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Nonsurgical Management of a Large Periapical Lesion: A Case Report

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ABSTRACT

Periapical lesions typically arise as a consequence of pulpal diseases, with the majority of inflammatory periapical lesions initially managed through conservative, non-surgical approaches. The success of root canal treatment depends on thorough cleaning, shaping, and obturation of the root canal system. Intracanal medicaments such as calcium hydroxide and triple antibiotic paste (TAP) are commonly used due to their antibacterial effects, tissue-dissolving properties, prevention of tooth resorption, and promotion of tissue healing, particularly hard tissue formation with calcium hydroxide. This case report emphasizes the use of calcium hydroxide as an inter-appointment dressing for managing large periapical radiolucencies, with regular follow-up. The non-surgical healing approach resulted in favorable clinical and radiographic outcomes for the large periapical lesions.

INTRODUCTION

Pulpal infection, often caused by caries or trauma, leads to tissue necrosis. Periapical infection is an inflammatory response in the periradicular tissues, resulting from the interaction between endodontic pathogens and the host immune system, which can cause bone resorption and tissue damage. Despite their protective role, periradicular lesions do not heal spontaneously[1].

Over 90% of periradicular lesions are typically classified as dental granulomas, radicular cysts, or abscesses[2]. Radiographic features alone cannot reliably differentiate between cystic and non-cystic periapical lesions[3]. The prevalence of apical cysts among periapical lesions ranges from 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%[4].The definitive diagnosis of a periapical cyst can be made only by a histological examination.

Conservative, non-surgical endodontic treatments should be the first choice for managing inflammatory lesions of endodontic origin. Studies have shown that 94.4% of these lesions resolve partially or fully with simple non-surgical treatment and proper infection control. If non-surgical treatment fails, surgical intervention is then recommended. So, all inflammatory periapical lesions should be initially treated with conservative nonsurgical procedures[4,5].

This article suggests that surgical removal of periapical lesions of pulpal origin is not always necessary. Regardless of the lesion's size, conservative treatment methods should be prioritized.

CASE REPORT

A 23-year-old female attended to the Department of Conservative dentistry and Endodontics at PGIDS, Rohtak, with the chief complaint of periodic swelling and pain inmaxillary anterior region. She had history of traumatic accident in this area and her past medical history was not contributory. Extra-oral examination showed non-palpable lymph nodes and no facial swelling.

Intra-oral examination showed swelling in the alveolar mucosa adjacent to tooth #21(Figure 1a). The tooth #21 was fractured and discoloured and had previously initiated endodontic treatment.Also, radiography showed presence of single gutta percha cone in respect to tooth #21(Figure 1b). It was decided to perform non-surgical retreatment.

(Figure 1a) **(Figure 1b)**

After local anaesthesia and rubber dam placement, retreatment was initiated and cleaning and shaping of the root canal was done. Irrigation duringinstrumentation was carried out with 3% sodium hypochlorite and final irrigation with EDTA. Paste of calcium hydroxide was used as the intracanal medicament. After 1 week, the canal was found to be dry. The canal filling was performed 2 weeks after the initial appointmentand lateral condensation technique was used to obturate the canal with gutta-percha and bio-ceramic sealer (Figure 2).The 6- and 12-month follow-ups indicated no sensitivity to palpation and percussion in clinical evaluations (Figure 3a) and radiographies showed evidence of developing bone regeneration. (Figure 3b ,3c)

(Figure 2)

(Figure 3a-Post op clinical view at follow up) (Figure 3b – 6monthsfollow up) (Figure 3c - 12 months follow up)

DISCUSSION

Surgical treatment for periapical pathologies is not always required, as many lesions respond well to proper endodontic care. A nonsurgical approach should always be considered first, as patients tend to feel less anxious about non-invasive treatments. Additionally, surgical procedures carry risks, especially in medically compromised patients[6]. Therefore, all inflammatory periapical lesions should initially be managed with conservative nonsurgical methods[4].

Effective chemo-mechanical cleaning of the root canal system and thorough microbial removal are critical to achieving successful outcomes in endodontic therapy. Several studies have emphasized that nonsurgical root canal treatment (RCT) should be the initial approach for managing periapical lesions[7]. Reports indicate that nonsurgical RCT has led to healing in 42% to 74% of cases involving periapical lesions, highlighting its effectiveness as a first-line treatment[8–10]. However, there remains some debate regarding the prognosis of conventional RCT for large versus small lesions[9]. While smaller lesions tend to have higher success rates due to their more manageable nature, large lesions may pose additional challenges due to factors such as the extent of infection, the complexity of the root canal system, and the potential for persistent inflammation. Despite these challenges, nonsurgical RCT continues to be a highly viable option, with many studies demonstrating its ability to promote healing in large periapical lesions when proper infection control measures are employed[11]. Nonetheless, more research is needed to fully understand the long-term outcomes of nonsurgical treatment for large versus small periapical lesions.

Calcium hydroxide is commonly used in endodontics due to its beneficial properties, including its high alkalinity, tissue-dissolving effect, and ability to promote hard tissue repair. It has a strong bactericidal action, which results from its effects on bacterial cytoplasmic membranes, protein denaturation, DNA damage, carbon dioxide absorption, and interaction with lipopolysaccharides. Additionally, its hygroscopic properties contribute to its effectiveness[12–14].In cases of large periapical lesions, such as in the current case report, the use of calcium hydroxide as an intracanal medicament can have a direct therapeutic effect on inflamed tissues, including epithelial cystic linings. This action helps promote healing of the periapical area by supporting tissue repair and encouraging osseous regeneration. By eliminating bacterial infection and creating an environment conducive to tissue regeneration, calcium hydroxide significantly aids in the resolution of periapical pathology[14].

In this case, conventional endodontic therapy, coupled with the use of calcium hydroxide as an intracanal medicament, proved to be an effective approach for promoting the healing of periapical lesions. Calcium hydroxide, with its antimicrobial properties and ability to induce tissue repair, played a crucial role in reducing inflammation and facilitating periapical healing. However, it is essential to monitor the progress of the lesion over time following non-surgical treatment. Periodic follow-up examinations are necessary to assess the resolution of the lesion and ensure that healing is progressing as expected. Only after observing a lack of improvement or failure to heal should surgical intervention be considered.

CONCLUSION

Nonsurgical endodontic therapy demonstrated significant success in promoting the healing of periapical lesions. Regardless of the lesion's size, the findings emphasize that every effort should be made to address periapical lesions with conservative, non-surgical endodontic treatment. Such an approach, when performed with proper infection control and technique, has shown to be effective in resolving or significantly reducing the lesion. Surgical intervention should only be considered if non-surgical methods fail to achieve the desired outcome, underlining the importance of prioritizing nonsurgical therapy whenever possible.

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