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Editor: Dr. Yuniardini S. Wimardhani, drg, MSc.Dent
Nadhia Anindhita Harsas, drg, SpPerio
Andini Tri Wijayati, drg
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MANAGEMENT OF RADICULAR CYST IN THE MAXILLA WITH SURGICAL ENUCLEATION: A CASE REPORT

M Ramaditto R¹, Vera Julia², Benny S Latief²

¹Oral and Maxillofacial Surgery Residency Program, Faculty of Dentistry, University of Indonesia, Jakarta, Indonesia
²Department of Oral and Maxillofacial Surgery, Faculty of Dentistry, University of Indonesia, Jakarta, Indonesia
Corresponding e-mail to: ramaditto@gmail.com

ABSTRACT

Background: Radicular cysts are the most common cystic lesions in the jaw, it is comprises about 52% to 68% of the entire cyst which affect the jaw. They are generally asymptomatic and were diagnosed during routine radiologic examination. These cysts associated with non-vital teeth and most common in maxillary lateral incisor teeth. The treatment of radicular cysts includes nonsurgical with root canal therapy when lesion is localized or surgical treatment like enucleation for a large lesion. Objectives: To report a case management of radicular cyst in the maxilla with a surgical enucleation. Case Report: Female patient, 20 years old, came to oral and maxillofacial surgery division of Jakarta Hospital with chief complaint of swelling at the anterior upper jaw. Intraoral clinical examination revealed swelling at the labial mucosa region 21-24. On panoramic radiograph showed periapical radiolucency associated with teeth 21-24. The patient was treated first with root canal therapy and followed by surgical enucleation under general anesthesia 5 days after. Conclusion: One of the surgical approach to radicular cyst is enucleation. Depending on size and extent of lesion, a surgical enucleation is necessary for achieving optimal treatment and prevent recurrence.

Key words: radicular cyst, maxilla, enucleation

INTRODUCTION

A cyst is generally defined as an epithelium-lined sac filled with fluid or soft material which has a centrifugal, expansive mode of growth. According to WHO, cysts of the jaws can be
divided into developmental and inflammatory cyst.\textsuperscript{1,2} Radicular cyst are the most common inflammatory cysts.\textsuperscript{3-5}

Radicular cyst are the most common cystic lesions in the jaw, it is comprises about 52\% to 68\% of the entire cyst which affect the jaw. Radicular cysts occurs in all tooth-bearing areas of the jaws and about 60\% are found in the maxilla and 40\% in the mandible. There is a particularly high frequency in the maxillary anterior region especially in maxillary lateral incisor teeth. Radicular cysts are uncommon in children, and become more frequent in adolescents but are most often seen in adults. Based on gender, radicular cyst are found more in men rather than women (Jones \textit{et al.}, 2006).\textsuperscript{1,3,4,6,10}

It is possible that some individuals may have a genetic tendency to develop radicular cysts. Radicular cysts generally originate after trauma or dental caries. Dental caries can cause inflammation of the pulp cavity which leads to pulp necrosis. The infection then spreads to the tooth apex of the root, causing periapical periodontitis, which can leads to chronic granuloma. Inflammation seems to play a major role in those cysts arising in granulomas from infected dental pulps. Persistent chronic infection can lead to formation of a radicular cyst. They are most commonly found at the apices of the involved tooth. The cyst usually arises from epithelial remnants stimulated to proliferate by an inflammatory process originating from pulpal necrosis of a non-vital tooth. Chronic inflammation of this tissue initially stimulates the cell rests of Malassez, resulting in epithelial proliferation. This initiation phase is then followed by a phase of cyst development, followed by cyst growth. Radicular cysts are fluid-filled lesions that expand in the jaw by osmotic pressure and cytokines cause local resorption of bone. Enlargement of cysts is caused by a gradual expansion.\textsuperscript{1,3,4,10}

Radicular cyst are generally asymptomatic and presented as slow-growing, painless swellings associated with a non-vital or root-treated tooth. In the maxilla there may be buccal or palatal enlargement. At first the enlargement may felt like bony hard but as the cyst increases in size, the swelling then exhibits ‘springiness’ or ‘egg shell crackling’. When the cyst has completely eroded the bone, the lesion usually will be fluctuant. On palpation with firm pressure we may feel a characteristic rebound resiliency.\textsuperscript{1,3,4,10}
Radicular cyst are usually were diagnosed during routine radiologic examination. The radiographic usually features a smooth, rounded or ovoid radiolucencies surrounded by a narrow radiopaque margin which extends from the lamina dura of the involved tooth.\textsuperscript{1,3,4,10} The treatment of radicular cysts includes conservative treatment with root canal therapy when lesion is localized or surgical treatment like enucleation for a large lesion. Enucleation is defined as a complete removal of the cystic lining with healing by primary intention. Although small cystic lesions frequently heal simply with endodontic therapy, larger lesions may need additional treatment such as enucleation. Untreated cysts may expand causing local tissue destruction and deformities.\textsuperscript{1,3,9,10}

**OBJECTIVES**

The purpose of this paper is to report a case management of radicular cyst in the maxilla with a surgical enucleation.

**CASE REPORT**

Female patient, 20 years old, came to oral and maxillofacial surgery division of Jakarta Hospital with chief complaint of an asymptomatic swelling at the anterior upper jaw since 5 years ago. 5 years before admission, patient felt swelling at anterior left maxilla. She never recognized the initial size of the swelling, she was found out when she felt the swelling was getting bigger. The swelling was growing slowly. History of toothache, trauma, fever, pain and pus discharge was denied by the patient. The patient had history of gastric pain. The patient’s previous illness such as allergy, heart disease, hypertension, diabetes mellitus, were denied.

From the physical examination, extraoral clinical examination showed a facial asymmetry. From the intraoral clinical examination revealed a well defined fluctuant swelling at the labial mucosa of maxillary anterior region with smooth surface, extending from region 21-24. The swelling colour was same as surrounding tissues, had cystic consistency and no tenderness. Pulp vitality testing showed negative responses only in 21 tooth.

On panoramic radiograph showed a large unilocular radiolucent lesion which involved periapical regions associated with teeth 21-24 (Figure 1). From history, clinical and radiograph examination, a provisional diagnosis of radicular cyst was made and a surgical enucleation was
planned under general anesthesia. The patient was explained the line of treatment and an informed consent was taken. She was treated first with root canal therapy on 21-24 by an endodontist (Figure 1) and followed by surgical enucleation 5 days after it was finished.

**Figure 1.** Panoramic radiograph shows a unilocular round radiolucent (red circle) at the apex teeth 21-24 which already had endodontic treatment.

The patient was on supine position under general anesthesia. Vasoconstrictor was infiltrated from region 11-24. A vertical incision from bucco-distal 11 was made and extending along the crevicular incision until region 24. A full thickness mucoperiosteal flap was reflected (Figure 2a) and the cystic site was exposed, which showed a large bony defect filled with the cyst (Figure 2b).

**Figure 2.** a) Full thickness mucoperiosteal flap reflected, b) exposed cyst lesion site

Careful removal of bone defect overlying the cyst was done with surgical blade. The cyst line border were peeled off carefully layer by layer by currette and surgical round burs with sterile
saline irrigation due to separate the cyst line border from the bone. A plastic filling instrument was also used to separate the cyst lining border from the bone (Figure 3).

**Figure 3.** Separating the cyst lining border from the bone.

It had to be done so we can identified and exposed the cyst lesion more clearly (Figure 4).

**Figure 4.** Radicular cyst.

Enucleation cyst was carried out with rasparatorium and a gauge (Figure 5a). The lesion was curetted in toto. The cyst was then separated from the surrounding bone and enucleated in total (Figure 5b).
Apex resection was performed 2-3 mm above the periapical region of the root canal treated teeth. (Figure. 6).

The cut was made using a straight fissure bur in a low-speed handpiece. The gutta-percha at the exposed root apex then was burnished with cauter. The bone cavity was irrigated with sterile saline solution and gently dried with moist kemicetine and iodine gauge. Careful clinical examination of the area was done to ensure no residual lesion tissue was left behind (Figure. 7).
Figure 7. Clinical presentation of the maxilla after the cyst was enucleated.

The enucleated cystic sac was submitted for histopathological examination (Figure 8).

Figure 8. Cyst lesion specimen.

The flap was repositioned and was sutured using 4-0 silk with interdental matrasses and interrupted sutures (Figure 9a). The wound was closed primarily (Figure 9b).

Figure 9. a) reposition the flap with interdental matrasses suture, b) the wound was closed primarily.
The patient was given post operative instruction. Antibiotics, analgesics were prescribed. On the follow up day 1, 3 and 5, the patient showed a reduced swelling on the cyst site. On the 7th post operative day, healing of covering mucosa was observed and the sutures were removed and the patient was asymptomatic. Histopathological report confirmed the provisional diagnosis of a radicular cyst.

**DISCUSSION**

Radicular cyst is the most common cystic lesion which affects the jaw. It usually occurs more in the maxillary anterior region. In the current case, the teeth involved with the cyst apparently from region 21. In some cases, individual genetic can play a part in causing radicular cyst but generally it originates from dental caries or trauma.³

In the current case, no history of dental caries was found in the involved teeth. The patient also claimed no history of trauma on the involved teeth but it could be the probable etiology. If the cyst caused by dental caries, usually the patient at least had a history of pain in the teeth before it leading to pulp necrosis. When it comes from trauma, pulp necrosis could happen without any pain symptom.¹¹

The cyst usually arises following the development of periapical granuloma from the necrotic remnants of the dental pulp. This condition can stimulate the cell rests of Malassez, resulting in epithelial proliferation. This initiation phase is then followed by a phase of cyst development, followed by cyst growth and enlargement of the cyst. Although the enlargement of the cyst in the maxilla can cause buccal enlargement, it usually presents as a painless swelling. In the current case, the patient seemed to be asymptomatic from the start she felt the swelling.¹,³

Due to a large lesion in the current case, a surgical enucleation is an option to eliminate the cyst. Enucleation of cysts should be performed with care in an attempt to remove the cyst in one piece without fragmentation, which reduces the chances of recurrence by increasing the likelihood of total removal.¹

Before the surgical procedure was performed, the non vital teeth causing the cyst which in this case is 21 was treated first with root canal treatment by an endodontist. The purpose of this treatment is to eliminate the necrotic remnants or other contaminants from the root canal. The
teeth in region 22-24 was also treated with root canal treatment because the apical third of the related tooth was affected by the cyst lesion which it showed on panoramic radiograph.\textsuperscript{11}

Enucleation was performed under general anesthesia 5 days after the endodontic treatment finished. In the current case, the cyst lesion is large and wide exposure is necessary to allow complete access to the bony cavity. With large cysts, a mucoperiosteal flap may be reflected and access to the cyst obtained through the labial plate of bone, which leaves the alveolar crest intact to ensure adequate bone height after healing. A surgical blade or thin-bladed curette is a suitable instrument for cleaving the connective tissue layer of the cystic wall from the bony cavity. The concave surface should always be kept facing the bony cavity and the edge of the convex surface can be used for stripping of the cyst. Care must be exercised to avoid tearing the cyst fragment for allowing the cystic contents to escape because margins of the cyst are easier to define if the cystic wall is intact.\textsuperscript{3}

After the cyst has been enucleated and removed, the bony cavity is inspected for proximity to adjacent structures. Irrigating and drying the cavity with gauze aids in visualizing the entire bone cavity. The sharp bone edges of the defect should be smoothed before closure. A sharp curette or a bone bur with sterile irrigation can be used to remove a 1-2 mm layer of bone around the complete periphery of the cystic cavity. This should be done with extreme care when working proximal to important anatomic structures. This is done to remove any remaining epithelial cells that may be present in the periphery of the cystic wall or bony cavity. These cells could proliferate into a recurrence of the cyst.\textsuperscript{3}

In the current case, apical resection of 21 tooth was performed. It is generally accepted that an apical resection of 3 mm of the involved tooth will remove the potential problem areas of recontamination and maintained inflammation. The angle of resection should be as close to horizontal as possible. This exposes a minimal number of dentine tubules, thereby reducing apical leakage and providing the best potential for healing. But root resection angle at 30-45° can be the best option for best visualization of the apex for the surgeon. In the current case a beveled 30-45° cut was made. Cross-cut fissure and diamond burs tend to create a rough surface that may harbor debris, particularly remnants of the root filling material, thereby impairing healing. Conventional air rotor drills must be avoided in this surgical procedures so as to reduce the possibility of producing emphysema. After apical resection was performed, the gutta-
percha at the exposed root apex then was burnished with cauter to remove any remaining epithelial cells from the cyst wall that may be present in the root end and also can act as a sealer.\textsuperscript{1,3,6}

A watertight primary closure then should be obtained with appropriately positioned sutures which in this case using interdental matrasses sutures. The bony cavity fills with a blood clot, which then organizes over time. The involved teeth was not extracted because the cyst only affected not more than apical third of the apex.

CONCLUSION
One of the surgical approach to radicular cyst is enucleation. Depending on size and extent of lesion, a surgical enucleation is necessary for achieving optimal treatment and prevent recurrence.

REFERENCES
