INFLAMMATORY ODONTOGENIC CYSTS: A BRIEF LITERATURE REVIEW

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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. They are classified into periapical or lateral radicular cyst, residual cyst and paradental cyst, which need a source of infection to proliferate. The current study mainly aims to deepen the knowledge regarding the types of inflammatory odontogenic cysts, describing its 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 odontogenic inflammatory cysts. By avoiding the persistence of an asymptomatic lesion such as a residual cyst, the structure and vitality of the teeth are conserved and the integrity of anatomical structures is preserved, in other words, it restores the patient's oral health.

KEYWORDS: Odontogenic inflammatory cysts, accurate diagnosis, appropriate treatment. Oral health.

1. INTRODUCTION

Odontogenic cysts are the most common osteolytic lesions (90% to 97% of reported cysts) in the oral region. Its growth is slow, from remnants of odontogenic epithelium of Malassez. Thus, its histogenesis is related with debris that are trapped within the bone, enamel or gingival tissue; they are usually intraosseous location. Although benign, can become destructive, because they are frequent incidence and represent a major cause of bone destruction in the jaw and mandible[1,2].

In 1992, the World Health Organization (WHO) classified odontogenic cysts according to their development or with inflammatory cysts. Are cysts of development: the gingival cyst of childhood, the primordial cyst, the dentigerous cyst (follicular cyst), the eruption cyst, lateral periodontal cyst, calcifying odontogenic cyst, glandular odontogenic cyst and the gingival cyst of adults. In these cysts, the active factor in cyst formation is unknown, i.e., the infection is not stimulating the proliferation of odontogenic epithelium[4,5]. The inflammatory cysts are lesions that originate from the infection of root canals from caries or occurrence of a trauma that generated pulp changes. The appearance of these cysts occurs from the pre-existence of a periapical granuloma or by induction of epithelial rests of Malassez[5,6].

The inflammatory cysts can be classified as: inflammatory periapical cyst (apical radicular cyst and lateral periodontal cyst or apical), residual cyst and cyst paradental. These cysts require a source of infection for the remaining epithelial root sheath of Hertwig (or epithelial remnants of Malassez), are stimulated and begin the spread of infection. Some of these cysts, such as periapical cysts, inflammatory and lateral root cyst, depend on endodontic infection, while paradental require periodontal cyst or pericoronal infection[3,4,7]; the odontogenic inflammatory cysts constitute about 70.1% to 85% of maxillary cysts[1,2].

Due to the high incidence of inflammatory odontogenic cyst in the maxilla, the aim of this study is to deepen knowledge about the different types of odontogenic inflammatory cysts, describing its characteristics and main aspects and highlighting the importance of differential diagnosis for the treatment of these lesions.

2. MATERIAL AND METHODS

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 semi-adjustable articulators. Studies published from 1980 to 2013 were included according to the author's analysis. The keywords of this study were utilized to the consult the databases.

3. LITERATURE REVIEW

A cyst is defined as a pathological cavity lined with epithelium and odontogenic or non-odontogenic origin, showing fluid or semi-solid contents inside[1,6].

The most accepted theory for the formation of cysts would be combining its beginnings to the proliferation of epithelial remains under the influence of inflammatory cytokines and growth that are released by various cells in the apical lesion factors, leading to the formation of islets without blood vessels, which degenerate the central region of the lesion. These islets, being away from the adjacent connective tissue, release enzymes which degenerate their own cell protoplasm, liquefying the dead cells, forming a cavity searched by stratified squamous epithelium[5,8,9].

Thus, odontogenic cysts are formed from this mechanism, being classified as "developmental cysts" or "inflammatory cysts." The odontogenic inflammatory cysts require one infection to the epithelial remnants of Malassez proliferate and are the subject of this brief review of the literature.

DEFINITIONS

Inflammatory periapical cyst is truly inflammatory odontogenic cyst coated by epithelium that is adhered to the periapical region of the tooth with pulp necrosis[4,8.] The lateral radicular cyst is an example of inflammatory odontogenic cyst that is attached to the lateral surface of the root of a tooth erupted and necrosis caused by infection of the pulp chamber of the tooth[3,10].

There are two distinct categories or types of radicular cysts: those with cystic cavity completely filled by epithelial lining (true cysts) and those whose epithelium lining the cystic cavity is interrupted by the root apex, which penetrates into the lumen (cyst bay)[9,11]. More than half of the apical cystic lesions are true cysts, because they consist in a pathological cavity coated by epithelium originated from the epithelial rests of Malassez and, often, filled with liquid[6,12].

According to Neville *et al.* (2004)[7], the radicular cyst is not removed after tooth extraction via alveolar curettage procedure, the degree of inflammation can continue. Thus, the absence of periapical curettage tissue during surgical removal of a tooth can lead to the formation of an inflammatory cyst called residual cyst. The residual cyst is a type of inflammatory odontogenic cystic lesion, caused an inflammatory periapical cyst that persists retained within the bone after extraction of the affected tooth involved, or arises after incomplete removal of a cyst original, motivating the persistence of a radicular cyst. Thus, residual cysts occur in sites healed extraction[13,14,15].

The paradental cyst is an uncommon inflammatory odontogenic cyst located adhered to the cementoenamel junction of a vital tooth with partial irruption, which extends along the root surface, and is associated with pericoronitis, i.e., gingival inflammation, leading to hyperplasia and consequent cystic formation[3,4,16].

ORIGIN

The inflammatory periapical cysts originates from the epithelium of periapical granulomas, which commonly is derived from the remaining epithelial sheath of Hertwig, but may also be related to the crevicular epithelium lining the sinus or the epithelial lining of the fistulae. It is also admitted that the cyst may be caused by the proliferation of the epithelium, which seeks to take the abscess cavity in periapical granuloma, in view of the worsening of the lesion. However, this method of training is not well founded[3,7].

The lateral root cyst is similar to the inflammatory periapical cysts and extends along the side portion of the root. Also stems, commonly, the epithelial rests of Malassez or a preexisting dental granuloma. The source of the inflammation can be a periodontal disease or pulp necrosis extending through a side foramen. Toxins exit of the foramen and infect the tissue of the periodontal ligament. The inflammatory response induces proliferation of epithelial rests of Malassez or the remnants of Hertwig's epithelial sheath and the formation of a cystic lesion[3,7,10].

The residual cyst has the same origin of the inflammatory periapical cyst, i.e., stems, after extraction of the involved tooth without curettage, by proliferation of epithelial remnants of the sheath of Hertwig stimulated by endodontic infection[3,15].

The paradental cyst seems to originate in crevicular epithelium, the reduced epithelium of the enamel organ or remnants of Hertwig's epithelial root sheath in the periodontium; epithelial remnants of Malassez. Although its exact origin is not yet understood, it is believed that an inflammatory process, such as periodontitis or pericoronitis, stimulate their development and observations of scholars suggest that the formation of the enamel projection in the root bifurcation is related to the pathogenesis of cyst paradenta[4,16,17].

ETIOLOGY

The inflammatory periapical cysts are caused by odontogenic infection of low virulence and long duration, based root canal after pulp necrosis that extends to the periapical tissues and stimulates proliferation remnants of Hertwig's epithelial sheath, or epithelial remnants of Malassez contained ligament periodontal. The infection is constituted especially by anaerobic bacteria in the periapical region, which stimulate and activate the mechanisms of innate and acquired defense, allowing vascular and cellular events encourage the development

of dental granuloma and radicular cysts[4]. The lateral radicular cyst can develop from a dental granuloma. Etiologic factor an odontogenic infection of low virulence and long duration, side of the affected tooth root canal caused by an accessory canal after the pulp necrosis. This odontogenic infection appears to be similar to that observed in inflammatory periapical cyst, which is composed mainly of anaerobic bacteria[1,2,3].

The residual cyst is a common odontogenic lesion on the part of the tooth support areas of the jaws. Is closely related to the periapical or radicular cyst, so the etiology is common between the two entities, these being distinguished only by the association or not, the root of a tooth. This is periapical or radicular etiology of infectious inflammatory cyst, infection of low virulence and long, located in the root canal and the residual cyst generated from the extraction of the non-vital tooth without curettage[3,4,18].

The paradental cyst is caused by infection of the pericoronal tissues, a tooth irruption or due a tooth partially erupted. This infection triggers an inflammatory reaction of these tissues, pericoronitis, which stimulates the proliferation of the reduced enamel epithelium subsequent cystic degeneration[3].

CLINICAL CHARACTERISTICS

The inflammatory periapical cyst is the most common odontogenic cyst. The preferred location of this cyst is the anterior maxilla. There is a slight predilection for males. There are no age group with the highest incidence of inflammatory periapical cyst[12,19,20]. Its evolution is slow because months are needed to observe clinical manifestations. Most of these cysts grow slowly and does not reach full size. Patients with inflammatory periapical cysts have no symptoms. The inflammatory periapical cyst is painless, unless an acute inflammatory exacerbation occurs, since this cyst is inflammatory. The affected tooth has become normal, not sensitive to percussion, mobility or with sudden extrusion. If the cyst reaches a medium or large size (20-35 mm in diameter), or in case of worsening signs and symptoms of acute inflammation, such as toothache, swelling, increased tooth mobility, sudden extrusion, light sensitivity arise It is possible to mobility and displacement of adjacent dental elements occur. The intensity of these clinical manifestations is directly proportional to the degree of intensification. The tooth of origin does not respond to vitality tests. The pulp by cold, heat and pulp test are negative, i.e., reveal pulp necrosis[3,7].

The majority of radicular cysts (60%) are found in the maxilla[3], most frequently affecting the alveolar bone of the upper jaw, especially around incisors and canines, and having a higher prevalence in women[2,10,21]. This type of cyst usually represents an asymptomatic lesion and the displacement of adjacent teeth is possibly the first clinical manifestation of the presence of the cyst, whose growth is slow but aggressive, and may take sufficient size to produce destruction of the outer cortical bone and a swollen hard and painless[19,23,24]. Lesions that persist or increase in size are probably secondarily infected[24]. The occurrence of radicular cysts was noted that the third and fourth decades of life have highlighted the prevalence[20,22], and that are not commonly associated with primary dentition[19,20].

The residual cyst is rarely found in children. Occurs at any age, being diagnosed mainly between 40 and 60 years, more commonly in male patients (62.5%) and in both jaws, suggesting to be more common in segments of the mandible[4,14,21]. It is the third or fourth most common cystic lesion in the jaws[15], representing approximately 10% of all odontogenic cysts[25]. Although residual cysts are usually asymptomatic and is an incidental radiographic finding in edentulous areas, occasionally, can cause expansion of the affected and jaw pain, if a secondary infection is present. Often these cysts occur within the bone, being very rare in extraosseous region, but have observed and therefore should be included in the differential diagnosis of peripheral lesions of the mandible[2,4]. Typically, these cysts have limited growth potential, although further expansion can be seen, causing displacement of teeth. According to Strickland *et al.* (2013)[13], in the mandible, the mandibular canal may be displaced inferiorly. Buccal and/ or lingual expansion can occur. The displacement of the top floor of the maxillary sinus may occur when these cysts in the jaw.

The paradental cyst is an inflammatory odontogenic cyst considered rare, since its prevalence ranges from 0.9% to 5.6% of odontogenic inflammatory cysts. There seems to be an imbalance of its occurrence in relation to gender, as is more common in men than in women and in the third decade of life. Occur near the cervical margin of the lateral surface of the root, due an inflammatory process of the periodontal pocket, and is usually associated with the buccal and distal of molars erupted, where there is associated with pericoronitis history. More than half of the reported cases are associated with lower third molars, occurring at a later age than those that relate to the first or second molars and, more rarely, with anterior teeth and globulomaxillary region. The evolution of paradental cyst is slow, because the proliferation of epithelial remnants and cystic formation occur in long time. It is often painless. In some cases, discomfort, halitosis, swelling, acute pain, pain during occlusion, delayed eruption, suppuration and trismus may be present. The paradental cysts associated with the buccal surface and distobuccal third party erupted or partially erupted molars is the most frequent clinical form and usually associated with inflammatory periodontal procedures such as pericoronitis. In this location, except for cases of acute infection, clinical signs are scarce. The

pain may be associated with pericoronitis only semi-enclosed bone. Usually does not cause bone expansion. Absence of bone expansion and not being palpable lesion, its consistency cannot be perceived. The tooth related paradental cyst has pulp vitality[3,12.25].

RADIOGRAPHIC CHARACTERISTICS

The inflammatory periapical cyst reveals radiolucent image with circular or oval shape, bounded by thin radiopaque, continuous and clear line, which is reactive osteogenesis and located in the periapical region (Figure 1). The hard layer is destroyed in the image region. The occlusal radiography, bone cortical inflammatory, medium or large periapical cyst, commonly, is expanded and preserved, but can be destroyed in large cyst with rupture of the regular type, revealing their ends facing the front position. When inflammatory exacerbation suffers periapical cysts, thin radiopaque region of the limiting line shows the image is partially destroyed, as well as the adjacent cancellous bone, according to the X-rays[3].

Figure 1. Radiographic aspects of inflammatory periapical cyst. **Source:** Guttenberg, cited Moraes & Rodrigues (2011)[6].

The periapical radiograph, in a lateral radicular cyst reveals radiolucent, small, with a semilunar shape, bounded by thin radiopaque line in the cyst, which is within the alveolar bone. The part of the cyst located in the periodontal ligament merges with this normal structure, which is also radiolucent. Therefore, the picture is only half of the cyst. Cystic image is located on the lateral surface of the tooth root between the root apex and the dental neck. There is loss of lamina dura along the adjacent root and a rounded radiolucency surrounding the apex of the tooth. The root resorption is common. With the increase in radiolucency flattens out, often as the lesion approaches the adjacent tooth. It is possible a significant growth and lesions can be observed occupying a whole quadrant[3,7].

The lateral root cyst appears as a radiolucent uniloccular lesion with a round or elliptical in the apical area and with a thin edge well defined cortical bone along the side of the root portion[13]. Loss of the hard layer and a source obvious inflammation can be detected without a high index of suspicion. In the event that it is this type of cyst before surgical exploration of radiolucent areas positioned laterally, we recommend performing a full evaluation of the periodontal status and vitality of adjacent teeth[7].

Radiographically, the residual cyst reveals radiolucent image with circular, oval or elliptical, bordered by thin radiopaque line and located in the region of an extracted tooth. In case of a large cyst, the occlusal radiograph shows expansion of cortical bone that is commonly preserved. When the expanded cortical bone is found destroyed, there is a discontinuity characterized by the broken ends facing each cortical (Figure 2), suggesting benign lesion[4]. Can cause tooth displacement and root resorption and external cortical maxillary and mandibular growth may suffer. The cyst may invaginate into the maxillary antrum or moving inferiorly dental nerve canal[4].

Figure 2. Residual cyst in the anterior mandible. **Source:** Domingues & Gil (2007)[3].

According to the radiographic analysis, paradental cyst can vary in your image, depending on the overlap of anatomical structures, presence of infection, size and location of the lesion. Usually the image of the lesion is well-defined radiolucent, cortical and adjacent to the teeth and semi-included, usually located laterally (common distal) limited by a thin radiopaque line and associated with a mandibular third molar partially erupted (Figure 3). The lesion has a semi-lunar, ellipsoid or crescent shape and does not cause bone expansion. Paradental cysts were found in the root bifurcation region at the limit of the buccal amelo-cementum. In buccal location, the cysts from paradental portion show radiolucency, extending above the face of the root of the molar with a thin radiopaque line delimiting the lesion. This circular shape is projected onto the roots and periapical region, changing their shape and making diagnosis difficult. This requires a more careful analysis to view the periodontal ligament space and hard lamina in the region that were overlapped the radiolucent image. In case of paradental cyst located in the distal and mesial, the radiolucent acquires lunate shape, being outlined by radiopaque line on the edge toward the bone[3,16,25].

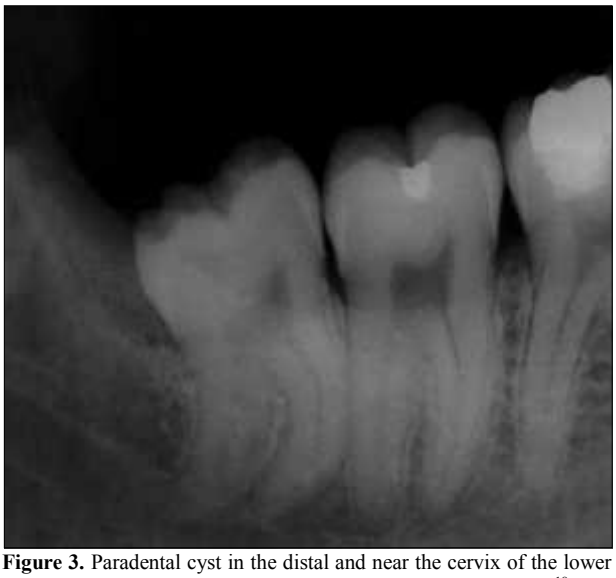

Figure 3. Paradental cyst in the distal and near the cervix of the lower third molar region partially erupted. **Source:** Castro *et al.* (2008)[18].

DIAGNOSIS

The cysts are epithelial odontogenic inflammatory lesions characterized by a pattern of slow, expansive and non-infiltrated growth. This is clear evidence of benign biological nature of these lesions, which can reach considerable size, if not diagnosed in time and treated appropriately[21].

A correct diagnosis is essential for planning the treatment of conditions that compromise the maxillomandibular complex[6]. Given that the number of cystic lesions of the jaws share similar clinical and radiographic features, the diagnosis of odontogenic cysts, usually requires detailed analysis of the clinical, radiological and histopathological findings[10].

Clinical and radiological features support the diagnosis of inflammatory periapical cyst. The radiographic image (radiolucent, with circular or ovoid shape, bounded by continuous thin and sharp line radiopaque) suggests inflammatory periapical cyst, even without bone expansion. However, if there is bone expansion and displacement of adjacent teeth, beyond the radiographic appearance described above, it is likely that the lesion is inflammatory periapical cyst. This may be confused radiographically with periapical granuloma. Radiographic features such as lesion size, continuity and sharpness of the radiopaque line and the intensity of radiolucency image can be used in differential diagnosis. The macroscopic diagnosis of periapical lesion adhered to the light, in the case of extraction, and lesion regression, after shaping and obturation of the root canal, are also effective in the definitive diagnosis of inflammatory periapical cyst[3].

Considering that lateral radicular cyst often presents no clinical manifestations, usually, is discovered by routine radiographic examination of the maxilla or mandible. The radiograph shows radiolucent image with a half-moon shape, located on the lateral surface of the root of a tooth with pulp necrosis, bordered by thin radiopaque line at the margin in contact with the alveolar bone. This cyst can be confused with other odontogenic cysts, especially with the lateral periodontal cyst and the cyst paradental. The analysis of some clinical features, such as pulp test can pinpoint the most likely clinical diagnosis of lateral periodontal cyst and the lateral radicular cyst (Figure 6). Lateral radicular cyst in the pulp of the affected tooth is necrotic; the lateral periodontal cyst, no pulp vitality of the affected tooth. The differential diagnosis can be guided by factors such as etiology, time of surgical removal of the cyst and the incidence jaws. The differential diagnosis with paradental cyst, you should use several clinical features: pulp test, the affected tooth eruption, mucous cyst of the region, adherence and the frequency jaws. The clinical diagnosis must be confirmed even without histopathological analysis, regression when the lateral radicular cyst occurs after shaping and obturation of the root canal of the affected tooth. If the lateral radicular cyst does not disappear after endodontic therapy, should be subjected to histopathological examination after its removal. Microscopically, the capsule is composed of cystic epithelium supported by connective tissue; the stratified squamous epithelial tissue is formed by several layers of cells; the tissue is infiltrated with chronic inflammatory cells, lymphocytes, and plasma cells[3,7,19].

The residual cyst commonly is detected by routine radiographic examination of the jaws, since only sometimes causes bone expansion, i.e., presents clinical manifestations that lead patients to seek care. This examination revealed a radiolucent image, circular or ovoid in area of a missing tooth. These radiographic features added to injury slow, painless and with a history of tooth extraction developments induce clinical diagnosis of residual cyst. However, this can be confused with other bone cysts, especially the primary cyst and odontogenic keratocyst tumor. The differential diagnosis between primary cyst and residual cyst is facilitated if the patient can inform the tooth extraction in image radiolucent area that, if performed, tilts the diagnosis for residual cyst. The differential diagnosis with odontogenic keratocyst, one must pay attention to bone growth, consistency and aspiration of the lesion, the incidence of these cysts in the jaw. If there is extensive bone expansion, consistent with the image size, the consistency is papyraceous or floating in the vacuum of injury is enough liquid citrus harvested, leaning diagnosis for residual cyst. However, definitive diagnosis is determined by histopathology, after removal of the cyst. The capsule is formed by cystic epithelium and underlying connective tissue. The epithelium is stratified squamous, have variable thickness

and may contain corpuscles Rushton. The connective tissue contains cells of chronic inflammation, mononuclear infiltrate and sometimes large numbers of polymorphonuclear neutrophils[3,12].

The clinical and radiographic examination is sufficient to diagnose paradental cyst. Are evidence that the patient is the third partial molar irruption, impacted, and/or mucosa with pericoronitis: bone expansion not exist; radiography reveal a radiolucent image in relation to tooth eruption (3rd impacted molar); localization especially in the root surface for distal or distobuccal and bound by thin radiopaque line in the margin in contact with the bone[3].

The definitive diagnosis of paradental cyst is obtained by adding the clinical-surgical, radiological and microscopic data. Other odontogenic cyst, as dentigerous, the radicular, the lateral periodontal, beyond of the dental follicle, odontogenic tumors such as ameloblastoma and keratocystic odontogenic tumor, and other unusual conditions such as, for example, Langerhans cell histiocytosis, can be included in the differential diagnosis[3,25]. Due to similar clinical and radiographic with other odontogenic cysts, the cysts can be confused paradental, especially with the lateral periodontal cyst and the lateral radicular cyst. Their definitive diagnosis is established by histopathology[3]. Histopathologically, the paradental cysts are invariably lined by non-keratinized stratified squamous epithelium, which appears hyperplastic, backed by a wall of granulation tissue and fibrous tissue containing intense chronic or mixed inflammatory infiltrate. Focus of hemosiderin pigment and cholesterol crystals may be present[25].

METHODS OF DIAGNOSIS OF INFLAMMATORY ODONTOGENIC CYSTS

The diagnostic tests, namely the imaginological tests, are extremely important for the correct diagnosis of odontogenic inflammatory cysts. Radiographs (digital intraoral, panoramic, periapical, occlusal and teleradiography) are often used for global assessment of the state of dentition and diagnosis of various diseases, such as periodontitis, odontogenic and non-odontogenic lesions of the maxilla and mandible, although they have anatomical and geometric limitations, relationship with the visualization and interpretation of the image obtained. For the establishment of a differential diagnosis, are available to the oral health professional methods as conventional computed tomography (CT), magnetic resonance imaging (MRI), ultrasound (US) and cone beam computed tomography (CBCT)[3,4].

Panoramic and periapical radiographs are less precision and accuracy than the cone beam computed tomography (CBCT). The CT has limited use in dentistry, because although it can provide many details in the axial plane shows the drawbacks exposure time and the high dose of radiation to which the patient is subjected. CBCT is a noninvasive method suitable for the examination of tissues stiff and not as efficient for the evaluation of soft tissue. The acquired CBCT image is composed of isotropic voxels; they are equal in all dimensions, eliminates the overlap observed in conventional radiographic images, allowing early visualization of small periapical lesions, even if they are within spongy bone, and full size on the three orthogonal planes. Thus, the cone beam technology gives the professional measuring conditions, and the thickness of the bone, the amount of cancellous and cortical bone, allowing the analysis of lesions at an early stage of development. CBCT is a versatile method of diagnosis. Facilitates differentiation and planning, streamlining the treatment and follow-up of periapical lesions[3].

In addition to indicating the presence of inflammatory periapical lesion, the use of CBCT is of proven efficacy[11,27,29] for the diagnosis differentiation between inflammatory granuloma and periapical cysts. It is a precise technique preoperative diagnostic periapical inflammatory lesion, as images with fewer shades of gray (negative values), with a darker area homogeneous; with a lower density of the surrounding area, so areas less dense fluid into a cavity containing indicate cystic lesions. Areas with high number of shades of gray (positive values) with similar density to surrounding tissue, but with a sharper radiolucency suggests the presence of granulomas[6].

TREATMENT

All odontogenic cysts, with the exception of inflammatory periapical cyst and lateral radicular cyst, should be treated with surgical intervention. The periapical cystic lesions are usually treated by conservative endodontic treatment (periapical curettage) or surgical treatment (enucleation, marsupialization and decompression). In lateral radicular and inflammatory periapical cysts, surgery is indicated only if the lesions do not regress after removal of odontogenic infection intra-canal the affected tooth. In case of residual cyst, surgery is the only option[1,3].

According with Petterson *et al.* (2000)[28] the cysts of the jaws can be treated surgically by one of the following basic techniques: enucleation, marsupialization combination of the two procedures in steps or enucleation with curettage.

Research conducted by Silva *et al.* (2002)[29], to assist the dental professional in choosing the appropriate surgical treatment for different types of cysts shows that in cysts of the jaws, the treatment is purely surgical nature, therapeutic enucleation, marsupialization of and can be performed decompression.

The current recommended treatment for inflammatory periapical cyst consists of shaping and obturation of the root canal without immediate surgical intervention. However, extensive lesions in restorable teeth have been treated successfully by conservative endodontic treatment when accompanied by biopsy and marsupialization or fenestration decompression. Radiographs of control, every four months, must be made, before they had total repair of tissues. Surgical removal (enucleation cystic) is indicated when the periapical lesion does not regress or increased in size during the observation period. Surgery should not be limited to the removal of the cyst; It will hold the tooth engaged apicoectomy with or without back-filling. Still, when the tooth involved an extensive prosthetic crown, or a root pin, especially when removing the crown or pin may cause fracture of the remaining tooth structure, it is advisable to perform the paraendodontic surgery[3].

The lateral radicular cyst, initially, it should be treated by endodontic therapy, ie, shaping and obturation of the root canal of the affected tooth so as to eliminate the infection within that channel. If, after the treatment, the cysts do not regress, it will be removed by surgery. All inflammatory focus in the area of a lateral radicular cyst should be eliminated. The material should be sent for biopsy and strict monitoring of at least one to two years should be performed[3,7,26].

Treatment of residual cyst is usually surgical removal by different techniques, depending on the size and location of the lesion. Cysts to small and medium sized easy access and without compromising patient health, in general, the first option is cystic enucleation. The residual cyst is large and there is a possibility of bone fracture during their enucleation, it is advisable marsupialization of the lesion, it is introducing a drain for draining the cystic fluid. Without the pressure of the cyst on the bone, its size reduction occurs by peripheral bone formation to injury and there is no risk of bone fracture and the residual cyst can be removed[3,4].

Treatment of paradental cyst when associated with third molars is the excision of the lesion, together with the removal of the tooth. If paradental cyst affects the first or second molars, the treatment consists of enucleation of the lesion with preserving the tooth involved. But, the affected tooth is usually extracted along with the cyst, as is often impacted in the second molar[3,25].

Regarding to the treatment of cysts and tumors, Neville *et al.* (1998)[7] argue that all cysts and odontogenic and non-odontogenic tumors can mimic the appearance of a residual periapical cyst thus suggest that all these cysts and tumors should be surgically excised for complete evaluation of ignition source.

However, any surgical procedure should be thoroughly evaluated and planned. Each surgical technique has its correct indication. The professional must properly assess the type of cyst, its shape and location, the degree of expansion and involvement with the underlying structures, ie, the size of the lesion, the contents of the cystic cavity and the general condition of the patient. We must always consider the extent and anatomical relations of the cystic process, thus guiding the surgical technique and the precautions to be taken. The success of each case will depend on a treatment plan, beyond the expertise of the surgical technique and orofacial anatomy[6,15,27].

Among the objectives of surgical treatment in addition to immediate or delayed removal of the cyst, whenever possible, one should look to the structure and vitality of the teeth, as well as preserve the integrity of anatomical structures: nasal cavity, maxillary sinus, neurovascular bundles and maxillary continuity. To minimize the consequences on the region affected by the cyst, reconstructive techniques of the bone defect should be considered[3].

PROGNOSIS

Some inflammatory periapical cysts are reversible only with endodontic therapy. The prognosis is also good, when the inflammatory periapical cyst is removed by surgery because of periapical tissue repair occurs. The reason for the regression of some inflammatory periapical cysts after modeling and root canal filling without periapical surgery is unknown[4]. The prognosis of lateral radicular cyst is good, because this cyst has no tendency to relapse. Regression of the lesion after endodontic therapy may occur. This suggests that the lesion was not granuloma and cyst (regresses cavity granuloma, cysts not). It is common bone repair cystic region after surgical removal of this type of cyst[3].

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[3].

Authors showed the fact that incomplete enucleation epithelium 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[19,20].

Whatever the case of paradental cyst recurrence is not common. This type of cyst has an excellent prognosis; it has no tendency to relapse when the lesion is completely removed. After surgical removal, is common bone repair occurs in cystic region[3,27]. The prognosis of all inflammatory cysts are good. These cysts usually do not recur after appropriate treatment. Fibrous scarring may occur, especially when both cortical are broken. Rare cases of developing squamous cell carcinoma have been reported in periapical cysts. The squamous cellular carcinoma can

be occasionally originate from the epithelial lining of radicular cyst or other odontogenic cysts. Thus, even in the absence of symptoms, treatment is required for all intra-osseous changes persistent[7,19,25].

4. DISCUSSION

As already stated above, the odontogenic inflammatories cysts are lesions that depend on a focus of endodontic, periodontal or pericoronal infection of low virulence and long term, to proliferate[3,4,7]. They grow slowly from the remaining epithelial Malassez or a pre-existing periapical granulomas. The source of inflammation may be a necrotic pulp or periodontal disease[5,6,10]. They often occur within the bone, being very rare in extraosseous region, where he was observed and therefore must be included in the differential diagnosis of peripheral lesions of the mandible[2,4]. Although benign, depending on size, odontogenic inflammatories cysts can become destructive, because they are frequent incidence and represent a major cause of bone destruction in the jaw and mandible[2,3].

Clinically, odontogenic inflammatories cysts are asymptomatic, being incidental radiographic findings. Appear more often in the maxilla[2,12,22], but residual cysts were found in both jaws, most commonly in the jaw segments[15,18,23]. Show a pattern of slow, expansive and non-infiltrated growth, which clearly shows the biological nature of these benign lesions[3,7,23]. If the cyst reaches a size 20-35 mm in diameter, or in case of exacerbation, signs and symptoms appear, such as destruction of the outer cortical bone, toothache, hard, painless swelling, increased tooth mobility, sudden extrusion, light sensitivity, being possible mobility and displacement of adjacent dental elements also occur[3,22,24]. Lesions that persist or increase in size are probably secondarily infected[26]. Regarding gender, there is predilection for males[12,19,20] but in the case of radicular cyst, there was a higher prevalence in women[10,2,23]. Regarding age, no age group with the highest incidence of inflammatory periapical cyst[19,20,22]. The occurrence of radicular cysts, it was observed that the third and fourth decades of life have highlighted the prevalence[14,24,25] and radicular cysts and residual cysts are rarely found in children[20,25].

The odontogenic inflammatories cysts are diagnosed by imaging. Radiographs (digital intraoral, panoramic, periapical, occlusal and teleradiography) are often used for global assessment of the state of dentition and diagnosis of various diseases, but present anatomical and geometric limitations with respect to visualization and interpretation of the image obtained. The establishment of a differential diagnosis can be obtained with conventional CT, MRI, US and CBCT, a technique preoperative accurate and versatile diagnosis, which facilitates the differentiation and planning, streamlining the treatment and follow-up of periapical lesions[4,6]. The CBCT, besides indicating the presence of apical periodontitis, has proven efficacy[11] diagnosis for differentiating granuloma and periapical cysts

The periapical cystic lesions are usually treated by conservative endodontic treatment (periapical curettage) or surgical treatment (enucleation, marsupialization or fenestration and decompression)[3,29]. Silva *et al.* (2002)[29] emphasized that the cysts of the jaws, the treatment is purely surgical nature, therapeutic enucleation, the marsupialization and decompression can be performed. To Domingues & Gil (2007)[3] all odontogenic cysts, with the exception of inflammatory periapical cyst and lateral radicular cyst, should be treated with surgical intervention. In lateral root and inflammatory periapical cysts, surgery is indicated only if the lesions do not regress after removal of intracanal odontogenic infection of the affected tooth[3,7,28]. In the case of residual cyst or paradental cyst surgery (cystic enucleation or marsupialization) is the only option[1,4,27]. Whereas all cysts and odontogenic and non-odontogenic tumors can mimic the appearance of a residual periapical cyst, Neville *et al.* (1998)[7] suggest that all these cysts and tumors should be surgically excised for complete evaluation of ignition source. Given that every surgical procedure should be carefully evaluated and planned, each surgical technique has its correct indication. The professional need properly evaluate the cyst according to: its type, shape, location, degree of expansion and involvement with the underlying structure. Thus, the size of the lesion, the contents of the cystic cavity and the general condition of the patient, leading to immediate or delayed removal of the cyst, and conservation of the structure and vitality of teeth as well as the preservation of the integrity of anatomical structures in the treatment of odontogenic inflammatories cysts should be considered[6,16,28].

5. CONCLUSION

The inflammatories odontogenic cysts are interosseous lesions that affect the regions of the maxilla and mandible. Although asymptomatic 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 the clinical, radiological 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 for successful 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.

The treatment of lateral inflammatory periapical cysts or imply conventional endodontics or alveolar curettage, post-extraction does not listen when regression of post endodontic lesion or whether it is a paradental cyst. With this, we avoid the permanence of an odontogenic lesion, which may become a residual cyst, which may present expansive and destructive potential, if not properly removed surgically.

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