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Case Report

SUCCESSFUL SURGICAL MANAGEMENT OF RADICULAR CYST USING BIODENTINE, PRF AND BONEGRAFT: A CASE REPORT

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ABSTRACT

Radicular cysts are generally asymptomatic lesion of the jaw which comprises up to 68% of cysts in the region. Often large cystic lesions necessitate surgical management for successful treatment outcomes. Here we report surgical management of radicular cyst associated with maxillary central incisor. Biodenine was used as the retrograde filling material owing to its excellent sealing and push out bond strengths along with Bone graft and PRF for faster healing.

Introduction

Anterior teeth are prone for traumatic dental injuries due to their position and morphology. Trauma is one of the chief aetiology for disfigurement and cystic changes if left untreated. Cyst-like apical periodontitis could be the fate of untreated traumatically injured teeth. Treatment options like periapical surgery have been proposed to manage such cases.[1] Periapical surgery is indicated when the Periradicular disease associated with a tooth where iatrogenic or developmental anomalies prevent non-surgical root canal treatment being undertaken and when Periradicular disease in a root-filled tooth where non-surgical root canal retreatment cannot be undertaken or has failed, or when it may be detrimental to the retention of the tooth.[2]

Radicular cysts are inflammatory cyst of endodontic origin, known to be most common cyst in maxillofacial region. They arise from the cell rests of Malassez following pulp necrosis.[1]Demiralp reported that 24.5% of referred cases with radicular cyst required surgical intervention. Periapical surgery

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becomes the treatment of choice, if the root canal treatment cannot adequately eliminate periapical lesion.[3]After surgical procedure healing usually occurs by repair or regeneration. Platelet rich fibrin (PRF) is coming up as a biological revolution in dental field. Using platelet-rich fibrin, or PRF, is a way to accelerate and enhance the body's natural wound-healing mechanisms.[4]

Recently, it was reported that PRF could stimulate cell proliferation of osteoblasts, gingival fibroblasts, pulp cells, and periodontal ligament cells, but suppress oral epithelial cell growth. These cell-type-specific actions of PRF may be beneficial for tissue regeneration[5,6]

In order to maintain space for cell repopulation and for osteoconductive/inductive materials like bone grafts have been widely used.[7]

Case:

A 35-year-old male patient reported to the department of conservative dentistry and endodontics, KVG dental college and hospital, Sullia with mild pain in the upper front tooth since many days. Clinical examination revealed no associated swelling or pus discharge and an acrylic extra coronal restoration. Radiographic examination revealed a well-defined unilocular periapical radiolucency of 5mm diameter irt #21.More over intraradicular radioopacities were observed indicating root canal treated tooth with post and core.

The potiential risk versus benefit of coronal disassembly, which includes cast post removal followed by non-surgical re-treatment was evaluated and we opted for a surgical approach.

A full thickness mucoperiosteal flap was raised with a sulcular incision. Cyst was enucleated and the defect was curretaged followed by saline irrigation.

After thorough debridement platelet- rich fibrin was prepared by drawing the required amount of blood into a 10 ml test tube without an anticoagulant and centrifuged immediately using a centrifuge machine for 10 min at 300rpm. A fibrin clot was formed in the

Fig: 1- Clinical Presentation

Fig : 2- Bony defect

middle part of the test tube, while the upper part contained acellular plasma and the bottom part contained red corpuscles.[8]Commercially available Hydroxyapatite (HA) bone graft crystals were sprinkled over PRF gel and together the mixture was placed into defect site. Flap was repositioned and sutured back with sterile absorbabalesutures (vicryl). Post-operative instructions were given and the patient was prescribed with antibiotics and analgesics. Patient was recalled after 7 days and satisfactory healing could be observed.

Enucleated cystic lining was sent for histopathological examination which revealed non keratinized stratified squamous epithelium and areas of osteoid tissues.

Fig: 4- Apicoectomy & retrograde filling(Biodentine™)

Fig: 4- PRF

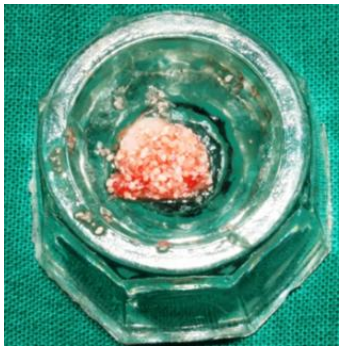

Fig: 5- Mixture of PRF & Bone graft

Connective tissue was fibrous with dense infiltrate of inflammatory cells. The diagnosis of radicular cyst was confirmed.

Discussion

The Historical triad, states that "debridement, disinfection and obturation" are important for success of root canal therapy,[9] and in present case due to poor treatment there was no hermatic seal and as a result the existing lesion did not heal.

Surgical treatment followed by placement of suitable graft material is considered as an option when non-surgical root canal therapy fails in removing lesion.[10]

Bone regeneration after the periapical surgery depends upon critical factors such as primary wound closure, angiogenesis as a blood supply and source of undifferentiated mesenchymal cells, space maintenance, and stability of the wound [11]

Use of bone graft is the most commonly used regeneration technique. Bone grafting materials include autograft, allograft, xenograft, and alloplasts. Alloplasts such as osteoconductive hydroxyapatite have been widely used in periapical surgery to enhance new bone formation.[3]

Within a short period after PRF introduction, it has been found to have a wide application in dentistry. It is commonly used to fill the surgical defects following periapical surgery as it has numerous advantages over other materials. It is an autogenous bone filling material, therefore shows minimal adverse reactions and can be easily prepared chairside by 'Choukroun's technique'. Another factor for the frequent use of PRF is its cost-effectiveness. PRF acts by enhancing body's natural bone healing mechanism as it contains various growth factors like PDGF, TGF and IGF.[8]

Therefore surgical cyst enucleation was performed and the dead space was filled with a mixture of PRF and bone graft. Follow-up was done after 3 months, 6 months and 1 year which showed progressive healing with total resolution of signs and symptoms as well as the sinus tract.

CONCLUSION

This case report concludes that PRF in conjunction with bone graft is effective in the treatment of large periapical bony defect. PRF is an autologous preparation which is found to be clinically effective and economical, than any other available regenerative materials. The use of PRF in conjunction with bone graft induced a rapid rate of bone formation. However, histological evaluation is required to examine the nature of newly formed tissue in the defect.

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