JMS 2022; Vol 5 (3):153-157
UDC: 613.314.17-006.2-091.8:616.716.1
DOI:10.55302/JMS2253153ma

TREATMENT APPROACH FOR ODONTOGENIC CYSTS IN THE MAXILLA

Mirjana Markovska Arsovska[1], Goran Terzievski[2], Ljuba Simjanovska[1],
Sofijanka Gerasimova Pisevska[1], Irena Stojanova[1]
[1]Universal dental clinical centre St. Pantelejmon-Skopje, Clinic for Oral Surgery, North Macedonia
[2]PHO Terzievski Dental Studio, Ohrid, North Macedonia

Abstract

A cyst is defined as a pathological cavity lined by epithelium and the lumen is filled with cystic contents. The epithelium itself is surrounded by fibrocollagenous connective tissue and may be derived from various sources. Cysts are usually associated with carious, nonvital, discolored, or fractured teeth and are found mostly at the apices of the teeth. Radiologically, it arises from the apex of the root of a carious tooth and is bounded by a thin rim of cortical bone.

They rarely become problematic and are incidentally found on routine dental radiographs. As they appear to reach a considerable size prior to medical attention due to their insidious and destructive growth characteristics during the intraosseous stage, treatment often requires extensive cystectomy and skeletal reconstruction.

This case report shows the treatment of a big radicular cyst in the maxilla. After surgical enucleation and biopsy, histopathological picture revealed fragments of sections of a collagen cyst wall lined with multilayered squamous epithelium which were seen microscopically. Scarce inflammation is present. Immunohistochemically was found focal CD20+ lymphoid accumulations (up to 40%) with CD3+ T lymphocytes up to 60% of which a significant part is CD40+, and 10% CD8+, CD68 mark the reduced pres ence of resident histiocytes (up to 5%).

The finding confirmed the presence of a chronically inflamed radicular cyst. The diagnosis of a cyst, in addition to clinical and paraclinical examinations must be confirmed by the pathohistological findings.

Keywords: radicular cyst, imunohistochemistery, cystectomy, cyst diagnosis, cyst biopsy.

Introduction

A cyst is defined as a pathological cavity lined by epithelium, and the lumen is filled with cystic contents. The epithelium itself is surrounded by fibrocollagenous connective tissue and may be derived from various sources [1]. Odontogenic cysts are derived from the odontogenic epithelium which is derived from the basal epithelium of the stomodeum [2]. They are usually associated with carious, nonvital, discolored, or fractured teeth and are found mostly at the apices of the teeth [3]. Radicular cyst is the most common odontogenic cyst of the maxilla and mandible. Radiologically, it arises from the apex of the root of a carious tooth and is bounded by a thin rim of cortical bone [4].

They rarely become problematic and are incidentally found on routine dental radiographs. As they appear to reach a considerable size prior to medical attention due to their insidious and destructive growth characteristics during the intraosseous stage, treatment often requires extensive cystectomy and skeletal reconstruction [5].

The treatment of the radicular cysts are suegical- endodontic in most of the cases. The patohistological findings confirms the diagnosis of the cyst.

There are two ways to treat a dental cyst:

Surgery – for the removal of all types of cysts or tumours with simultaneous extraction of the tooth that formed the cyst.

Surgical-Endodontic Therapy – This is done in conjunction with surgical removal if the cyst is associated with an infected root canal [6].

Conservative (endodontic) treatment is also the option for the therapy of the cysts.

This case report shows the possibility of saving the teeth from extraction after removal of a cyst in the maxilla which has destroyed the palatal bone and histopathological and imunohistochemical findings after cyst removal.

Case presentation

A 50-year-old male patient reported to our Clinic for oral surgery with a chief symptom of mild pain and pus discharge in relation to the left upper back tooth region. On clinical examination, there was a massive palatal swelling with pus discharge, extending from teeth 21 to 23. The dental history revealed repeated prescription of antibiotics and analgesics at private dental clinics for the same persistent swelling since 2 months. Medical history was unremarkable. There was a mesioproximal and buccal caries in relation to 23, which was non-vital. Also the 22 tooth was non- vital. The rest of the teeth in vicinity, 21 was vital with no pain. On palpation, the lesion was soft and fluctuant. The buccal vestibule was devoid. Lymph nodes were non-palpable.

Invastigations

The patient was advised for cone beam CT (CBCT), but he was unwilling for CT or CBCT, due to the poor financial situation, he couldn`t afford such expensive investigation. He was advised for orthopantamograph, and intraoral periapical radiograph. Radiographic examination revealed a large unilocular radiolucency with well-defined radiopaque border (figure 1,2).

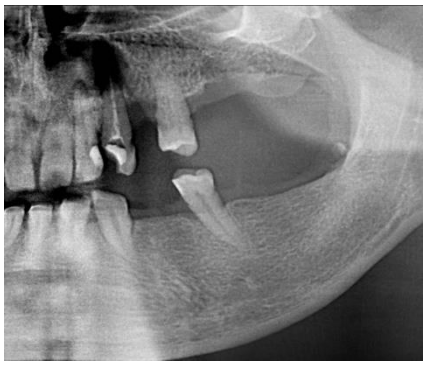


Figure 1.

Orthopantamograph
Shows bone changes around the tooth.

Figure 2.

Intraoral periapical radiograph
That confermed the same changes in the bone.

Differential diagnosis

In view of its clinical characteristics, similar to some commonly occurring lesions in the oral cavity, the differential diagnosis of the radicular cysts should include dentigerous cyst, pindborg tumour, periapical cementoma, traumatic bone cyst, ameloblastoma, odontogenic keratocyst and odontogenic fibroma. Confirmatory diagnosis of the radicular cyst is established only after surgical biopsy and histopathological examination of the lesion.

The patient was advised for surgical excision and biopsy. Careful enucleation of cyst was performed along with apicothomy of 22 and 23 under local anaesthesia. Intact bone wasn`t present all around the apices of adjacent teeth. The root canals were filled with filling cement and guttapercha points during the intervention. The suturing was performed. Excised tissue was sent for

histopathological investigation. Necessary prescriptions and postoperative instructions were given. (Figure 4,5,6)

Outcome and follow- up

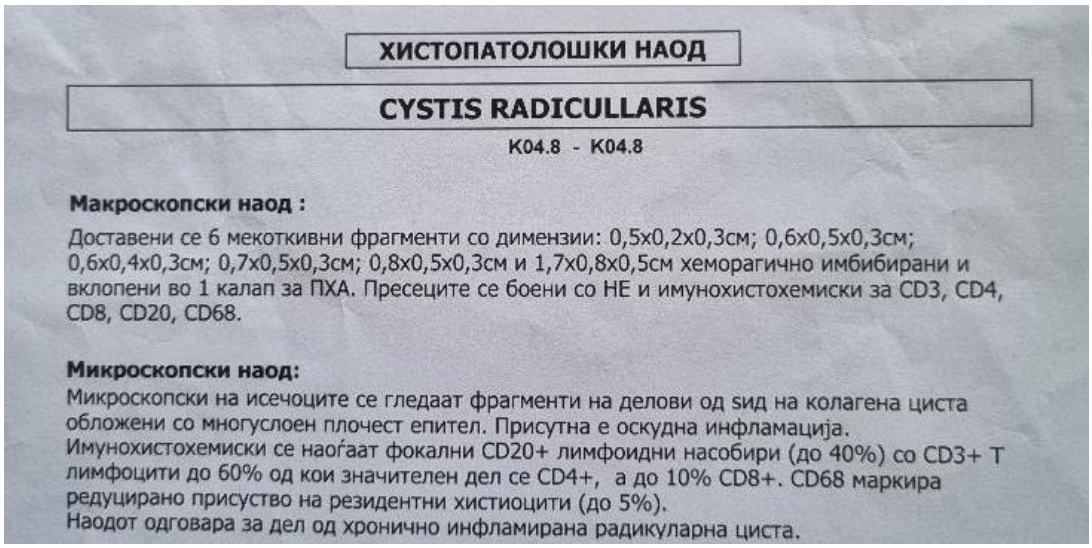
Postsurgical follow-up after 15 days showed considerable reduction in the size of swelling with prompt healing of surgical site. At 1 months follow-up, no recurrence was observed.

Figure 4. Surgical incision.

Figure 5. Raised mucoperiostal flap.

Figure 6. Bone defect in region 22 and 23.

Routine laboratory investigations were within normal limits. Fine needle aspiration revealed yellow-coloured fluid. Based on clinical, radiological and analysis of aspirate, a provisional diagnosis of an infected radicular cyst was made. After surgical enucleation and biopsy, histopathological picture revealed fragments of sections of a collagen cyst wall lined with multilayered squamous epithelium which were seen microscopically. Scarce inflammation is present. Immunohistochemically was found focal CD20+ lymphoid accumulations (up to 40%) with CD3+ T lymphocytes up to 60% of which a significant part is CD40+, and 10% CD8+, CD68 mark the reduced presence of resident histiocytes (up to 5%). The finding confirmed the presence of a chronically inflamed radicular cyst. (Figure 7)



ХИСТОПАТОЛОШКИ НАОД

CYSTIS RADICULLARIS

K04.8 - K04.8

Макроскопски наод :

Доставени се 6 мекоткивни фрагменти со димензии: 0,5x0,2x0,3см; 0,6x0,5x0,3см; 0,6x0,4x0,3см; 0,7x0,5x0,3см; 0,8x0,5x0,3см и 1,7x0,8x0,5см хеморагично имбибирани и вклопени во 1 калап за ПХА. Пресеците се боени со HE и имунохистохемиски за CD3, CD4, CD8, CD20, CD68.

Микроскопски наод:

Микроскопски на исечоците се гледаат фрагменти на делови од ѕид на колагена циста обложени со многуслоен плочест епител. Присутна е оскудна инфламација.
Имунохистохемиски се наоѓаат фокални CD20+ лимфоидни насобири (до 40%) со CD3+ Т лимфоцити до 60% од кои значителен дел се CD4+, а до 10% CD8+. CD68 маркира редуцирано присуство на резидентни хистиоцити (до 5%).
Наодот одговара за дел од хронично инфламирана радикуларна циста.

Figure 7. Histopathological finding.

Discussion

Inflammatory jaw cysts comprise a group of odontogenic lesions. They originate as epithelial residues in the periodontal ligament due to apical periodontitis following the death and necrosis of the dental pulp or was involved in the cyst of an adjacent tooth. Radicular cysts are diagnosed either during routine radiographic examination or following their acute exacerbation [3].

Prevalence of the radicular cysts in the maxilla is 60% as compared with mandible, and is associated with buccal or palatal enlargement [7].

The present case was associated with a huge palatal swelling without any buccal involvement.

Radicular cysts grow slowly and lead to mobility, root resorption and displacement of teeth. Once infected they may lead to pain and swelling and patients become aware of the problem [8]. In our case no mobility, root resorption or displacement of teeth was seen despite the presence of a large chronic infected cystic lesion.

Radiographically, the radicular cyst appears as round or pear-shaped unilocular radiolucency at the apex of a non-vital tooth. The margin of a radicular cyst is radiopaque with hyperostotic borders, which continues with the lamina dura. However, in infected or rapidly enlarging cysts, the radiopaque margin may not be present. The chronic radicular cyst may result in the resorption of offending tooth roots [9].

Despite being infected the present case had a clear radiopaque border and no root resorption was evident, which was helpful in the provisional diagnosis of radicular cysts.

Massive dental cysts sometimes may extend into the sinus away from the original epicentre [9] and sometimes present as a large multilocular radicular cyst [10].

The present case though massive, clinically and radiographically did not show any signs and symptoms of maxillary sinus invasion. Histopathologically, radicular cysts are lined completely or in part by stratified squamous epithelium. These linings may be discontinuous in part and range in thickness from 1 to 50 cell layers. 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 are present subepithelially [11].

Few cases are reported with hyaline bodies which represent a secretory product of the odontogenic epithelium in radicular cyst. The deposits of cholesterol crystals arise from the disintegration of red blood cells, lymphocytes, plasma cells and macrophages [12].

In our case, histopathological finding revealed chronical exacerbation phase infiltrate without any Rushton bodies.

The recommended treatment option available for radicular cyst is the conventional endodontic approach combined with decompression [13] or surgical enucleation of a cyst with extraction of the offending tooth. Some authors are of the view that suspected radicular cysts must be totally enucleated surgically to remove all epithelial remnants [14].

However, in large lesions the endodontic treatment alone is not efficient and it should be associated with a decompression or a marsupialisation or even with enucleation [15,16].

When the lesion is small with approximately 1 cm in diameter, most clinicians prefere conventional endodontic treatment but a surgical option for massive lesion is either marsupialisation or enucleation. In our case we enucleated the cyst and did apicothomy for saving the frontal teeth.

We observed complete regeneration of bone without employing any guided tissue regenerative techniques.

Batista et all. suggest that the studied proteins may participate in the pathogenesis of PG and RC, through the interaction of these proteins, in the remodeling of the ECM (versican) by ADAMTS-1, producing bioactive fragments, which could activate EGFR, contributing to the formation, growth and maintenance of injuries [17].

According to Brito et al. Galectins-1 and -7 may play important roles in the pathogenesis of PGs, RCs, and RRCs [18].

Langerhans cells induce a greater release of TNF-α which, in turn, is responsible for the stimulation of M1 macrophages. Higher immunoexpression of MMP-13 and MMP-9 is observed in the early stages of Radicular Cysts compared with Residual Cysts. Therefore, the toxins of microorganisms present in highly inflamed Radicular Cysts are the main factors triggering a proinflammatory immune response and greater cystic expansion in the early stages of these lesions [19].

Conclusion

The diagnosis of a cyst, in addition to clinical and paraclinical examinations must be confirmed by the pathohistological findings, because the patohistological findings and imunohistochemistery confirms the diagnosis of the radicular cyst. The treatment of the radicular cysts is surgical- endodontic in most of the cases.

References

1. Mass E, Kaplan I, Hirshberg A. A clinical and histopathological study of radicular cysts associated with primary molars. J Oral Pathol Med. 1995;24:458.
2. Fonseca JR. Oral and maxillofacial surgery. Philadelphia: WB Saunders; 2002. p. 5
3. Joshi NS, Sujan SG, Rachappa MM. An unusual case report of bilateral mandibular radicular cysts. Contemp Clin Dent. 2011;2:59.
4. Nilesh K, Dadhich A, Chandrappa P. Unusually large radicular cysts of maxilla: steps in diagnosis & review of management. J.Bio.Innov 2015;**4**:01–11.
5. Hahn HM, Lee YJ, Park DH. Huge Radicular Cyst of the Maxilla Treated with Complete Resection and Immediate Reconstruction by Rib Bone Graft J Maxillofac Oral Surg. 2019 Sep;18(3):378-381.
6. Uloopi KS, Shivaji RU, Vinay C; Pavitra, Shrutha SP, Chandrasekhar R.J Indian Soc Pedod Prev Dent. 2015 Jan-Mar;33(1):53-6.
7. Shear M. Cysts of the oral and maxillofacial regions. 3rd edn Boston: Wright, 1992
8. Irfan M, Alauddin M, Roselinda A, et al. Big radicular cyst in a 12 year old girl: a case report. Int Med J 2007;6:C5
9. Pekiner FZ, Borahan O, Ugurlu F, et al. Clinical and radiological features of a large radicular cyst involving the entire maxillary sinus. MUSBED 2012;2:31–6.
10. Krishnamurthy V, Haridas S, Garud M, et al. Radicular cyst masquerading as a multilocular radiolucency. Quintessence Int 2013;44:71–3.
11. Gibson GM. Case report: a large radicular cyst involving the entire maxillary sinus. Gen Dent 2001;50:80–1.
12. Jacob S. Rushton or hayline bodies in radicular cysts. A morphologic curiosity. Indian J Pathol Microbiol 2010;53:846–7
13. Tandri SB. Management of infected radicular cyst by surgical decompression. J Cons Dent 2010;13:159–61.
14. Walton RE. The residual radicular cyst: does it exist? Oral Surg Oral Med Oral Pathol Oral Radiol Endod 1996;82:471.
15. Danin J. Outcomes of periradicular surgery in cases with apical pathosis and untreated canals. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 1999;87:227–32
16. Rees J. Conservative management of a large maxillary cyst. Int Endod J 1997;30:64–7.
17. Batista et al. Immunohistochemical analysis of ADAMTS-1, versican and pEGFR expressions in periapical granuloma and radicular cyst, BMC Oral Health (2021) 21:102.
18. Brito et al. Immunohistochemical Analysis of Galectins-1, -3, and -7 in Periapical Granulomas, Radicular Cysts, and Residual Radicular Cysts, J End Vol. 44, Issue 5, May 2018, Pages 728-733.
19. França, Glória M. Release of Matrix Metalloproteinases by Macrophages in Radicular Cysts and Residual Radicular Cysts, Applied Immunohistochemistry & Molecular Morphology: April 2022 - Volume 30 - Issue 4 - p 291-297.