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Radicular Cysts

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Abstract Radicular cyst is the most common inflammatory jaw cystic lesion that occurs in necrotic pulp of a nonvital tooth. This account for more than 50% of all odontogenic cysts.
Radicular cyst are generally asymptomatic and diagnosed during routine radiologic investigations. Enucleating the cyst with or without endodontic therapy of the affected tooth is recommended as the primary treatment when lesion is small size.

Keywords: Radicular cyst, Enucleation, trauma, orthodontic force.

Introduction

A cyst is a pathological cavity usually lined by epithelium, filled with fluid or semi fluid material, but not pus.[1]
According to the World Health Organization, cysts in the jawbone can be classified as developmental, neoplastic, and of inflammatory origin.[2,.3]
Radicular cyst is of an inflammatory origin and is believed to be formed by inflammatory proliferation of epithelial cell rests of Malassez in the periapical area of a tooth having an infected necrotic pulp.[4]
Radicular cysts are the most common type of all jawbone cysts and comprise about 52-68% of all the cysts affecting the jawbone.[5,6]
Among the cysts affecting the jaws, about 65-70% are radicular cysts at the apex of the involved teeth.[7]
The common area where radicular cyst are found, are the anterior region of the maxilla and premolar region of the mandible than other parts of the jaw bone [8].
The treatment options for radicular cyst can be conventional nonsurgical root canal therapy when lesion is localized, or surgical treatment such as enucleation, marsupialization, or decompression when the lesion is large.[9]
The application of collagen fleece to fill the bone cavity is one of the generally recognized methods for local promotion of coagulation and hemorrhage prophylaxis and therapy.[10] Thus collagen can contribute to a fast stabilization of the wound area.

Case report 1:

A 45-year-old female patient visited the Department of Oral Surgery, University of Sebha, Libya with chief complain of yellowish discoloration in gum and slight swelling in the periapical area of 31 teeth.
On intraoral examination, the lesion was around 1.5 cm × 2.5 cm, soft to firm in consistency, and the swelling grew slowly without pain and discharge. The mucosa overlying the swelling is yellow in color.
There was no mobility of the involved tooth and tooth was tilled lingually. (Fig. 1.1).
Thermal pulp vitality testing showed a negative response in 31, and had a 10 year- orthodontic history.
Radiographic examination revealed solitary unilocular well defined round radiolucency associated with the root apex of 31. (Fig. 1.2).
A corticated margin is continuous with the lamina dura of the root of the tooth. The appearances is similar to those of an apical granuloma, but lesions with a diameter about 2.5 cm are more likely to be a cyst.
The treatment plan for this patient was of two phases; Endodontic phase and surgical phase.
Root canal opening was performed after working length and obturation canal by root filling material was determined. (Fig. 1.3).
The next step was surgical procedure, which included surgical enucleation of cyst, apicoectomy and curette of bone of surrounded the involved tooth. After local anaesthesia was administrated, access for apical surgery was gained via a three-sided mucoperiosteal flap (Luebeke Ochenbein flap (Fig. 1.4).
This type of incision is superior to envelope and triangular flap as it avoids involvement of the gingival margin, which is important where the tooth is restored with a crown, and offer adequate access when compared with envelope flap. Incision was made in labial region 31,32,41 and 42.
A full thickness mucoperiosteal flap was reflected (Fig. 1.4).
Bone was removed with a rose head bur over the tooth root apex.
Cyst lining was excavated, and then curettage was done. Complete curettage along with granulation tissue removal and enucleation of cystic lesion was done, and a Specimen was sent for histopathological evaluation.
Following irrigation of the surgical site, an absorbable wound inlay (Parasorb Fleece) haemostatic agent was placed in the cystic cavity. (Fig, 1.5). Flap was secured in position with sutures 3-0 silk sutures. (Fig. 1.6).
Post-operative instructions were given as well as prescribing antibiotics and anti-inflammatory drugs.
The patient was recalled after 1 week for suture removal. Currently, she is under follow-up every 6 month. (Fig. 1.7).

Histopathology report:

The section showed multiple small fragment of tissue revealed focus of squamous epithelial lining with connective tissue wall contain chronic inflammatory cell infiltrate, cholesterol clefts with dystrophic calcification.

Diagnosis showed radicular cyst.

Case report 2:
A 45-year-old male patient visited the Department of Oral Surgery, University of Sebha, Libya, with chief complain of massive buccal swelling from right canine side to left lateral incisor.
It was a large soft red swelling, fluent, edematous. All signs and symptoms were indicative of odontogenic infection.
Stab incision was done, drainage pus were made. Rubber drainage was put in the wound site, and antibiotic and analgesis were administrated. (Fig. 2.1).
After two weeks, the patient came back to the clinic and he had the same signs and symptoms before surgical incision.
Panoramic radiographic reveled large unilocular radiolucent extended from 13 to 22.(Fig. 2.2).
Trapezoid flap was done from 14 to 23. A full thickness flap reflected mucous tissue (Fig. 2.3). Cortical buccal wall was resorbed (Fig. 2.4), and cysts wall was removed by mucoperiosteal elevator, (Fig. 2.5) and sent to histopathology laboratory for diagnosis. (Fig. 2.6).
The flap was closed by 4-0 suture (Fig. 2.7) and antibiotic and analgesic were prescribed.

Histopathology report:
Section showed cystic lesion lined by squamous epithelium with focal surface ulceration and underlying mixed chronic inflammatory cells infiltrates. There was no evidence of dysplasia nor of malignancy**.**

The final diagnosis indicated "Radicular cyst".

Discussion:
The term, 'cyst' is derived from the Greek word, 'Kystis', meaning, 'sac or bladder'.[11]
Cyst is defined as a pathological cavity that is usually lined by epithelium and which has a centrifugal, expansive mode of growth.[12]
It is also known as periapical cyst, periodontal cyst, root end cyst or dental cyst. It originates from epithelial cell rests of malassez in periodontal ligament as a result of inflammation due to pulp necrosis or trauma.[13]
In first case, trauma happened due to orthodontic treatment ten years ago. Orthodontic force is called controlled trauma.[14] Orthodontic patients may suffer from transient pulp ischaemia, causing pain and discomfort in the first few days after adjustment of an appliance. This usually settles within a week, although pulp death/necrosis following Orthodontic treatment is occasionally reported,[15] when appropriate forces are used.

Case 1:

Fig. 1.1: Perioperative photo for lesion 31.

In the first case, there was no pain or symptoms, so almost all radicular cysts are symptomless and are discovered accidentally when periapical radiographs are taken of nonvital teeth.

In the second case, the patient had history of swelling in buccal mucosa due to trauma. By time, the cyst growth slowly progressed, with no symptoms. But, if there is an infection, the swelling becomes painful and rapidly expand due to inflammation oedema.[16]
In both cases, other signs and symptoms were observed, such as discoloration of tooth, tooth mobility and displacement of tooth.[17,18]
Both cases were diagnosed through clinical and radiographic examination, periapical or panoramic radiograph.
A panoramic radiograph is the standard examination for detecting mandibular bone lesions, including radicular cyst.[19]
Radiographically, most radicular cyst appear as round or pear shaped radiolucent lesion in the periapical region.[20]
Clinical findings which could support radicular cyst are non-vital teeth, buccal cortex expansion of the lesion, and absence of pain. A definitive diagnosis is established through histopathologic examination.
The choice of treatment depends on some factors, such as extension of the lesion, relation with noble structures, and the size and localization of the lesion.[21]
The first case was treated by conventional nonsurgical root canal therapy with enucleation methods to make sure that all cystic tissues in the periapical area were removed.
It is better to use "Parasorb Fleece" to fill bone cavity to enhance bone regeneration.[10]
The second case was not treated early due to misdiagnosis, so an untreated cyst caused expansion of the overlying bone. A cortical plate that has been thinned extensively may be present with crepitus on palpation.[22]
Enucleation was used in treatment. Enucleation is defined as complete removal of the cystic lining with healing by primary intention.[23,24]
Histopathological examination was made in both cases. The common features of radicular cysts are lined by nonkeratinized stratified squamous epithelium and inflammatory cells were found as well.[25]

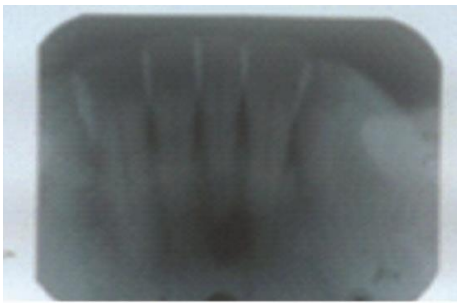

Fig. 1.2: Periapical view radiograph showing radiolucency involving apex of 31.

Fig. 1.3: Endodontic treatment of 31.

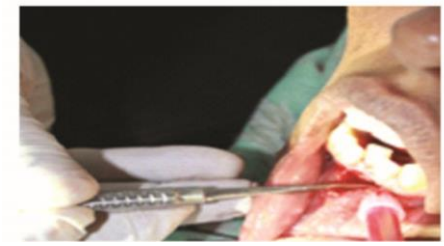

Fig. 1.4 Surgical flap incision and reflection of flap.

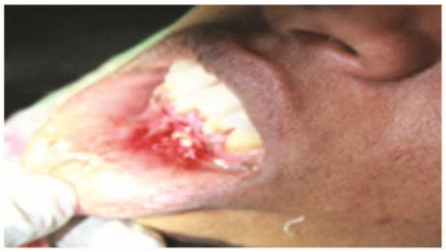

Fig. 1.5 Collagen fleecs inside cavity.

Fig. 1.6: Interrupted sutures.

Fig. 1.7: Patient healing after two weeks.

Fig. 2.1: Perioperative panoramic radiograph.

Fig. 2.2: Perioperative panoramic radiograph.

Fig. 2.3: Trapezoid flap incision.

Fig. 2.4: reflection of flap exposed cortical bone and cyst wall.

Fig. 2.5: remove all cystic wall.

Fig. 2.6: cystic wall lesion.

Fig. 2.7: interrupted sutures 0-4/

Conclusion:

A radicular cyst is the most common cystic condition found in the dental clinical.

The trauma and dental caries are the most common causes, but in few cases of orthodontic treatment, when applying excessive force for long time, may lead to pulp necrosis and then cyst as formation. Radiography helps dentists to make a good diagnosis for any lesion before and after treatment.

Treatment plan depends on the size and location of the cyst.

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