associated with maxillary right central incisor and lateral incisor that was successfully managed with routine endodontic treatment followed by surgical enucleation, apicectomy under microscope and placement of MTA as a retrograde filling material. One year follow up of the case shows healing as desired.

KEYWORDS : Radicular cyst, Enucleation, Microscope, MTA

Introduction

Pulpoperiapical pathologies are the most common diseases encountered by the clinician in routine dental practice. Most of the times these lesions could be successfully treated by orthograde endodontic treatment. Radicular (periapical) cysts are very advanced form of these lesions which originate from epithelial cell rests of Malassez in the periodontal ligament *per se* or in the periapical granulomas.(1)Expansion of the cyst is a slow and insidious process but it may enlarge to a considerable size to cause massive bone loss in the jaws, it usually goes unnoticed by the patients and many times diagnosed accidentally on the radiograph. It clinically exhibits as a buccal or palatal enlargement in maxilla, whereas in mandible it is usually buccal and rarely lingual.(2)Most commonly periapical cystic lesions develop in the maxillary anterior region. This fact may be correlated to the common occurrence of trauma in this area. At first, the enlargement is bony hard; but as the cyst increases in size, the bony covering becomes very thin and fragile the swelling exhibits springiness and becomes fluctuant when the cyst has completely eroded the bone.(3) Definitive diagnosis must be based upon the clinical, radiographic, and histological examination.

Cystic lesions were traditionally treated by surgical interventions which proved to be radical and caused greater tissue damage. Overall success rate of these surgeries were also reported to be inadequate. Recent trends towards management of such lesions have shifted towards orthograde treatment/retreatment and keeping the case under observation to witness the healing. In case the apical lesion does not show signs of healing or increases in size on the radiograph, the option of surgical approach should be opted(4). The incidence of healing of such lesions observed clinically in the recent past has been very striking. Where we stand today, it feels that as far as possible one should always wait and

watch for the bone to heal in such lesions than making a hasty decision of surgical intervention unnecessary.

The choice of treatment depends on the size and localization of the lesion, bony integrity of the cystic wall and its proximity to the vital structures. In cases of infected periapical cysts the infection process itself destroys the cystic lining rendering the cyst to heal without surgery. Large lesions involving multiple teeth or lesion which do not heal for a long time after orthograde endodontic treatment are the candidates for surgical intervention.(4)Apical surgery for radicular cysts generally involves enucleation, apical root resection and sealing with bio mimetic material.(5) The present case report discusses the management of a large maxillary radicular cyst by apicectomy using MTA as a root end filling material...

Case Report

A 57 year old well known diabetic patient reported to Department of Conservative dentistry and endodontics with the chief complaint of pain in upper right front teeth region since 2 months. The pain was insidious, intermittent & dull aching type. Patient gave history of sports contact injury to the maxillary right central & lateral incisor 10 years back which did not necessitate a visit to a dentist. Patient reported with no other extra oral abnormality or discoloration of teeth. Visual examination did not reveal any pathology. (Fig 1) Intra oral palpation revealed vestibular tenderness in the right maxillary anterior region. The buccal cortical bone in this region appeared to be expanded without any defined palpable borders as compared to the contra lateral side. The swelling appeared elastic in the peripheral areas and fluctuant towards the centre. Maxillary right central and lateral incisors were tender to vertical percussion and had grade II mobility. Electric and thermal pulp vitality testing showed a negative response in both the teeth. Intraoral Periapical radiograph revealed a well-defined unilocular radiolucency

(approximately 18mm x 15mm) associated with right maxillary central and lateral incisor with continuously outlined border extending from the mesial surface of left central incisor, involving entire right central incisor and lateral incisor. Border of the radiolucency appeared to be diffused in some areas. The clinical and radiographic findings were suggestive of infected periapical cyst related to the maxillary right central and lateral incisor. (Fig 2)



Figure 1 Preoperative Labial View



Figure 2 Preoperative Radiograph

Patient was a known well controlled diabetic taking his medication regularly. With the clinical diagnosis of infected periapical cyst endodontic therapy was planned. Endodontic isolation access preparation, cleaning & shaping, intracanal (Ca (OH)₂) medication for two weeks, obturation and restorations were done following standard protocol.

Patient was then advised to report back after every three months or in case of appearance of any signs and symptoms, whichever is earlier. For nearly one month the patient was all right after which he got similar pain as earlier. He reported back and was advised analgesics for the same. Again after a week patient reported with intense pain and increased mobility of the teeth with prominent cellulitis on the face. This acute phase was controlled by giving a course of antibiotics with a combination of analgesics for five days and surgical interventions was planned for removal of the pathology and accelerate the healing.



Fig 3-Working length determination



Fig 4- Ca(OH)₂ placement



Figure 5 – Master Cone

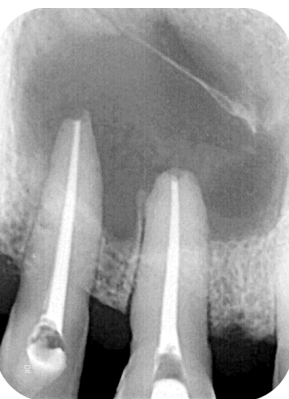


Figure 6 –Post Obturation

Surgical procedure

Preoperative routine investigations were performed to attain general fitness of the patient to undergo surgery. Written consent of the patient was obtained. Following standard aseptic protocol the area of operation was anesthetized using lignocaine 2% with adrenaline 1:80000 (LIGNOCAD ADR Cadila) was injected to anaesthetize the operating site by giving infraorbital nerve block, nasopalatine nerve block and local infiltration. The procedure was performed under the dental operating microscope (OPMI CARL ZEISS). Crevicular incision and two releasing vertical incision were placed on labial aspect (BP blade No 15) extending from left maxillary canine to right maxillary canine to reflect full thickness mucoperiosteal flap that exposed a wide labial bone defect (Fig. 6,7). Thin paperacious bone along with the buccal cortical perforation was encountered. The available window was widened by using blunt dissection and further at the margins using a slow speed straight fissure cross cut surgical bur .(SS white) along with the coolant (Fig. 8). Complete curettage, along with granulation tissue removal and enucleation of cystic lesion was done. As the lesion was found to be perforating the palatal mucosa, lining of the lesion was carefully dissected from the palatal mucosal and sub mucosal tissues to avoid palatal perforation during the procedure. Tissue obtained was sent for histopathological evaluation. Root end of maxillary right central and lateral incisors was resected and retrograde cavity was prepared using surgical ultrasonic tips (Dentsply Mallifer Switzerland) and retrograde filling was done with MTA (Pro Root Dentsply Mallifer) (Fig. 9). After proper approximation flap closure was done with 3-0 silk sutures through simple interrupted suturing technique. Patient was advised a course of antibiotics and analgesics for five days. Routine postoperative instructions were given and patient was recalled after 3 days for suture removal. Patient was advised to report back after every 3 months for follow up. 6 months and one year for follow up. Patient has been doing well and follow-up radiograph (one year) shows appreciable healing (Fig. 11,12).



Figure 7 –Crevicular Incision



Figure 8–Full thickness mucoperiosteal flap



Figure 9- Complete removal of cyst



Figure 10- Retrograde MTA Placement

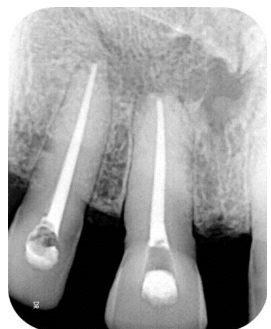


Figure 11 Signs of bone formation on periapical radiograph after 6 months of follow-up



Figure 12 Signs of bone formation on periapical radiograph after 12 months of follow-up

Discussion

The term 'Cyst' is derived from the Greek word 'kystis' which means 'sac or bladder'. Cyst is defined as pathological cavity lined by epithelium. It is formed periapically as a sequelae of chronic inflammation after tooth becomes nonvital.(6) Usually being symptomless, they are diagnosed during routine radiographic investigation(7). Dental caries is the most common cause of pulpal inflammation leading to necrosis of pulp followed by abscess or granuloma and further into cyst(8). However, in the present case, patient gave history of trauma 10 years back, which might have rendered the tooth nonvital, leading to formation of cyst.

There has been a paradigm shift in endodontics with regards to the surgical interventions. Lesions which were regarded as a clear indication for surgical intervention have been observed to undergo healing after nonsurgical approach in the recent past. This may be attributed to the advancements in the current knowledge of tooth morphology, diagnostic methods, shaping and cleaning instruments and devices and medications for root canal therapy which have enhanced the overall success of the treatment.

Root canal treatment of affected teeth was carried out by application rubber dam to maintain proper aseptic condition. The use of intracanal medicaments between sessions in root canal treatment of teeth with chronic periapical lesions is important, for reducing microbes which remains untouched by instruments or irrigation solutions, inside dentinal tubules and ramifications.(9) Takahashi et al, analysed the pH and the concentration of calcium ions in the periapical area, concluded that at least 2 weeks were necessary for calcium hydroxide bactericidal activity.(10) Taking this into account in the present case, calcium hydroxide was used as an intracanal medicament was used for period of 2 weeks followed by obturation.

Patient was advised to report back after every three months for assessment of healing of the apical lesion. A desirable outcome would have been when patient being asymptomatic and reduction in the size of periapical radiolucency on the radiograph on the periodic follow-ups. Finally complete resolution of the osteolytic lesion and replacement by a new bone with normal dentistry and appearance of the normal lamina dura around the apex.(11) A true noninfected sterile cyst can never heal by its own, rather can undergo expansion. Even though the size of the lesion was large in this case cystic lining was clinically considered to be destroyed by the infectious process. Hence the case was attempted for non surgical healing. Appearance of pain and swelling after the obturation, age of the patient and history of diabetes more than 10 years it was decided to take up surgical approach for removal of the pathology and accelerate the healing.

Full mucoperiosteal flap was raised followed by thorough curettage of the lesion. All remnants of the lining were carefully removed to minimize the chances of recurrence. Root after achieving hemostasis apical root resection was done following the standard guidelines i.e. Resection perpendicular to the long axis of the root. This minimizes the root structure damage and maximizes the removal of accessory canals and their content. Dental operating microscope proved to be a boon in retrograde preparation using the surgical ultrasonic tips. (Dentsply mallifer) retrograde cavity preparation was followed by filling with the Mineral trioxide aggregate.

It is widely preferred and used as a root end filling material due to its biocompatibility and sealing ability. Also, MTA has shown to have favourable effect on osteoblast in comparison to IRM and amalgam. Studies show presence of new cementum on the surface of the material.(12,13). On account of these factors, in the current case, periapical lesion was enucleated along with curettage, the root end was resected filled with root end filling material, MTA. Most peculiar characteristic of the case was the rapidity of healing observed in radiograph in one year even though the patient was known diabetic for past ten years and at the age of 60. Mobility of the affected teeth

was drastically reduced negating the need of any further intervention for the same.

Conclusion

Eventhough non surgical management of large periapical radiolucencies is becoming a standard protocol, surgical interventions are inevitable in certain circumstances. Modern periapical surgery utilises the principals of minimal invasion and has drastically enhanced the success rate. Current advancements in imaging, magnification, haemostasis, instruments and techniques of microsurgery retrograde fillings, Grafting materials have changed the way these surgeries were performed. In the light of current development it is up to the operator to make apt and prudent decisions in regards to the treatment plan and its execution to attain maximum possible success.

References

1. Shear M. Cysts of the oral regions. Radicular and residual cysts; 3rd ed. Boston: Wright; 1992. p.136-162
2. Narula H, Ahuja B, Yeluri R, Baliga S, Munshi AK. Conservative non-surgical management of an infected radicular cyst. *Contemp Clin Dent* 2011;2(4):368-371
3. Singh C, Agarwal T, Gupta S, International Journal of Applied Dental Sciences 2017; 3(2): 224-227 Surgical and supportive management of radicular cyst with palatal perforation: A case report
4. Nair PN. New perspectives on radicular cysts: do they heal? *Int Endod J* 1998;31(3):155-160
5. Bernabé PF, Gomes-Filho JE, Rocha WC, Nery MJ, Otoboni-Filho JA, Dezan-Júnior E. Histological evaluation of MTA as a root-end filling material. *Int Endod J* 2007;40(10):758-765
6. Sailer HF, Pajarola GF. Oral surgery for the General Dentist. 1st ed. New York: Thieme; 1999. p.106-110
7. Domingos RP, Gonçalves Eduardo S, Neto Eduardo S. Surgical approaches of extensive periapical cyst: considerations about surgical technique. *Salusvita Bauru* 2004;23(2):317-328.
8. Lin LM, Huang GT, Rosenberg PA. Proliferation of epithelial cell rests, formation of apical cysts, and regression of apical cysts after periapical wound healing. *J Endod* 2007;33(8):908-916.
9. Andersson L, Kahnberg KE, Pogrel MA. Oral and Maxillofacial Surgery. 2nd ed. Wiley-Blackwell 2010. p.243-247
10. Leonardo MR, Silveira FF, Silva LA, Tanomaru Filho M, Utrilla LS. Calcium hydroxide root canal dressing histopathological evaluation of periapical repair at different time periods. *Braz Dent J* 2002;13(1):17-22.
11. Grossman L. Endodontic practice. 11th ed. Philadelphia; 1988. p.194-196
12. Shahi S, Yavari HR, Rahimi S, Eskandarinezhad M, Shakouei S, Unchi M. Comparison of the sealing ability of mineral trioxide aggregate and portland cement used as root end filling materials. *J Oral Sci* 2011;53(4):517-522.
13. Coneglian PZ, Orosco FA, Bramante CM, de Moraes IG, Garcia RB, Bernardine N. In vitro sealing ability of white and gray mineral trioxide aggregate and white portland cement used as apical plugs. *J Appl Oral Sci* 2007;15(3):181-185.