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Case Report

A Combination of Enucleation and Apicoectomy as an Alternative Treatment for Removing Radicular Cysts

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Abstract:

Introduction: Radicular cysts are asymptomatic lesions that occur in the periapical area of the tooth due to caries, pulp necrosis, or trauma. Various surgical approaches of enucleation and marsupialization can be performed to remove radicular cysts. The combination of enucleation and apicoectomy is an alternative treatment that can be used to remove radicular cysts without extracting the causative tooth.

Case Report: A 37 years old female patient came with chief complaints of a lump on the upper front gum. The patient had a history of trauma to her front teeth approximately three years ago, then the patient underwent endodontic treatment, and tooth was restored with Porcelain Fused Metal (PFM). The patient underwent enucleation of the radicular cyst followed by apicoectomy. Retrograde obturation is performed using Mineral Trioxide Aggregate (MTA), and a bone graft is administered to help regenerate bone defects. The patient was followed up one week and three months after surgery, there were no complaints or recurrence in this case.

Conclusion: The combination of enucleation and apicoectomy is an alternative treatments to eliminating periapical abnormalities that can be performed to preserve existing teeth. Retrograde filling using MTA can prevent recurrence due to reducing the canal gap and apical seal, which is a good prognosis.

Key words : Cyst **,** Enucleation, Apicoectomy

Introduction

A radicular cyst is a lesion that can occur in the mandible and maxilla. Cysts are closely related to caries, pulp necrosis, and trauma. [1,2] The majority of cysts in the oral cavity, 60%, are radicular cysts. In general, cysts are asymptomatic but can be seen in a radiograph.[1,3]

Radiograph examinations that can be performed to diagnose cysts in the oral cavity include periapical, panoramic, and CBCT photos.[1,3] Radiographically, the cyst looks radiolucent with clear radioopaque borders, sometimes round or oval. Other examinations besides X-rays can also performed by aspiration. Cysts more significant than 1.5-2 cm can be aspirated to confirm the diagnosis.[2-4]

Various approaches to treating cysts in the oral cavity include enucleation and marsupialization.[2,4] Cyst enucleation aims to remove all cyst epithelium in the periapical area. Marsupialization is performed on large

cysts by performing a surgical window over the cyst lesion to decompress the cyst fluid and reduce the size of the cyst. [2-4]

Combination treatment with endodontics can be an alternative to removing cysts in the oral cavity without removing the causative tooth. Combination treatment in the form of apicoectomy aims to remove the area of infection in the apical part and prevent recurrent infections in the tooth.[2,3] This combination treatment can be carried out with 80-90% success in maintaining tooth structure.[3,5] In this case, the procedure for removing the cyst using a combination of apicoectomy is reported with enucleation surgery in the apical area.

Case Report

A 37 years old female patient came with a chief complaint of a lump on the upper front gum. The patient had a history of trauma to her front tooth from a fall about three years ago. Then, the patient underwent endodontic treatment, and tooth was restored with Porcelain Fused Metal (PFM). On clinical examination, a lump was found in the apical area of tooth 21, which was the same color as the surrounding tissue and did not feel painful on palpation. Periapical radiological examination of tooth 21 showed a radiolucent image with clear radioopaque boundaries, and tooth 21 looked hermetic after endodontic treatment. The results of the radiological examination showed that there was a cyst in the periapical area of tooth 21. Currently, the patient has no complaints of pain and wants to remove the lump without extracting the tooth. The patient was planned to perform a combination of enucleation and apicoectomy in this case.

Figure 1. Periapical clinical and radiological examination

The patient has performed supra periosteal infiltration anesthesia of the anterior superior alveolar nerve in the labial area and a nasopalatine nerve block in the palatal area. A full thickness mucoperiosteal flap with an envelope design was made on the labial teeth 12-22. Then, the flap was dissected with a rasparatorium. The labial bone of tooth 21 was reduced using a bone drill until it reached the apex of tooth 21. After the periapical cyst was visible, enucleation was performed using a curette until the entire cyst was removed. The removed cyst tissue was kept in 10% formalin for examination in the anatomical pathology department.

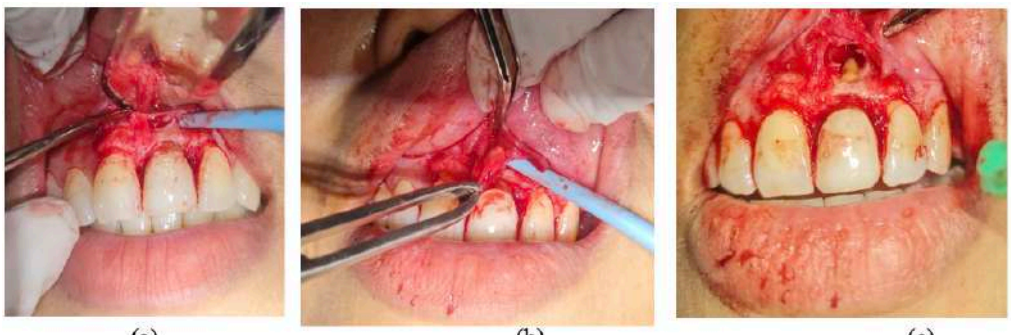

Figure 2. (a) creation and dissection of the flap envelope (b) enucleation of the periapical cyst 21 (c) bone defect due to radicular cyst

Apicoectomy was performed by resecting ± 3 mm from the apical at an angle of 45o. Cavity preparation was continued using a micro round bur with a depth of ± 3 mm. Then, obturation is retrograded by applying Mineral Trioxide Aggregate (MTA). After retrograde obturation, the bone defect caused by a cyst is carried out with a 0.5 g bone graft to speed up the bone regeneration process in the periapical area. After the entire process had been carried out, the surgical area was debridement, and the flap was repositioned and sutured. Patients were followed up for one week and three months after apicoectomy. The patient had no complaints, and no recurrence occurred after the procedure.

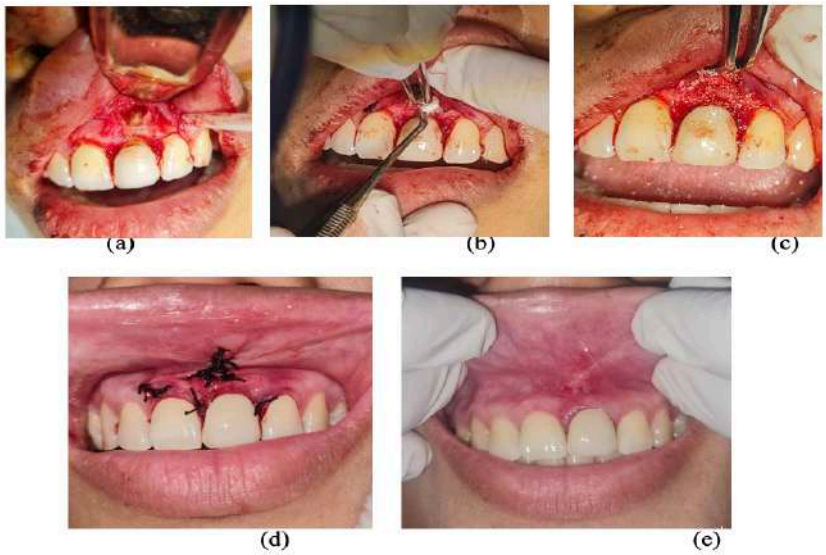

Figure 3 (a) Apicoectomy, (b) MTA application, (c) Bone graft application (d) one week follow up (e) three months follow up

Discussion

Radicular cysts are closely related to non-vital teeth, either due to caries or trauma to the tooth. This condition results in inflammatory tissue in the periapical area, resulting in bone resorption and granulation tissue formation. [5,6] The epithelial lining that forms from radicular cysts is thought to develop due to the proliferation of residual Malassez epithelium trapped within inflamed granulation tissue. Histologically, radicular cysts appear as squamous cyst lumens lined with epithelium surrounded by inflamed fibrous.[5,6]

Various treatments can be used to remove radicular cysts, including enucleation, marsupialization, or a combination of both. There are various considerations in managing radicular cysts depending on lesion size, age, and the patient's oral hygiene condition and mental health.[6,7] Apicoectomy is an alternative form of treatment for radicular cysts. Apicoectomy is a combination treatment of conventional treatment and surgery. Apicoectomy is a treatment procedure to preserve existing teeth by removing periapical lesions by cutting the infected apical root of the tooth, followed by retrograde filling to close the apical part. This procedure will be successful if the tooth root canal is filled hermetically.[4,5,7]

Endodontic surgery is an alternative option to avoid tooth loss, especially anterior teeth accompanied by lesions in the periapical tissue. The success of endodontic surgical treatment is quite high, in the range of 70-90% of all endodontic cases.[1,2,5] Generally, apicoectomy is performed on teeth with a single root. Several alternative flap designs that can be used for apicoectomy include envelope, triangular, trapezoid, and semilunar. The selection of flaps is carried out with various considerations, considering the need for access to lesions in the periapical area. After achieving periapical access, curettage and enucleation are performed to remove the cystic lesion in the area. Enucleation can remove inflammatory tissue in the periapical area, which hinders the healing process due to insufficient blood supply. The enucleation action aims to remove inflammatory tissue, which increases blood

supply and helps the healing and regeneration process of bone in the apical area. [2,6,7]

Apicoectomy is performed after enucleation and curettage of the periapical area. Apicoectomy is performed by apical resection at an angle of 45-90^{O} from the apical slope of the tooth. Cavity preparation is carried out to perform retrograde obturation. Endodontic apicoectomy surgery has a significantly higher success rate when retrograde obturation is performed. Retrograde obturation causes a decrease in the number of canal gaps so that the apical seal becomes better. [7,8]

The retrograde filler material, in this case, is Mineral Trioxide Aggregate (MTA). MTA can adapt well to tooth structure, is alkaline, and can adapt to tooth periapical tissue. MTA contains heavy metals such as Cu, Mn, and Sr, which can reduce inflammatory and allergic reactions in the body. MTA can adapt to humid conditions, so it is appropriate to carry out retrograde obturation after enucleation and apicoectomy.[8] The use of bone graft after apicoectomy aims to speed up the regeneration process of bone defects caused by periapical abnormalities, one of which is a radicular cyst.[9] Cyst enucleation, along with apicoectomy with retrograde obturation, provides a good prognosis in this case.

Conclusion

The combination of enucleation and apicoectomy is an alternative treatments to eliminating periapical abnormalities that can be performed to preserve existing teeth. Retrograde filling using MTA can prevent recurrence due to reducing the canal gap and apical seal, which is a good prognosis.

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