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NON-SURGICAL MANAGEMENT OF LARGE PERIAPICAL CYST: A CASE REPORT

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ABSTRACT

Aim: This case report aims at treating a large peripical lesion with non-surgical approach with intra-canal medication

Background: Small periapical lesions of endodontic origin usually heal by conventional endodontic therapy alone. Conservative nonsurgical management of such lesions eliminates the possibility of complications of surgery along with wider patient compliance and acceptance.

Case description: A periapical cystic lesion associated with 21 22 23 was treated conservatively using water based Calcium hydroxide paste as intracanal medicament is reported.

Clinical significance: The treatment was successful as evidenced by relief of symptoms and radiographic evaluation.

Conclusion: Large periapical cyst-like lesions can resolve by nonsurgical endodontic therapy employing calcium hydroxide intracanal interappointment medicament.

KEYWORDS : Periapical Lesion, Calcium Hydroxide, Non-surgical Management

INTRODUCTION:

Periapical Lesions are a sequel of endodontic infections, which may occur due to caries or trauma and manifest itself as a host response to microbial challenge in the root canal system.[1]

More than 90% of lesions can be classified as dental granuloma, radicular cyst, or abscess Differential diagnosis of periapical lesions cannot be done onlu on radiographic evidence. Few criteria for clinical diagnosis of periapical cystic lesions which include (a) the periapical lesion is involved with one or more nonvital teeth, (b) the lesion is greater than 200 mm2 in size, (c) the lesion is seen radiographically as a circumscribed, well-defined radiolucent area bound by a thin radiopaque line and (d) it produces a straw-colored fluid upon aspiration or as drainage through an accessed root canal system.[2-4]

A large periradicular lesion may have a direct communication with the root canal system and respond favourably to nonsurgical treatment. [5]

Many radicular cysts are symptomless and are discovered when periapical radiographs are taken of teeth with non-vital pulps. A periapical cyst may regress, remain static or grow in size. The treatment of the cysts can be either nonsurgical management using conventinal endodontic treatment with intracanal medication or surgical management being either marsupialization or enucleation. Nevertheless, no matter what choice it might be, the treatment option should be kept as conservative as possible.[6]

There has also been a prolonged debate about the management of large cystic lesions, with some maintaining that true cysts cannot successfully treat by surgical means. However, clinicians believe that a large majority of cysts will heal after nonsurgical root canal treatment.[7]

The fundamental approach of any non-surgical endodontic treatment is to have a conventional orthograde approach. In view of that calcium hydroxide [$Ca(OH)_2$] definitely has an edge over, when we look at its outstanding action as an intracanal medicament.[8-10]

CASE REPORT:

The patient complained her upper front teeth were hurting on touch since 10 days. The patient gave a history of trauma to the anterior teeth due to a fall when the patient was about 10 years of age, which was not attended.

On clinical examination, no extraoral swelling was observed. Intraorally, a fluctuant swelling in the labial vestibule in relation to upper right central incisor till upper right canine (21,22,23) (Figure 1), which was tender on palpation and percussion. Periodontal probing depth was within normal limits. Pulp sensibility tests were negative for 21, 22 and 23. Intraoral periapical radiograph (IOPA) of 21, 22 and 23 regions were made, which revealed a large periradicular radiolucency (Figure 2). A CBCT examination was done in which the extent of the lesion was measured to be 24.9mm x 16.1mm. (Figure 3) The various treatment options including periapical surgery and prognosis were discussed. The patient preferred to attempt nonsurgical procedure.

Under mucosal anesthesia, a 24-gauge needle attached to a 2 ml syringe was inserted into the center of the lesion through the labial surface. The needle encountered no resistance on insertion suggestive of bony defect. On confirming the needle position, the needle syringe assembly was stabilized using digital force and slow aspiration carried out. The aspiration initially yielded approximately 1 ml of pus followed by approximately 1.5 ml of blood tinged fluid. No digital compression of the swelling or vestibule was done during aspiration. The aspirated fluid was sent for histopathological examination. The report confirmed the diagnosis as infected radicular cyst. Endodontic therapy was immediately initiated in 21 and 22. On gaining canal patency, the working length was determined using apex locator. The pus and exudate was allowed to drain through the canals. On the next day, the canal was enlarged to ISO #40.06 conventional crown down technique. A total of 5.25% sodium hypochlorite was used as the main irrigant between files and the final irrigation was done with normal saline. The cleansed canals were visually observed for drainage and when no further drainage was observed an interim dressing was provided at the access with zinc oxide eugenol temporary cement. The patient was recalled after two days.

On recall, the patient reported relief of pain. The dressing was removed and the canals were observed for any drainage. The canals were reinstrumented and dried using absorbent points. The canals were filled with water-based calcium hydroxide paste employing passive injection and packing with a finger plugger. The access was sealed with zinc oxide eugenol temprorary cement. An IOPA was made to evaluate

the density of the fill and to rule out any overextension. The patient was recalled for after 15 days, the calcium hydroxide was flushed out of the canals and repacked with fresh paste for the next 5 months.

In between every 3 month CBCT evaluation was done to check for any changes in the size of the lesion. At the 5th month recall an IOPA was made to assess healing with a reduction in the lesion to from 24.9mm x 16.1mm to 9.5 mm x 12.3 mm. The radiograph showed definitive evidence of periradicular healing. (Figure 4). Also, Intra-oral examination showed complete healing and no swelling present (Figure 5) The medicament from the canals was sonically with help of an endoactivator flushed out and the dried canal was obturated employing conventional lateral condensation technique using guttapercha points. A postobturation IOPA was made. (Figure 6) Radiographic evidence of trabecular pattern at the area where the periradicular lesion in a 3 month follow-up was present was also noted and was confirmed on CBCT examination. (Figure 7). On a 3rd month follow-up, there was significant reduction in the healing. (Figure 8) The patient was then referred to department of prosthodontics for prosthetic phase of the treatment plan. On a 6th and 8th month follow-up almost complete healing of the lesion was observed on the radiograph with considerable reduction in lesion size and bone formation observed. (Figure 9)

Figure 1: Preoperative Photograph

Figure 2: Intra-Oral Periapical Radiograph showinh lesion extending from 21-23

Figure 3: CBCT evaluation of the periapical lesion

Figure 4: Evaluation of Healing before obturation

Figure 5: Intra-oral Examination before obturation

Figure 6: Post-Obturation Radiograph

Figure 7: Follow-up Radiograph

Figure 8: 3rd Month follow-up Radiograph

Figure 9: 6th Month follow-up radiograph

Figure 10: 8th month Follow-up

Figure 11: 12th month Follow-up

DISCUSSION:

The treatment options of large periapical lesions range from non-surgical therapy with repeated calcium hydroxide dressing to surgical intervention. The precise mechanism of large periapical lesions is still not known and a topic of research interest even today.[9]

Radicular cysts are considerably less frequent and occur in two distinct histological categories: (I) apical true cysts and (II) apical pocket cysts. Radicular true cysts are entirely enclosed by epithelium. They are believed to originate from dormant epithelium, which has been stimulated to proliferate. Periapical pocket cysts are lined by epithelium but are open to the root canal, effectively sealing off a pocket-like micro-abscess from the periapical surroundings. Continued enlargement of these cysts results in slow but progressive destruction of the surrounding bone and matrices.It is widely believed that granulomas and pocket cysts may heal after non-surgical root canal therapy, whereas true cysts are self-sustaining and therefore less likely to be resolved by non-surgical treatment.[10] Nair et al reported 6 to 55% incidence rate of periapical cyst within periapical lesions. It is widely believed that as the size of the periapical lesion (radiolucency) increases more is the chance of the lesion being a cystic one. [11]

According to Natkin et al., there is no doubt that larger lesions are more likely to be cysts and will be less likely to heal with endodontic therapy alone. Thus diagnosis of periapical lesions are very important for distinguishing granulomas and cysts. [12]

Nonsurgical management of periapical lesions is preferred in comparison to surgical methods and should be considered in all cases. Possible damage to adjacent vital teeth, damage to anatomic structures in the vicinity of the lesion, pain and discomfort associated with surgical procedures can be eliminated by nonsurgical methods. Patient acceptance and apprehension toward the surgical procedure, age and medical conditions which limits surgical procedures are also factors which favor nonsurgical approach. Surgical procedures should be considered only when conventional methods fail. In case of large periapical lesions, conventional endodontic therapy alone may not be sufficient. Associated procedures such as aspiration, decompression, nonsurgical aspiration and irrigation may be required.[13]

Periradicular lesions are usually endodontic in origin. Bacteria and bacterial by-products within the root canal and its ramifications bring out the inflammatory response in the periradicular tissue. Proper cleansing and disinfection of the root canal system will effectively reduce the microbial cause of cyst-like periapical lesions or inflammatory apical true cysts. In these cases, the lesions might regress by the mechanism of apoptosis in a manner similar to the resolution of inflammatory apical pocket cysts.[14]

Bhaskar has proposed to over instrument the canal by 1 mm beyond the apical foramen into the periapical region in case a periapical lesion is evident in a radiograph.[1] This has been suggested to cause transient inflammation and break in the continuity of the epithelial lining of the cyst and thereby resolution of the lesion. Bender has also proposed that penetration of the apical area to the center of the radiolucency (lesion) would establish drainage and relieve the pressure. When the drainage ceases, there would be proliferation of fibroblast in the area leading to deposition of collagen. Thus, deposited collagen would compress the capillary network into the area of lesion leading to starving of the epithelial cells. The epithelial cells undergo degeneration and are finally engulfed by macrophages. Shah stated that instrumentation beyond the apex could activate quiescent epithelial cells in the area leading to their proliferation and cyst formation and suggested follow-up period of at least 2 years. [15]

When surgical intervention becomes necessary for treatment, the decision point is whether to raise a flap and completely enucleate the lesion or to try "decompression" first the lesion.

Even if enucleation is still necessary later, the lesion will predictably be much smaller and present less difficulty with removal and less risk of damage to associated teeth and vital structures. As an aside, decompression with placement of tubing to maintain drainage is quite different from "marsupialization," although the terms tend to be used interchangeably. Decompression is favoured because of lower morbidity and the fact that bony ingrowth occurs as the lesion shrinks in size, thus resulting in more normal bony contours after treatment is concluded.

However as previously discussed by Natkin et al huge periapical lesions can be treated non-surgically alone through periodic dressings of $Ca(OH)_2$ [12]

Calcium Hydroxide is the most commonly used disinfectant due to its ability to penetrate, disinfect and neutralise the remaining micro-organisms in the root canal space. The known mechanism if $Ca(OH)_2$is that it dissociates into Ca^{2+} and OH^-. The antimicrobial effects of calcium hydroxide is directly related to its high pH of 12.5, it has a destructive effect on the membrane and protein structure on the bacterial cells. A study also reported that unintentionally extruded $Ca(OH)_2$ paste into the periapical lesion showed no detrimental effect on the periapical tissues but healing might take longer. Calcium hydroxide has been found to be resorbed extraradicularly without apparent ill effect and proved to be clinically and radiographically successful. [2,5,10]

In a long time period clinical study, Calskan have reported 42 nonsurgically treated teeth with large cyst-like lesions.There were 73.8% of all cases completely healed with nonsurgical treatment.

The advantages of nonsurgically managing patients with large periapical radiolucencies is that the psychological trauma is less and is more comforting to the patient. a rich blood supply, lymphatic drainage, and abundant undifferentiated cells are major advantages of periapical tissues. All these structures are involved in the process of inflammation and repair. Therefore, because the periapical tissues have the potential to heal, treatment of periapical lesions should be directed toward only removal of the causative factors. [14]

CONCLUSION

A nonsurgical treatment approach is always mandatory be adopted before resorting to surgery. The decompression and aspiration irrigation techniques can be used when there is drainage of cystic fluid from the canals. Advantage of this technique is decreasing the hydrostatic pressure within the periapical lesion. Regular change of intracanal dressings of calcium hydroxide has proved to be very beneficial for reducing the size of periapical lesion.

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