IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 19, Issue 11 Ser.13 (November. 2020), PP 07-11
www.iosrjournals.org

Hollowed Out Anterior Mandible Due To Radicular Cyst – A Case Report

Vigneshkumar P, PrashanthiGurram, Vivek N,
SaravananChandran, KarthikRamakrishnan, Cynthia Scott
(*Department of oral and maxillofacial surgery, SRM Kattankulathur Dental College and Hospital, SRM Institute of Science and Technology, India*)

Abstract: *Radicular cysts are inflammatory odontogenic cysts of tooth bearing areas of the jaw. The present case report documents a massive radicular cyst crossing the midline of the mandible from one side of mental foramen to another. Based on patient history, clinical, radiographic and histopathological findings the present case was diagnosed as a radicular cyst. The clinical characteristics of this cyst could be considered interesting and unusual, due to its giant nature. Owing to its clinical characteristics similar to other more commonly occurring lesions in the oral cavity, differential diagnosis should include dentigerous cyst, ameloblastoma, odontogenickeratocyst, periapicalcementoma and Pindborg tumour. Most of these lesions involve the apices of offending teeth and appear as well-defined radiolucencies. The lesion was surgically enucleated along with the retrograde filling of the associated tooth, without any postoperative complications.*
Keywords*: Anterior mandible, odontogenic cyst, radicular cyst, surgical enucleation.*

Date of Submission: 16-11-2020 Date of Acceptance: 02-12-2020

I. Introduction

Radicular cyst is the most common odontogenic cyst of inflammatory origin that accounts for about 52% to 68% of the entire cyst affecting the human jaw [1]. It is common in the apical region and hence the name apical periodontal cyst [2]. It can also be seen in the lateral aspect of teeth because of the presence of lateral accessory canals [3]. It is predominantly seen in the third and fourth decades of life and occurs more often in maxilla than in the mandible [4]. Radicular cyst is a sequelae of apical periodontitis resulting from carious lesions, periodontitis or from non-vital teeth as a result of trauma [3]. It arises due to stimulus of epithelial cell rest of Malassez derived from Hertwig's epithelial root sheath. This epithelium may also be derived from respiratory epithelium when the maxillary sinus gets involved, oral epithelium from fistulous tract or oral epithelium proliferating apically from a periodontal pocket [5]. Most of the small radicular cyst are asymptomatic and are found in routine radiographic surveys for non-vital teeth [6]. But in case of a large cyst it may show signs of pain, swelling, facial asymmetry, teeth displacement, bone resorption and can even lead to paraesthesia of the affected region [5]. Larger cysts cause expansion of both buccal and palatal cortices in the maxilla but in mandible, it causes expansion of the buccal cortex alone, rarely involving the lingual aspect [1].The choice of the treatment is usually based on the size of the lesion. Treatment of the cyst involves either conventional non-surgical root canal therapy, extraction of affected teeth or surgical intervention by enucleation and/ or apicoectomy with root end filling [7]. Here, we present a case report of an unusually huge radicular cyst in the anterior mandible extending from one side of the mental foramen to another along with its clinical, radiological presentation and management.

II. Case Report

A 29 year old female patient reported to the Department of Oral and Maxillofacial surgery, SRM Kattankulathur Dental College and Hospital, with a primary complaint of painful swelling in the mandibular anterior region for the past 4 month. The patient had a history of trauma in relation to the lower anterior region 20 years ago, following which she developed recurrent abscess during different time intervals in relation to that particular region. Dental history revealed that she underwent endodontic treatment in relation to 31, 32, 33,41,42,43 and failed to continue the same. On clinical examination, a large single localised swelling with diffused margins measuring about 4cm x 3 cm in size was observed extending from the region of 33 to 43, obliterating the mandibular anterior vestibule. On palpation, it felt like a hard swelling with tenderness and there was expansion of the buccal cortical plate. No signs of colour changes, mucosal breach or paraesthesia were evident.[Figure: 1]

Figure 1: Intraoral swelling obliterating labial vestibule

Orthopantomogram (OPG) and Computed Tomography (CT) mandible were obtained for the patient and it showed a well-defined homogeneous unilocular radiolucency with thick sclerotic borders measuring about 6cm x 5cm x 4cm, extending from distal aspect of 33 to distal aspect of 43. There was no radiological evidence of mental nerve involvement. [Figure 2: (a), (b)]

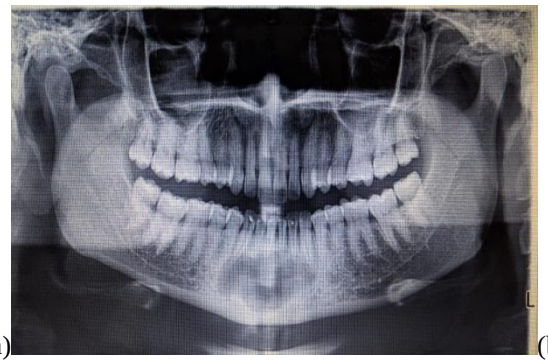
(a)  (b) 

Figure 2 (a-b): (a) OPG (b) CT mandible with unilocular radiolucency in the anterior mandible

The patient was operated under general anaesthesia. Under local infiltration, a wide mucoperiosteal flap was raised to expose the bone between the 33- 43 region. Mental nerve was identified and protected bilaterally. Buccal cortex breach was observed in relation to 31, 41 regions. Drilling was performed through the existing perforation and cystic lining exposed. The cyst was found to be infected with the purulent discharge.The entire cystic lining was separated from the bone and removed. A huge hollowed out defect was observed at the surgical site. All the roots of the anterior teeth were exposed and apicoectomy along with retrograde filling performed with Type II GIC. Chemical cauterization was performed using Carnoy's solution. Platelet Rich Fibrin (PRF) was prepared and placed in the bony defect and closure performed. [Figure: 3 (a,b,c,d,e)]

(a)  (b) 

(c)   (d)

(e) 

Figure 3 (a-e): Intraoperative pictures: (a) Incision, (b) Enucleation and apicoectomy, (c) PRF placement, (d) Suturing, (e) Post-operative OPG

The histopathological report showed a cystic epithelium with underlying capsule. The cystic epithelium was stratified squamous type with arcading pattern and complete loss of architecture in focal areas due to underlying inflammatory cell infiltration. Capsule was loose and collagenous in nature and exhibited increased vascularity with areas of haemorrhage and densely infiltrated mixed types of inflammatory cells, predominantly made up of lymphocytes, macrophages, PMN's, and plasma cells. Based on clinical, radiological and histopathological examination, the final diagnosis was made as the radicular cyst of the anterior mandible.

III. Discussion

The term"cyst" is derived from the Greek word "kystis" meaning "sac or bladder". A cyst is defined as a pathological cavity having fluid, semi-fluid, or gaseous contents, which is not created by accumulation of pus (Kramer, 1974). In the head and neck region cyst can be broadly classified into odontogenic and non odontogenic cysts [1].Radicular cyst is one of the most common odontogenic cysts occurring in the oral cavity predominantly found in the anterior maxilla relative to other parts of the oral cavity [8]. In general, radicular cyst tends to develop from carious teeth where the infection progresses from pulpal necrosis to periapical abscess and granuloma. If the infection persists for a prolonged period of time it can also develop into a chronic infection with periapical cyst [1].

Pathogenesis of the radicular cyst was described by Torabinejad (1983) as "breakdown/ nutritional deficiency theory" and "abscess cavity theory". According to "breakdown/ nutritional deficiency theory", due to provocation, the cells of the epithelium begin to proliferate after which central cells become deprived of nutrition and undergo liquefactive necrosis which forms microcyst. The "abscess cavity theory" states that epithelial cells multiply and cover the exposed connective tissues of pre-existing cavity (abscess). The pathogenesis is further explained under three stages, phase of initiation, phase of cyst formation and phase of cyst enlargement. The process gets initiated by provocation of epithelial cell rest of Malassez by any trauma, microbial foreign body, endotoxins from antigen and cytokines from the apical portion of the tooth. It leads to a cavity formation by necrosis of the odontogenic epithelium and cyst enlarges mainly due to the principle of osmosis which is mediated by lytic products and inflammatory cells. Various molecular interactions take place in each stage. Initiation stage happens because of bacterial endotoxins, as a result of which cytokines and chemokines are released as a counteract mechanism. Complement fixation and antibody complex formation are the main cause for cyst proliferations and cyst enlargement happens from the release of various growth factors like TGF- beta, IL-1, IL-6, IL-8 and some bone resorbing factors. Osteoprotegerins have also been expressed in radicular cyst which can cause cyst expansion [3, 9].

In the literature search, the maximum size of a radicular cyst reported is 4cm x 3cm in the anterior mandible. However, our lesion measured about 6cm x 4cm clinically, which was quite huge for a common cyst like radicular cyst. The etiology for the present case was trauma, since the patient gave a history of fall 20 years

ago. The patient also had recurrent swelling and abscess over the region for many years, for which she never underwent complete treatment. As a result of which, a massive cyst formed in the anterior region of lower mandible seen spreading bilaterally just anterior to the mental foramen.

The common radiological picture of a radicular cyst includes radiolucency which is found to be oval or pear shaped covering the apices of the non- vital teeth with expansion of the labial or buccal cortical plates with or without adjacent teeth displacement [10]. The current case is presented with a well-defined unilocular radiolucency with sclerotic borders measuring about 6cm x 5cm x 4cm in the anterior mandible without involving the mental nerve. The differential diagnosis of radicular cyst includes dentigerous cyst, pindborgtumor, cementoma, traumatic bone cyst, ameloblastoma, odontogenickeratocyst and odontogenic fibroma [11].

Aspiration in a radicular cyst usually reveals a straw colored fluid which can be useful in performing cytological examination to aid in confirmation of the diagnosis [4]. Based on the clinical and radiological findings a provisional diagnosis was made as radicular cyst.

Histopathologically, the radicular cyst is lined by stratified squamous epithelium. The lining may be discontinuous and range from 1 to 50 cell layer thickness. The lumen of a cyst contains fluid with low concentration of protein and collection of cholesterol clefts (Rushton bodies) with multinucleated giant cells. Different intensities of acute and chronic inflammatory infiltrate may be present subepithelially. Hyaline bodies which represent secretory products of the odontogenic epithelium in radicular cyst may be observed in some cases along with deposits of cholesterol crystals from the disintegration of red blood cells, lymphocytes, plasma cells and macrophages. A few long-standing cases of radicular cysts have shown histopathological evidence of transition from a cystic lining to epithelial dysplasia progressing as infiltrating squamous carcinomas. Although there is no concrete evidence or justification regarding cysts as precancerous lesions, clinicians should be aware of this phenomenon [11].

The treatment option for any cyst depends on the size, location, proximity of cyst to the vital structures (such as inferior alveolar canal, mental foramen, infraorbital foramen, maxillary sinus, nasal cavity, and infratemporal space). It also depends on the integrity of the cystic epithelium and nature of the cyst (clinically aggressive and radiologically invasive). Apical periodontal cysts are usually small in size ranging from 0.5cm to 1.5cm which can be treated endodontically or extracting the involved teeth, depending on the amount of teeth destruction and expected prognosis [12]. In cases of larger pathology, surgical procedures like marsupialization (Partsch I) can be considered if it does not involve any tooth or periapical region. Marsupialization followed by enucleation (Partsch II), is carried out in cases of atrophic mandible to prevent any pathological fracture. If the cyst involves periapical regions of the teeth and the teeth are salvageable, radicular cyst can be treated by enucleation followed by periapical surgery [13]. Periapical surgery is a procedure in which root canal treatment of the involved teeth is done after enucleation and a 3mm apical portion of the root is resected and filled with any biocompatible material using retrograde technique [14,15]. The best material used after apicoectomy is Mineralized Trioxide Aggregate (MTA) since it has a high osteoblastic response, offers a perfect seal with minimal microleakage and antibacterial action when compared to amalgam or other intermediate restorative materials [16]. In recent times, methylene blue is used for staining the organic portion of the cystic lining during the surgery which can aid in complete cystic lining elimination [17]. In our scenario, we treated the cyst surgically since it was an extensive pathology. Cystic enucleation along with retrograde filling was done in relation to the involved teeth along with PRF placement which resulted in complete resolution of the lesion during follow up period.

IV. Conclusion

An extensive lesion in the anterior mandible is a diagnostic dilemma and differential diagnosis should include odontogenic cysts and tumors of that particular region. The purpose of this case presentation is to consider even very common cysts such as radicular cyst in such pathology though they are usually presented with much smaller size. Clinical examination along with a thorough history, radiological and histopathological investigations plays an important role in the diagnosis of such huge pathologies. Surgical enucleation along with retrograde filling is the best treatment option available for a radicular cyst especially in younger patients when the lesion involves an aesthetic zone like anterior mandible, for better clinical outcome.

References

[1]. Vinayakrishna, KolariRao, HT & Thomas, Taniya. Maxillary and mandibular unusually large radicular cyst: A rare case report. National Journal of Maxillofacial Surgery.2019;10(2). 270-273.
[2]. Singh C, Agarwal T, Gupta S. Surgical and supportive management of radicular cyst with palatal perforation: A case report. IJADS. 2017;3(2):224-227.
[3]. Kumar ND, Sherubin JE, Jose M, Swaminathan C. Surgical Management of Large Radicular Cyst in Mandible. Int J Dent Oral Health. 2017;3(2):1-5.
[4]. Bava FA, Umar D, Basheer B, Baroudi K. Bilateral radicular cyst in mandible: an unusual case report. Journal of international oral health: JIOH. 2015;7(2):61-63.

[5]. Aparna PV, Ramasamy S, Sankari SL, Masilamani F, Priyadharshini A. Bilateral radicular cyst of the mandible: A rare case report. SRM Journal of Research in Dental Sciences. 2018;9(1):37-39.
[6]. Nagaraj T, Sinha P, Saxena S, Sahu P, Biswas A. Radicular cyst in upper left incisor-A case report. Journal of Medicine, Radiology, Pathology and Surgery. 2018;5(4):5-7.
[7]. Uloopi KS, Shivaji RU, Vinay C, Shrutha SP, Chandrasekhar R. Conservative management of large radicular cysts associated with non-vital primary teeth: a case series and literature review. Journal of Indian Society of Pedodontics and Preventive Dentistry. 2015;33(1):53-56.
[8]. Harshitha KR, Varsha VK, Deepa. C. Radicular cyst: A case report. Int J Appl Dent Sci 2015;1(4):20-22.
[9]. Koju S, Chaurasia NK, Marla V, Niroula D, Poudel P. Radicular cyst of the anterior maxilla: An insight into the most common inflammatory cyst of the jaws. Journal of Dental Research and Review. 2019;6(1):26-29.
[10]. Vijay, PradakshinaSinghal, Ishank& Singh, Neeraj& Gupta, AmitBhardwaj, Gaurav& Jain, Jinendra. CASE REPORT : Radicular Cyst and its Management Radicular Cyst and its Management: A Case Report. International journal of dental and medical research.2015;1(5):80-81.
[11]. Deshmukh J, Shrivastava R, Bharath KP, Mallikarjuna R. Giant radicular cyst of the maxilla. BMJ-Case Reports.2014
[12]. AboulHosn M, Noujeim Z, Nader N, Berberi A. Decompression and enucleation of a mandibular radicular cyst, followed by bone r regeneration and implant-supported dental restoration. Case reports in dentistry. 2019;
[13]. Dowselt E. Operative procedure for cyst of the jaws. Proc R Soc Med 1931;25: 47-56
[14]. Gilheany PA, Figdor D, Tyas MJ. Apical dentin permeability and microleakage associated with root end resection and retrograde filling. Journal of Endodontics. 1994;20(1):22-26.
[15]. VonArx T, Walker III WA. Microsurgical instruments for root-end cavity preparation following apicoectomy: a literature review. Dental Traumatology: Review article. 2000;16(2):47-62
[16]. Koh ET. Mineral trioxide aggregate as a root end filling material in apical surgery: a case report. Singapore Dent J. 2000;23:72-78
[17]. Cambruzzi JV, Marshall FJ, Pappin JB. Methylene blue dye: an aid to endodontic surgery. Journal of endodontics. 1985;11(7):311-314.

Vigneshkumar P, et. al. "Hollowed Out Anterior Mandible Due To Radicular Cyst – A Case Report." *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, 19(11), 2020, pp. 07-11.