

Surgical Management of Large Periapical Inflammatory Lesion

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Abstract

Case Report

The periapical cyst arises from the epithelial cell rests of malassez. This condition is usually asymptomatic but can result in a slow growing cystic lesion. Radiographically, the lesion round or oval measuring 2cm*2cms approximately. The current concept in management of such lesion is non-surgical. However, periapical surgeries can be chosen as treatment option in such large periapical cyst.

Keywords: Radiographically, malassez, lesion, urgical.

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INTRODUCTION

Traumatic injuries to anterior teeth of young patients are relatively common in young population. Such trauma is often followed by pulpal necrosis. If microbial infection occurs, a periapical lesion may develop, possibly evolving into a chronic inflammatory lesion (e.g., granuloma, periapical cyst or scar tissue)[1].

Radicular cysts are the mos common odontogenic cystic lesions of inflammatory origin affecting the jaws (between 38 % and 68 % of all the jaw cysts). Radicular Cysts are believed to be formed from epithelial cell rests of Malassez (ERM). Proliferation of these epithelial cell rests is frequently associated with stimuli from periapical periodontal inflammation secondary to pulpitis.

Radicular cyst are commonly found at the apices and lateral aspects of the roots [4]. They are symptom less and are discovered when periapical radiograph are taken of teeth with non-vital pulps. If the cyst does become large, patient often complains of slowly enlarging swellings, mild sensitivity, tooth mobility and displacement [5]. Patients do not experience pain unless acute inflammatory exacerbation

is present. The affected tooth is nonresponsive to thermal and electrical pulp tests [1].

Radiographically most radicular cyst appears as round or pear shaped unilocular radiolucent lesion in the periapical region. The cyst may cause mild root resorption. The treatment options for radicular cyst can be conventional nonsurgical root canal therapy when lesion is localized or surgical treatment like enucleation, marsupialization or decompression when large lesion is present[6].

This case report presents the successful surgical management of large infected radicular cyst.

CASE REPORT

A 23 year old female patient was referred to the Department of dental surgery and implant dentistry, with the chief complaint of pain and swelling in the upper front teeth region since 10 to 12 weeks. Medical history and investigations did not reveal anything that could oppose or influence the proposed treatment plan. The patient gave a history of trauma to the teeth 1 years back. On clinical examination, palatal swelling was seen in association with maxillary right central incisor (tooth no. 11), lateral incisor (12) and canine (13), with displacement of maxilaary canine due to size of the cyst.



Fig-1: Pre-operative photograph



Fig-2: preoperative radiograph occlusal view

There was no discoloration of involved tooth, and discharging sinus present in relation to involved teeth. Teeth nos. 11, 12, 13 and 14 were tender to percussion. Periodontal examination revealed sulcus depths within normal limits. Teeth nos. 11, 12, 13 and 14 gave a negative response with the electrical pulp tester. The maxillary occlusal radiograph showed a large radiolucent periapical lesion in association with maxillary right anterior teeth and 1st maxillary premolar ranging from size 2cm*2cm.

A decision of conventional root canal treatment with the placement of intracanal medicament was made after discussion with the patient. The patient consented to the treatment plan. The operative field was isolated, and access preparation was done in 11, 12, 13 and 14.

After the radiographic determination of the working length, biomechanical preparation following 'step back' method was done using 2.6% sodium hypochlorite and normal saline as an irrigating agent. Iodine containing calcium hydroxide (Metapex, Japan) was placed as intracanal medicament, and the root canal access was sealed with zinc oxide eugenol cement.

After 21 days, the patient reported with no relief from her symptoms. There was no resolution of the palatal swelling.

Decision was changed in favour of periapical surgery on the right maxillary anterior region. Consent was obtained from the patient prior to the surgical treatment. Teeth 11, 12 and 13 were obturated with mta apical plug using orthograde approach. The canals were sealed with zinc oxide eugenol cement. After one day the remaining canals were filled with thermoplastisized gutta-percha. (E & Q, Meta Biomed). The canals were then restored with composite. In maxillary premolar, root canal therapy was also performed. Assessment of the surgical site showed adequate mouth opening & adequate depth of the vestibule. Local anesthesia of 2% lignocaine with 1:80,000 adrenalines was infiltrated in the alveolar buccal mucosa superficial to the periosteum at the level of root apices from 13 to 21 to get added advantage of less surgical bleeding. Nasopalatine nerves were also anesthetized by infiltration in the incisive foramen. The buccal full thickness mucoperiosteal flap was elevated to expose the area of periapical lesion (figure 3).



Fig-3: Intraclavicular incision and flap elevation

Already existing pathological cortical bone window was expanded until underlying pathology was adequately exposed and sufficient space was available for thorough curettage. Sterilized gauze was placed between the pathological soft tissue mass and the lateral wall of the crypt, and lateral pressure was applied on the gauze with the concave surface of the curette facing the bone. This helped in separation of the periapical lesion from the surrounding bone and the nasal mucosal and palatal linings.

The dental assistant supported the palatal lining from inside the oral cavity with his finger while the cystic lining was being separated from the palatal lining. The periodontal curette was used to remove the tissue firmly attached to the root surface. Caution was exercised in separating the lesion from the roof because no intervening bone was present between the nasal lining and the lesion. The nasal lining could be seen moving with inhalation and exhalation.

The enucleated periapical lesion was stored in 10% buffered formalin solution and sent for histopathological examination. The root resection was done and retrograde filling was done to seal the periapical area.

The bone cavity was irrigated with sterile normal saline and gently dried with moist gauze. Careful clinical and radiographic inspection of the area was done to ensure no residual lesion tissue was left behind.

Later, the bone cavity was filled with bone graft and PRF and hydroxyapatite crystals were placed in the bone cavity (figure 7 & 8). An absorbable membrane was placed in buccal cortical surface covering the large bony defect for guided tissue regeneration and bone formation (Figure 9). The mucoperiosteal flaps were repositioned and secured in place using 4-0 non absorbable silk suture. The simple interrupted sutures were placed (figure 10,11,12).



Fig-4: Root end filling material being placed



Fig-5: PRF membrane in bony cavity



Fig-6: Covering of bony cavity with membrane



Fig-7: Flap repositioning and closer of bony cavity



Fig-8: Acrylic plate in upper arch



Fig-9: Acrylic plate in upper arch

Post-operative care

The suitable antibiotics and analgesics were prescribed for 7 days. Warm saline mouthbath 3 to 4 times a day was also prescribed for 2-3 days. Sutures were removed after 1 week. Patient was given oral hygiene instructions and follow-up examinations were carried out weekly for 1 month after surgery and then 3 & 6 months.

DISCUSSION

A wide variety of cysts and neoplasms may occur in the maxillofacial region. The most important of these are maxillary cysts [7]. A cyst is a pathological cavity with a defined wall of connective tissue and an

epithelial carpet, filled with liquid, semiliquid or gaseous content [8]. Radicular cysts are thought to arise from epithelial cell rests of Malassez in the periodontal ligament, and they are believed to proliferate as a result of periapical inflammation caused by infection of the root canal system. They are particularly frequent in the maxillary anterior region, presumably as a result of trauma [9].

The exact mechanism by which periapical lesions are formed is not clearly understood. An inflammatory reaction may be evoked due to entry of irrigants from infected root canals into periradicular tissue which can initiate the formation and perpetuation

of periapical lesion. Depending upon the nature, quantity of irritants, and duration of exposure the lesion may vary from apical periodontitis, granulomas or cysts [10].

The management of large cystic lesions has been the focus of prolonged discussion. There are two treatment options for large periapical lesions range from conventional nonsurgical root canal treatment with long term calcium hydroxide therapy and surgical intervention. Some endodontists maintain that true cysts can be successfully treated only by surgical means, but the current endodontic philosophy for the treatment of large periapical lesions involves initial use of nonsurgical root canal treatment [1].

Non-Surgical treatments are successful, but they require 6 month – 2years follow-up. If lesion has no signs of healing then surgical approach is applied. Surgical treatment is more normally the chosen approach to treating a large periapical cyst [11].

The usual surgical treatments for radicular cyst include total enucleation of small lesions. Marsupialization or decompression of larger cysts or a combination of these techniques can be chosen. The clinician must decide whether to raise a flap and completely enucleate the lesion or to try “decompression” first [5].

The four critical factors that influence healing after the periapical surgery are primary wound closure, angiogenesis as a blood supply and source of undifferentiated mesenchymal cells, space maintenance, and stability of the wound. The nature of healing of the large periapical lesion can be repair or regeneration. Regeneration is defined as the reproduction or reconstruction of a lost or injured part of the body in such a way that the architecture and function of the lost or injured tissue are completely restored [12].

Since repair is not an ideal outcome after wound healing regenerative approaches that aim to restore the lost tissue have been introduced. Regenerative therapies like bone graft and barrier membrane have been used for optimal healing of the defect area after degranulation of the lesion [13].

The healing potential when PRF was used with HA was more effective than when PRF used alone. PRF enriched surgical sites have been shown to heal at rates two to three times that of normal surgical sites. For this reason, HA was chosen, as that it could maintain the space for tissue regeneration to occur, as well as by it exerts an osteoconductive effect in the bony defect area [10, 12].

Bone grafts alone without a blood clot or angiogenic factors are unlikely to be capable of promoting periapical wound healing. PRF is the form of

a platelet gel. It can be used in combination with bone grafts, which offers several advantages including promoting wound healing, bone growth and maturation, graft stabilization, wound sealing, and hemostasis and improving the handling properties of graft materials [12, 14].

According to Simonpieri *et al.* [15], the use of this platelet and immune concentrate during bone grafting offers the following advantages:

- The fibrin clot plays an important mechanical role, with the PRF membrane maintaining and protecting the grafted biomaterials and PRF fragments assisting as biological connectors between bone particles.
- The addition of this fibrin network into the regenerative site aids cellular migration, particularly for endothelial cells necessary for the neo-angiogenesis, vascularization and survival of the graft.
- The platelet cytokines (PDGF, TGF- α , IGF-1) are progressively released as the fibrin matrix is resorbed, so creating a uninterrupted process of healing.
- The presence of leukocytes and cytokines in the fibrin network can play a important role in the self-regulation of inflammatory and infectious phenomena within the grafted material.

CONCLUSIONS

PRF is the platelet gel form which is reported to be used in cases like large bony defect, periodontal surgery, for guided bone regeneration and pulp revascularisation. Many studies and trials have reported promising result with PRF alone or when used in combination with other biomaterials. PRF is effective and economical regenerative material when used with HA crystals. It accelerates the resorption of the bone crystals and would increase the rate of bone formation.

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