"Case Report"

Extraction Management of Gangrene Radix with Radicular Cyst

Widia Firgina¹, Erwin Setyawan²

¹ Student, Faculty of Dentistry, Universitas Muhammadiyah Yogyakarta, Yogyakarta, Indonesia
² Lecture, Faculty of Dentistry, Universitas Muhammadiyah Yogyakarta, Indonesia

* Corresponding author, e-mail: widya1810@gmail.com

Abstract

Introduction: Radicular cysts are the most common type of cyst found in the teeth and mouth are associated with pulp necrosis and tooth root canal infections. Treatment that can be done for radicular cysts consists of surgical and non-surgical treatments, treatments such as tooth extraction. This case report describes the results of managing tooth root extraction with a radicular cyst. Case Report: A 22-year-old woman complained that her lower right back tooth had root residue. Objective examination revealed that her two roots remain, mesial and distal to tooth 46. Percussion (-) and palpation (+) revealed an asymptomatic, firm consistency, nodular lesion 1 cm in size. Radiographic examination showed a radiolucent area on tooth 46 with a clear and firm base in the shape of a semicircle measuring ± 1 cm. Case management: The tooth was extracted using a technique called infiltration anesthesia. Conclusion: Establishing a good and correct diagnosis in cases of radicular cysts can provide appropriate treatment for patients by knowing the characteristics of the lesion. Tooth extraction with optimal elimination of infected tissue is one of the treatments that can be carried out in radicular cysts.

Keywords: Radicular Cyst, Gangrene Radix, Tooth Extraction

INTRODUCTION

Radicular cysts are the type of cyst most often found in the teeth and mouth, which are associated with pulp necrosis and tooth root canal infections. Radicular cysts are closely related to the formation of caries with expanded cavities, pulp necrosis, infection of the root canal, and remaining tooth roots.¹ Another study states that radicular cysts occur due to chronic apical periodontitis as a result of root canal infection and pulp necrosis. Inflammatory cells in unremitting apical periodontitis will discharge cytokines and development components that can initiate the expansion of the remaining Malassez epithelium. P. Polyferation of the remaining Malassez epithelium causes the formation of a radicular cyst.²

Cysts that grow on the jaw generally have painless, asymptomatic, and slow lesion growth, except for lesions that are already infected.³⁴ Chronic cysts or long-standing infections can cause acute exacerbation of cysts accompanied by swelling, pain, and pus discharge. Clinical signs found in the maxilla were amplification of the buccal and palatal cortical plates, while in the mandible, there was enlargement of the buccal and rarely lingual cortical plates.³⁵ Radicular cysts tend to have slowed growth. The supporting tissue and size of the lesion can also influence cyst growth. Radicular cysts can cause mobility and detachment of teeth, paresthesia, root resorption, and tooth displacement or migration.⁶ The radiographic appearance is that there is a round or oval unilocular radiolucent with a radiopaque sclerotic border within the periapical area of the infected tooth.³⁵

Treatment that can be done for radicular cysts consists of surgical and non-surgical treatments. Several studies suggest that to treat radicular cysts, complete enucleation should be done through a surgical process to remove all remaining epithelium.⁵ Moreover, endodontic treatment, marsupillation by enucleation, and tooth extraction can be carried out.⁷ This case report aims to describe the results of treatment—removal of the remaining roots of teeth with radicular cysts.
CASE REPORT

A 22-year-old female patient came to the Oral Surgery and Emergency (OSnE) education clinic at RSGM UMY complaining that her lower right back tooth had remaining roots. This complaint has been felt since four years ago. In the past, the tooth hurt and was treated with painkillers (Cataflam) bought at the pharmacy. A dentist has never examined this complaint. Currently, the tooth never hurts again. However, these teeth are often annoying because they often carry food. Patients brush their teeth twice daily when showering in the morning and before bed. Patients usually only bite with one side, namely the right side, because the left tooth has a cavity. The patient likes to eat sweet foods and drinks. The patient has no history of systemic disease and does not have any allergies. The patient's mother has a history of Diabetes Mellitus. The patient's father is unlikely to have a history of systemic disease.

Objective examination showed two remaining tooth roots on the mesial and distal parts of tooth 46. By percussion (-) and palpation (+), there was a nodular lesion with a solid consistency measuring 1 cm asymptomatic. Medication before the procedure was not performed. The patient's OHI is 3, which is in the moderate category. The results of the vital sign examination include blood pressure with results of 99/70 mmHg, pulse 79x/minute, respiration 19x/minute, and temperature 36,5°C. Based on these results, it was found that the patient's vital signs were in the normal category, so extraction could be carried out. (Figure 1).

Radiographic examination was carried out by periapical radiograph, with the results of the interpretation in Figure 2 showing that there was an abnormality in tooth 46, namely that there were two visible roots that had shifted mesially, there was a broken lamina dura in the apical 1/3 with the periodontal ligament missing in the apical 1/3, there was The alveolar crest is within normal limits, and the apical radiolucent is ovoid with clear and firm boundaries with a diameter of ± 1 cm. (Figure 2)

The diagnosis obtained from subjective, objective, and radiographic examinations showed that there were radixes in 46 patients' teeth accompanied by radicular cysts. The treatment will be carried out to extract tooth 46 using the infiltration anaesthesia technique.

CASE MANAGEMENT

The treatment stages in this case are providing communication to the patient in the form of an explanation of the cause of the complaint experienced, the factors that influence the complaint, the treatment to be carried out, post-treatment complications, and filling out an informed consent form. Perform anaesthesia and extraction on tooth 46. The treatment plan procedure is expected to let the patient know how the treatment will proceed.

The stages of treatment for the patient began on October 15, 2022, to carry out extraction of tooth 46 using infiltration anaesthesia technique, after the patient agreed to the action through approved
informed consent. Treatment starts with operator preparation, patient preparation, and preparation of tools and materials used during the treatment. Instruct the patient to sit on the dental unit, gargle with 1% povidone-iodine solution, and use a poly bib. The operator adjusts the work area at 11 o'clock. Asepsis the work area by applying povidone-iodine using a cotton ball and tweezers. The operator applies topical anaesthesia in the form of benzocaine around the work area using a cotton ball with tweezers. The operator performs infiltration anesthesia in the mucobuccal folds in the buccal and lingual areas near the root of tooth 46 with aspiration first. If the results are negative, deposit one cc of solution on each side. Check the effect of the anesthetic after waiting 2-3 minutes by pressing the gingiva in the left region and comparing it with the gingiva of tooth 46. The anaesthesia penetrates well if there is a difference in numbness between the area of the tooth that is anesthetized and not.

Soft tissue separation using an excavator around the root of tooth 46. The operator uses a bein to leverage the tooth until the tooth feels pried, followed by posterior mandibular adult root molar forceps. Fixation is carried out during extraction using the index finger and thumb, then moved lingually and buccally, then removed and pulled buccally (Figure 3).

Figure 3. Photo of Tooth 46 after extraction

Check the socket in the area of tooth 46 that has been removed (Figure 4). Check the socket to see if there is still any remaining root or granulation tissue. If there is, curettage is carried out to clean the tissue in the area of the radicular cyst, especially in the buccal part. If sharp or rough bones exist, smooth them with a bone file. Irrigation of tooth socket 46 using an irrigation syringe containing povidone iodine and saline. Control bleeding using a cotton roll, wait 5 minutes. Apply spongostan to the socket. Instruct the patient to use a cotton ball moistened with povidone iodine.

Figure 4. Clinical appearance of tooth socket 46 after extraction

The operator gives DHE to the patient by giving post-extraction instructions to the patient to keep biting the cotton for 30-45 minutes. If the bleeding has stopped or the cotton roll is full of fluid, it can be replaced. Instruct patients who do excessive things such as extractions, change the cotton swab if the cotton is full of blood and saliva, avoid excessive oral activity such as sucking on the post-extraction area, gargling too hard, and not playing with the extraction area with the tongue. Avoid hot drinks and hot food for 1 x 24 hours, take medication that has been prescribed according to the instructions for use, if there are complaints such as severe pain and bleeding that doesn't stop, please contact the operator immediately. Instruct the patient to compress the extraction area with ice water or drink a cold drink to help the bleeding process stop quickly. The patient was prescribed medication such as 10 tablets of mefenamic acid 500 mg tablets, which were taken only when he felt sick and continued taking the antibiotic Amoxicillin 500 mg tablets until they were
finished. Patients are asked to check again 1 week after tooth extraction. Post-extraction control was carried out on November 5, 2022. The patient came for control 3 weeks after the treatment was carried out. The patient did not complain of pain and had no other complaints. The patient took antibitox medication 3 times a day for 5 days and did not take painkillers because the patient did not feel pain. Objective examination showed an edentulous area on tooth 46, the condition of the gingiva had improved, the extraction scar had closed, and there was no gingival bleeding (Figure 5).

![Figure 5. Clinical appearance during control](image)

**DISCUSSION**

Radicular cysts are the type of cyst most often found in the teeth and mouth associated with pulp necrosis and tooth root canal infections. Radicular cysts are closely related to the formation of caries with expanded cavities, pulp necrosis, infection of the root canal, and remaining tooth roots. In this case there were two remaining roots when percussed. Another study states that radicular cysts occur due to chronic apical periodontitis resulting from root canal infection and pulp necrosis. Inflammatory cells in unremitting apical periodontitis will discharge cytokines and development components that can initiate the expansion of the remaining Malassez epithelium. P. Polyferation of the remaining Malassez epithelium causes the formation of a radicular cyst.

Cysts that grow on the jaw generally have the characteristics of being painless, asymptomatic, slow growth of lesions, except for lesions that are already infected. Chronic cysts or infections that have been going on for a long time can cause acute exacerbations of cysts accompanied by swelling, pain and pus discharge. Clinical signs found in the maxilla were amplification of the buccal and palatal cortical plates, while in the mandible there was enlargement of the buccal and rarely lingual cortical plates. In this case, the gingiva was found to feel solid/dense when palpated, round in shape with a diameter of ± 1 cm. The patient stated that he currently does not complain of pain. The patient also does not feel pain when percussed/palpated.

The growth and development of radicular cysts tends to slow in growth, supporting tissue and the size of the lesion can also influence cyst growth. Radicular cysts can cause tooth mobility and mobility, paresthesia, root resorption, and tooth displacement or migration. Enlargement of radicular cysts can involve the symmetrical dimensions of the face. Lesions that are not treated immediately will damage the supporting tissue of the teeth and even cause facial deformities.

The radiographic appearance of a radicular cyst is a round or oval unilocular radiolucent with a radiopaque sclerotic border in the periapical area of the infected tooth. The borders of the lesion are radiopaque, clear, but sometimes unclear due to infection and rapid growth. The size varies and surrounds the apex of the tooth. In this case, a radiolucent image was seen in tooth 46 accompanied by bone that had undergone resorption.

The pathophysiology of radicular cyst formation consists of three phases: initiation, cyst formation, and enlargement. In the first phase, inflammation occurs so that the Malassez epithelial cells proliferate, then are modified by bacterial antigens, epidermal growth factors, metabolic and cellular mediators. Lesions appear with prostaglandin (PG), interleukin-1 (IL-1), IL-3, IL-4, IL-6, interferon (IFN), tumor necrosis factor-alpha (TNF-α), and
transforming growth factor- alpha (TGF-α) and chemokines - RANTES, IP-10, and MCP-1 as chemical mediators for epithelial proliferation. In the second phase, cyst formation occurs, a cavity lined by epithelial cells. In the third phase, cysts form due to osmosis. The growth and expansion of cysts is due to the release of histamine, hydrolytic enzymes (matrix metalloproteinase) and bone-resorbing factors. Continuous activation of inflammatory mediators has resulted in the expansion of the lesion to enlargement. 11,12

Nearly all radicular cysts are lined by non-keratinized squamous depithelial cells. The epithelial lining can develop with severe inflammation and consists of polymorphonuclear lymphocytes. 10 Classification of radicular cysts based on the relationship between the apical foramen and the root canal is divided into trus cysts and bay cysts. Ture cysts are formed from encapsulated lesions with a central lumen not connected to the apical foramen. Ture cyst is considered an independent lesion. The lumen can enter through the apical foramen to the main part of the epithelium. Bay cyst is an epithelial-lined inflammatory lesion with the central surface of the lumen in direct contact with the apical foramen. Bay cyst formation begins with bubbles, then a capsule collar forms around the roots. 12

The choice of treatment in cases of radicular cysts is influenced by several factors such as the location of the cyst, the integrity of the cyst wall that forms, the size of the cyst, and the distance of the cyst to vital tissue in the body. 10 Treatment that can be done for radicular cysts consists of surgical treatment (surgical) and without surgery (non-surgical). Several studies suggest that it is best to carry out thorough enucleation through a surgical process to remove all remaining epithelium for treating radicular cysts. 5 In addition, endodontic treatment, marsupilation accompanied by enucleation can be carried out if the lesion is large and closer to vital tissue, decompression, and tooth extraction. 7 In this case, tooth 46 was extracted using infiltration anesthesia technique, then curettage was carried out on the socket wall to clean the entire surface from granulation tissue. The differential diagnosis for radicular cysts is periapical granuloma, odontogenic cysts or tumors, such as odontogenic keratocyst and lateral periodontal cyst, non-odontogenic lesions such as solitary bone cysts, nasopalatine duct cyst, and periapical cementosseous dysplasia. 12

CONCLUSION
Building up a great and rectify conclusion in cases of radicular cysts can provide appropriate management for patients by knowing the characteristics of the lesion. Supporting examinations are needed to help treat radicular cyst lesions. Tooth extraction with optimal elimination of infected tissue is one of the treatments that can be carried out in radicular cysts.

REFERENCE
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