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Management Of Large Periapical Lesion With A Noninvasive Approach: A Case Report

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Abstract:
Periapical lesions develop as a sequela to pulpal diseases. The majority of inflammatory periapical lesions are initially treated with conservative non-surgical procedures. The success of root canal treatment is based on thorough cleaning, shaping and obturation of the root canal system. Calcium hydroxide and triple antibiotic paste (TAP) are recommended as intracanal medicaments due to its antibacterial properties. This case report describes the non-surgical management of a large cyst-like periapical lesion in relation to the maxillary lateral incisor of a 19-year-old male with the chief complaint of periodic swelling and pus drainage from the palatine region with a history of a traumatic accident in the same area. The present case highlights the use of calcium hydroxide and TAP as an interappointment endodontic dressing for non-surgical management of large periapical radiolucency, which resulted in favourable clinical and radiographic outcomes.

Keyword*: Non-surgical Healing, TAP, Metapex, Periapical Lesion*.

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I. Introduction

Invasion of the root canal system by microorganisms and their by-products activates an inflammatory response which in turn may lead to bone resorption and damage to the periradicular tissues. Despite the defensive and preventive nature of these periradicular lesions to microbial infection, they are not self-healing.(1) The incidences of radicular cysts in these lesions have been reported to be in the range of 6 to 55%. Moreover, the prevalence of periapical granuloma varies from 9.3 to 87.1%, and periapical abscess from 28.7 to 70.7%.(2)

The rationale of endodontic therapy is to eliminate the microbes and disinfect the root canal system while creating a conducive environment for periapical healing.(3) Microbial eradication during an endodontic procedure is achieved using chemomechanical debridement. However, this method alone may not suffice the root canal system microbe free, especially in case of a large periapical lesion. root canal complexities and persistent polymicrobial nature of biofilm on root dentin makes total disinfection of the canal space difficult.(4)

Different techniques been employed for lesion sterilization and periapical repair therapy. This includes the employment of various intracanal medicaments such as calcium hydroxide and triple antibiotic paste. Calcium hydroxide due to its properties such as antimicrobial activity, neutralization of acidic products, activation of alkaline phosphatase which induces induction of hard-tissue formation and promote periodontal repair is commonly used as an intracanal medicament. The major limitation of calcium hydroxide is its ineffectiveness against some microorganisms like Enterococcus faecalis and Candida albicans which are commonly associated with persistent endodontic infections.(5) To overcome this Metapex, a silicone oil-based calcium hydroxide paste containing 38% of the iodoform is used as intracanal dressing.

Antimicrobial treatments and various antibiotics are being used to cure active and acute infections. The use of antibiotics as intracanal medicament has proven to be beneficial in treating persistent endodontic infections. The triple antibiotic paste is a blend of Ciprofloxacin, Metronidazole, and Minocycline. When used in a concentration of 1:1:1 (33% each) as intracanal medicament, it has given promising results in eliminating E. faecalis in the root apex to a depth of about 400 μ.(6)

This case report presents the non-surgical management of a large periapical lesion with calcium Hydroxide with iodoform and TAP as intracanal medicament.

II. Case Report

A 57-year-old male patient reported to the Department of Conservative Dentistry and Endodontics with the chief complaint of swelling on the palatal surface of the maxillary anterior teeth region. The patient had a

history of root canal treatment initiated 4 years ago. Intraoral examination revealed a soft, fluctuant swelling with sinus tract opening on the left maxillary anterior palatal aspect[Figure 2]. Periodontal probing revealed normal intact gingiva. An intraoral periapical radiograph revealed a well-circumscribed large radiolucent lesion with well-defined margins approximately 10 mm × 10 mm involving the apex of teeth 21 and 22[Figure 1]. Teeth 11, 21 and 22 failed to respond to thermal and electric pulp testing; the adjacent and contralateral teeth responded within normal limits. Hence, considering his dental history, a presumptive diagnosis of previously initiated root canal therapy with extensive inflammatory apical periodontitis was established. It was decided to perform root canal treatment on tooth 11, 21 and 22.

FIGURE 1 – PREOPERATIVE RADIOGRAPH

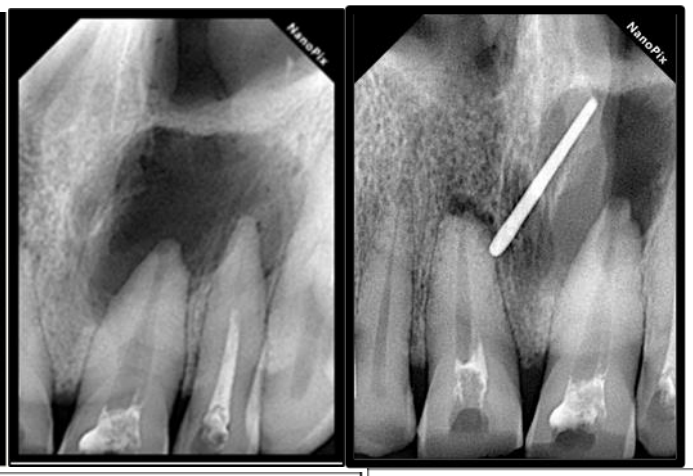

FIGURE 2 – SINUS TRACING

Teeth 11, 21 and 22 were isolated with a rubber dam and root canals were accessed, a suppurative yellowish fluid was drained through the cavity. Initially, root canal space negotiation was done using a size 10 K-file, and copious irrigation was done using saline. By applying digital pressure on the swelling present on the palatal surface of the maxillary teeth, a yellow straw-coloured fluid drained through the access-opened teeth and the sinus tract opening. Then, the working length was determined, followed by gentle irrigation with sodium hypochlorite (3% NaOCl) and normal saline, and a closed dressing was given in the first visit. During the second visit after 3 days, the canal was irrigated with 3% NaOCl and normal saline. The root canal was then prepared up to 50 K-size Master File. The biomechanical preparation with the first few files was intentionally extended a few millimeters beyond the apical foramen. During the instrumentation, the canal was irrigated copiously with a 3% NaOCl solution and normal saline. For removal of the smear layer, irrigation with 5 mL of 17% EDTA and followed by sodium hypochlorite using EndoActivator for approximately 1 min. The final irrigation was performed with a 2% CHX digluconate solution.

As the discharge and swelling did not cease completely, TAP was used as an intracanal medicament instead of calcium hydroxide for long-term dressing. TAP was prepared by using tablets of ciprofloxacin (ciplox 250 mg, Cipla, India), metronidazole (metrogyl 400 mg, J. B. Chemicals and Pharmaceuticals Ltd., India) and minocycline (minoz 100 mg, Cipla, India). The tablets were scraped with a Bard Parker blade to remove the outer coating and crushed. Ciprofloxacin, metronidazole and minocycline powders were mixed in a 1:1:1 proportion, to obtain a triple antibiotic mixture.

FIGURE 3– INTRACANAL DRESSING

FIGURE 4– 6 MONTHS FOLLOW UP

The TAP dressing was removed after 4 weeks and teeth displayed no symptoms on examination. The canals were irrigated with 3% NaOCl solution, followed by normal saline and 2% CHX solution, and Metapex® (Meta Biomed Company Ltd., Korea) as intracanal medicament was placed and temporized[Figure 3]. The teeth were reassessed after 3 months and irrigated with 3% NaOCl solution, followed by normal saline and 2% CHX solution, and obturated with 2% 50-size gutta-percha and Epoxy Resin Based sealer using lateral compaction technique[Figure 5]. Post-endodontic restoration with composite was done after 1 week and reviewed after 6 and 12 moths. After 12 months, the radiograph showed complete bony healing with well-defined trabeculae[Figure 6].

III. Discussion

Majority of periapical lesions (>90%) constitutes of dental granulomas, radicular cysts or abscesses.(7) Periapical granulomas commonly range up to 10 mm and more than 10 mm are considered as radicular cysts.(8) The existence of straw-colored exudate, size of lesion in combination with two non-vital teeth, radiopaque border, and divergence of adjacent teeth roots strongly demonstrated a radicular cyst. However, a definitive diagnosis can only be made using histopathologic examinations.

Numerous treatment options have been employed for the treatment of large peri radicular lesions ranging from a root canal therapy to different surgical interventions. Surgical approach may lead to various consequences such as Possible damage to the adjacent vital teeth, damage to the anatomic structures in the vicinity of the lesion and pain and discomfort whereas in case of non-surgical approach the treatment is less invasive with a better patient acceptance. The success rate of the non-surgical endodontic treatment has shown to be 94.4% with complete and partial healing of periapical lesions and is primarily based on appropriate instrumentation with a copious irrigation protocol to gain asepsis and 3-D filling of the root canal.(9) Although instrumentation and irrigation reduces the bacterial count, an agent with bactericidal action is still required to ensure optimum disinfection.

The concept of 'Lesion Sterilization and Tissue Repair (LSTR)' therapy that uses a triple antibiotic paste of ciprofloxacin, metronidazole, and minocycline, for disinfection of oral infectious lesions, including dentinal, pulpal, and periradicular lesions. Repair of damaged tissues can be expected if lesions are disinfected.(7) American Association of Endodontists has recommended the use of TAP in the range of 0.1–1 mg/mL for 1 to 4 weeks.(6) the TAP dressing was placed for 28 days to treat the weeping canal.

Metapex contains silicone oil as a vehicle and has a pH below that which is said to be effective in killing Enterococcus feacalis. Oily vehicles increase the antimicrobial effects of calcium hydroxide against Enterococcus feacalis and other bacteria. The antimicrobial effects of calcium hydroxide is related to its high pH of 12.5 which is said to have a destructive effect on the cell membranes and protein structures and the pH is maintained for a long term.

The healing time for periapical lesion when treated nonsurgically ranged from 18 to 24 months. Periapical lesions take at least 6–12 months to show any dimensional changes on periapical radiograph following the completion of endodontic therapy.(3,10) Shah suggested that patients should be recalled at intervals of three months, six months, one year, and two years, to assess the healing of periapical lesions. There is always the possibility that quiescent epithelial cells may be stimulated by instrumentation in the apical region, with resultant proliferation and cyst formation.(11)Therefore a follow up of at least 2 year is required to conclude a treatment successful.

IV. Conclusion

Root canal treatment rendered with the highest standards of care with attention to asepsis, adequate cleaning and shaping, irrigation, canal disinfection and judicious use of TAP and calcium hydroxide can lead to the non-surgical regression of large periapical lesions. In the present case, an extensive periradicular lesion was treated non-surgically with calcium hydroxide and TAP as intracanal medicaments and provided favourable clinical and radiographic outcomes.

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