Review of Literature

Residual cysts: A brief literature review

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Introduction

A cyst contains fluid or semisolid material and is lined by an epithelium-lined sac. The proliferate, epithelial cells first later undergoes degeneration and liquefaction, leading to the formation of a cyst. There is equal pressure on the walls of the cyst from inside which is applied by the liquefied material. The cyst grows spherical in shape due to this reason, but in some cases the shape changes due to unequal resistance produced by the surrounding teeth. This may also lead to displacement of teeth and sometimes even the cortical bone by the pressure produced during the expansion of the cyst. Cysts are broadly classified as odontogenic cysts and non-odontogenic cysts. Odontogenic cysts originate from the epithelium of the developing teeth. The epithelium arises from the enamel organ, the cell rests of Malassez, the reduced enamel epithelium or the remnants of the dental lamina. The epithelial rests can also cause the formation of a residual cyst after the extraction of a tooth. [1] The term residual cyst is used most often for retained radicular cyst from teeth that has been removed. Residual cysts are among most common cysts of the jaws. The location of all odontogenic

ABSTRACT

Inflammatory odontogenic cysts are benign osteolytic asymptomatic lesions, but that, depending on the size, they can destroy the surrounding bone and let it infected. The term residual cyst is used most often for retained radicular cyst from teeth that has been removed. Residual cysts are among most common cysts of the jaws. This article aims to report characteristics and main aspects and highlighting the importance of the differential diagnosis for the treatment of these lesions. The methodology adopted consists in a literature review. It can be concluded that early detection and accurate diagnosis are essential for the proper treatment of the residual cysts.

Keywords: Accurate diagnosis, appropriate treatment, residual cysts

cysts is usually intraosseous. The peripheral (extraosseous) presentations are rare ^[2] and commonly seen in the elderly. ^[3] Radiology showed a round to oval radiolucency of variable size within the tooth bearing regions of jaws at the site of a previous tooth extraction, as the cyst ages, degeneration of the cellular contents within the lumen occasionally leads to dystrophic calcifications and radiographic opacities. ^[4]

Residual cyst occurs due to incomplete surgical removal of a radicular or other inflammatory cyst. The histological and clinical features of the radicular cyst are very similar to those of the residual cyst except for the site of the extracted teeth. Residual dental cysts harbour an innocuous pathosis and are often discovered as incidental findings on routine radiographs. Unless infected, it is rare to find symptomatic residual dental cysts which will result in clinical signs or symptoms that will concern the patient enough to seek treatment.^[5]

The following literature databases were searched: General Science Index, Medline, Pubmed, EBSCO host and CAPES Periodicals. Studies were selected if they scope were directly related to semiadjustable articulators. Studies published from 1998 to 2014 were included according to the author's analysis. The keywords of this study were utilized to the consult the databases.

Incidence

In a study carried out on five hundred ninety four patients with 621 cysts, most of the cysts were inflammatory: 435 cysts (70.1%) and odontogenic: 603 (97%) in their origin. Out of 621 cysts, 112 (18%) were residual, 44 (7.1%) were exacerbated, and 15 (2.4%) recurrent. Residual cysts are more common in the upper jaw (66.2%) and affected predominantly the distal areas of the maxilla-areas adjacent to molars and premolars. extracted The percentage of men with jaw cysts was higher compared to that of women, males to females ratio was 1.22 : 1. The average age of patients with jaw cysts is 35 years.^[6] Other authors also report that of the 2275 biopsy reports analyzed, 194 cases (8.5%) were jaw cysts, including odontogenic (6.7%) and nonodontogenic cysts (0.25%). Odontogenic cysts included 69.3% radicular, 20.3% dentigerous, 5.2% keratinizing odontogenic, 3.3% residual, and 1.9% other cysts, such as lateral periodontal, botryoid odontogenic, and gingival cysts. ^[7] According to Acikgöz A et al.^[8] the most frequent odontogenic cyst (54.7%), was radicular followed by dentigerous (26.6%), residual (13.7%), odontogenic keratocyst (3.3%), and lateral periodontal cyst (0.2%). According to Khosravi N et al.^[9] the four most frequent odontogenic cysts were radicular cysts (35.12%), dentigerous cysts (25.77%), keratocysts and odontogenic (22.58%) residual cysts (12.98%). Nunez-Urrutia S et al. ^[10] accounted for 5.9 %, Kambalimath DH et al. [11] accounted for 6 %, Ledesma-Montes C et al. ^[12] accounted for 6.1 % and Ochsenius G et al. [13] mentioned 13 % of cases. These lesions occurred in the sixth decade with male predominance and mainly in the mandibular anterior region. According to Kambalimath DH et al. [11] residual cysts is

the fifth most frequent type of OC. Avelar RL et al. ^[14] found this type of lesion in the third and fourth decades. These lesions are well distributed among different age groups and are prevalent above the seventh decade of life in many aforementioned studies. Younger patients are also affected when the teeth are lost prematurely.

Clinical characteristics

Shojaei S et al. ^[15] described patient with a chief complaint of a dull pain presenting after falling down one month ago, but at that time, he did not have any pain or paresthesia. Extraoral examination revealed a swelling in the right side of mandible. The patient was edentulous and had complete denture. The swelling was firm with eggshell crackling on palpation. (Fig. 1) Most residual cysts are less than 1cm in size. Occasionally, enlarging cysts may cause displacement of the adjacent teeth, as well as bone expansion. ^[5]

The development of cystic lesions may lead to bone resorption, dental damage, and harm to the anatomical structures (maxillary sinus, nasal cavity, and mandibular fractures), especially when they reach large proportions. The presence of an RC in an edentulous area prevents the functional rehabilitation of the patient due to the resulting bone defect (Fig. 3). ^[16] Sridevi K et al. ^[17] reporting a case of symptomatic residual cyst, associated with calcifications involving the anterior region of the body of the mandible in a 60-year-old patient. The histopathological male examination revealed the presence of stratified squamous epithelial lining in an arcading pattern. The connective tissue wall inflammatory showed infiltrate with numerous cholesterol clefts and foci of dystrophic calcifications.

The neoplastic transformation of the epithelial lining of odontogenic cysts is rare, although well-described in the literature. According to Tarakji B et al. ^[18] the development of Squamous Cell Carcinoma from radicular /residual cysts is rare,

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however, it should always be considered in the differential diagnosis. The number of studied cases in literature is limited. Only a small number of case series & case reports are available. Tarakji B et al. ^[18] recommend that further work involves large series of tumors arising from radicular/residual cyst to determine the malignancy transformation potential of radicular/ residual cyst. They demonstrates the importance of clinician awareness of the malignant potential of apparently innocuous cystic lesions. It also underscores the importance of a careful histological examination and the necessity of obtaining biopsy materials from various areas to prevent a misdiagnosis of large-sized cysts. Intraoral swellings involving alveolar ridges in edentulous patients are clinically diagnosed as residual cysts, traumatic bone cysts, Stafne's jaw bone cavity, ameloblastoma and metastatic tumours of the jaw. Mahajan AD et al. ^[19] described a residual cyst in a 68year-old edentulous male patient which was enucleated and histopathologically confirmed as a unicystic ameloblastoma.

Radiographic characteristics

Serman N^[20] described residual dental cyst radiographically as a round unilocular, radiolucency with well defined borders in an edentulous area. (Fig. 2)

Panoramic radiograph revealed a radiolucent area in the right maxillary region corresponding to the previously extracted right first molar tooth. (Fig. 3) A CBCT volume was acquired for three reasons: to localize the borders/extent of the radiolucency; to determine the relationship between the lesion and the maxillary sinus and to establish differential diagnosis. Panoramic а reconstruction showed a large $(2 \times 4 \times 3 \text{ cm})$, unilocular, low-density area in the right maxilla, extending horizontally from the root of the second premolar to the distal root of the second molar. The lesion was elevating the floor of the maxillary sinus with no clear interruption, the anterior aspect presented with an ill-defined margin and a remarkably sclerotic bone. A possible interruption of the floor of the maxillary sinus was noted on the posterior aspect of the lesion suggesting a direct contact between the lesion outline and the Schneiderian membrane of the maxillary sinus **Cross-sectional** images showed elevation of the floor of the maxillary sinus without interruption. These images showed also an empty cavity surrounded by a thick soft tissue lining and sclerotic bone margin. The alveolar crest was interrupted with buccal moderate and palatal cortical expansions.^[21]



Fig. 1: Residual cyst in edentulous lower jaw Source: Morrison A. 2014



Fig. 2: Radiographic aspects of residual cyst Source: Jamdade A et al. 2012



Fig. 3: Residual cyst panoramic Source: Morrison A. 2014

Micro description

Epithelial lining of cyst: stratified squamous epithelium which may demonstrate exocytosis, spongiosis, or hyperplasia (Fig. 4).

- Epithelium may be discontinuous in part and range in thickness from 1 to 50 cell layers
- The majority are 6–20 cell layers thick
- The nature of the lining may depend on the age or stage of development of the cyst, or on the intensity of the inflammation
- In early cysts, the epithelial lining may be proliferative and show arcading with an intense associated inflammatory process but as the cyst enlarges the lining becomes quiescent and fairly regular with a certain degree of differentiation to resemble a simple stratified squamous epithelium
- Rarely, scattered mucous cells or areas of ciliated pseudostratified columnar epithelium are noted
- Cyst epithelium may also demonstrate:
- Linear or arch-shaped calcifications known as Rushton bodies
- The bodies measure up to about 0.1mm and are linear, straight or curved or of hairpin shape and sometimes they are concentrically laminated
- Although the origin of hyaline bodies remains obscure, it is generally now thought that they represent a secretory product of odontogenic epithelium
- Dystrophic calcifications
- Cyst lumen may demonstrate fluid and cellular debris
- Cyst lumen or wall may demonstrate:
- Cholesterol clefts with multinucleated giant cells, red blood cells, and areas of hemosiderin pigmentation
- In histological sections, the cholesterol crystals are dissolved out and clefts are seen surrounded by dense aggregations of multinucleate giant cells

- The cholesterol may be due to disintegrating red blood cells in a form that readily crystallizes and incites a foreign body giant cell reaction
- Cyst wall may demonstrate
- Dense fibrous connective tissue, often with an inflammatory infiltrate containing lymphocytes variably intermixed with neutrophils, plasma cells, histiocytes, and (rarely) mast cells and eosinophils
- Occasionally will contain scattered hyaline bodies (pulse granuloma giant cell hyaline angiopathy)
- These bodies appear as small circumscribed pools eosinophilic of material that exhibits a corrugated periphery of condensed collagen often surrounded lymphocytes by and multinucleated giant cells
- Spicules of remodeling bone
- Russell bodies are commonly seen. [4]



Fig. 4 Stratified squamous epithelial cyst lining Source: Morrison A. 2014

Differential diagnosis

Unicystic ameloblastoma, inflamed Odontogenic keratocyst, inflamed Glandular odontogenic keratocyst, inflamed Lateral periodontal cyst. ^[4]

Treatment

Any number of odontogenic and nonodontogenic cysts and tumors can mimic the appearance of a residual periapical cyst, therefore, these lesions should be excised surgically, even in the absence of symptoms. Residual cysts do not recur after appropriate management. Intraosseous fibrous scars are possible, especially when both cortical plates have been lost; this can give the appearance of a persistent radiolucent lesion. ^[4] Types of treatment that can be conducted for the residual cyst is either marsupialisation or enucleation depending on the size of the cyst. ^[1]

Prognosis

The residual cyst has no tendency to relapse, so it has a good prognosis. After excision, bone healing usually occurs in the cyst region. Exceptionally, the epithelium can give rise to squamous cell carcinoma, malignant tumor. Authors showed the fact that enucleation epithelium incomplete can develop a residual cyst after months to years after treatment. If the original radicular cyst, residual cyst or remain untreated, their continued growth can cause significant destruction and weakening of the maxilla or mandible. In root and residual cysts treated fairly, in general, there is bone repair.^[22]

Conclusion

The residual cysts are interosseous lesions that affect the regions of the maxilla and Although asymptomatic mandible. and benign, due to its continuous increase, these lesions can become destructive, because they affect and infect the adjacent bone and thus should be treated appropriately. In this sense, it is crucial for diagnosis and treatment planning usually requires a detailed analysis of clinical, radiological the and histopathological examinations. In dentistry, early detection and accurate diagnosis of the affected by inflammatory, neoplastic or cystic lesions, odontogenic fabric are of paramount importance successful for treatment. Therefore, the dentist must have knowledge of the biological and histological behavior of odontogenic cysts and their frequency to ensure early detection, accurate diagnosis and proper treatment.

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