

Original Article

Clinicopathological study of Odontogenic Cysts – a retrospective study

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ABSTRACT

Introduction : Odontogenic cysts are characterized by a pathological cavity either completely or partially covered with epithelial tissue. These cysts are one of the most common osseous-destructive lesions affecting the jaws. The aim of the present study was to determine the relative prevalence of odontogenic cysts and to identify the clinicopathological characteristics.

Methodology : A retrospective observational study was conducted on 1011 histopathological reports from January 2008 to December 2012. Patients with radicular cysts, dentigerous cysts, odontogenic keratocysts, lateral periodontal cysts and glandular odontogenic cysts were further analyzed. The following variables were recorded: age, gender, clinical characteristics of the lesions such as size, location and association with impacted teeth and a descriptive analysis of the study variables was carried out.

Results: Among 1011 biopsy reports analyzed, 131 cases of odontogenic cysts (13%) were diagnosed. The age of patients ranged from 10 to 85 years. The gender distribution showed a male predilection (n=81; 62%), compared to females (n=50; 38%). The lesion size ranged from 3-130 mm; with a mean size of 18 mm. The mandible (n=74; 56%) was more commonly involved than the maxilla (n=57; 44%). The majority of cysts were detected in the posterior mandible followed by the anterior maxilla. Impacted teeth most commonly associated with odontogenic cysts was lower third molar, followed by upper canine.

Conclusion: Radicular cysts, dentigerous cysts and odontogenic keratocysts were the most common cystic lesions, accounting for 88.9% of all odontogenic cysts, with radicular cysts being most common.

INTRODUCTION

Odontogenic cysts (OC) are characterized by a pathological cavity either completely or partially covered with epithelial tissue.¹ These cysts are one of the most common osseous-destructive lesions affecting the jaws. These cysts arise from the epithelial components of the odontogenic apparatus or its remnants that lie entrapped within bone or in the gingival tissue.² They are classified traditionally into a developmental group including keratocysts, dentigerous cysts (DC), lateral periodontal cysts (LPC), glandular odontogenic cysts (GOC) and an inflammatory group including radicular (apical, lateral and residual) cysts (RC).³

Odontogenic cysts are characterized by a slow growth and an expansive tendency and in spite of being entities which present a benign biological behavior; they can reach considerable size if they are not diagnosed in time and treated appropriately.⁴ Some odontogenic cysts such as odontogenic keratocysts present a locally aggressive behavior and are prone to recurrence.^{5,6} Therefore, the correct diagnosis of these lesions is essential for correct surgical treatment. In addition, a number of cystic lesions of the jaws share similar clinical and radiographic features; the diagnosis of odontogenic cysts usually requires a detailed analysis of clinical, radiographic and histopathologic findings.⁷

The present study was designed to know the relative frequency of the odontogenic cysts (i.e. radicular cysts, dentigerous cysts, odontogenic keratocysts (OKC), lateral periodontal cysts and glandular odontogenic cysts), their clinicopathological characteristics (i.e. age, gender, clinical characteristics of the lesions like the size, location and association with impacted teeth and descriptive analysis) and to compare our findings with other publications from different geographic areas (i.e. Brazil,

Chile, Sicilia, United Kingdom and Mexico).

METHODS

After approval by the Ethics Committee of Darshan Dental College and Hospital, Udaipur, case records from patients with odontogenic cysts diagnosed from January 2008 to December 2012 were retrieved from the files of Department of Oral Pathology of the college. Data regarding age, gender, size, anatomic location and its association with impacted teeth of all cases were compiled from the clinical data sent together with the biopsy records. The inclusion criteria involved histological confirmation of odontogenic cyst. Repeated biopsies were not considered, even those performed for recurrences after treatment. The other criterion for exclusion was the absence of information concerning the site or the patient's age.

To classify the location of the cysts, each jaw was divided into an anterior and a posterior zone. The anterior zone included the incisors, canines and premolars and the posterior zone consisted of the molars and ramus/ tuberosity. If a tooth could be implicated, then irrespective of the extent of the cyst it was classified in the zone in which the tooth was located. Otherwise, it was placed in the zone which according to radiographic evaluation, was involved to the greatest extent. Where the zones were equally represented, the cyst was placed in the most posterior zone. The Microsoft Excel™ software was used for data analysis and construction of the graphs.

RESULTS

During the study, 1011 biopsy reports were examined at Department of Oral Pathology. A total of 131 (13%) of these were regarded as odontogenic cysts. The age of patients ranged from 10 to 85 years, and most of them were in the age group of 21-50 years. The gender distribution showed a male predilection (n=81; 62%), compared to females (n=50; 38%). The lesion size ranged from 3-130 mm; with a mean size of 18 mm. The mandible (n=74; 56%) was more commonly involved than the maxilla (n=57; 44%). The majority of cysts were detected in the posterior mandible followed by the anterior maxilla (Table 1). Impacted teeth most commonly associated with odontogenic cysts was lower third molar, followed by upper canine (Table 2).

Table 1: Site distribution of cysts

Type of cyst	Anterior maxilla	Posterior maxilla	Anterior mandible	Posterior mandible
Radicular cyst	40	15	13	35
Dentigerous cyst	4	1	1	9
Odontogenic keratocyst	-	-	5	6
Lateral periodontal cyst	-	-	1	-
Glandular odontogenic cyst	-	-	1	-

Table 2: Frequency of odontogenic cyst associated with impacted teeth.

Type of cyst	Lower 3rd Molar	Upper Canine	Lower Canine	Odontome
Radicular cyst	-	-	-	-
Dentigerous cyst	9	3	2	1
Odontogenic keratocyst	2	1	-	-
Lateral periodontal cyst	-	-	-	-
Glandular odontogenic cyst	-	-	-	-

In the present study, radicular cysts was the most prevalent odontogenic cyst (n=103; 79%), mostly occur in third and fourth decade of life (average 37 year), anterior maxilla most common site followed by posterior mandible, size ranging 3-50 mm (average size 11.6 mm). Dentigerous cyst was the second most prevalent odontogenic cyst, posterior mandible being most common site followed by anterior maxilla size ranging 10-70 mm (average size 18.9 mm). The third most prevalent odontogenic cyst was odontogenic keratocyst (n=11; 8%), mostly occurring in third and fourth decade of life (average 34 year), posterior mandible being the most common site followed by anterior mandible associated with impacted (n=3) or erupted (n=8) tooth, size ranging from 13-130 mm (average size 73.5 mm) (Figure 1).

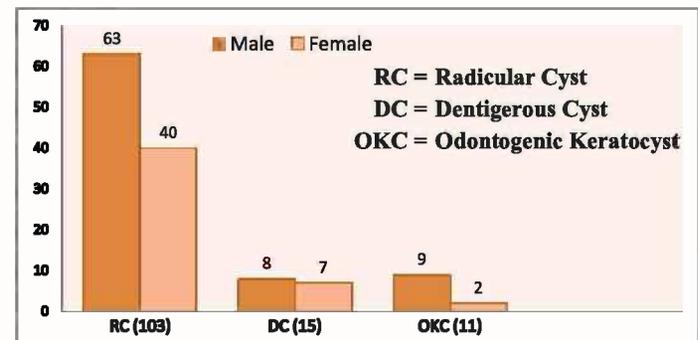


Figure 1: Relative frequency and sex distribution of odontogenic cyst.

Lateral periodontal cyst and glandular odontogenic cysts were found to be least prevalent in the study (n=1; 0.8% each) (Figure 2). Lateral periodontal cyst was reported in 45 year male patient having size 20 mm and was located in mandibular anterior region. Glandular odontogenic cyst was reported in 30 year female patient, located in mandibular anterior region having size 5 mm.

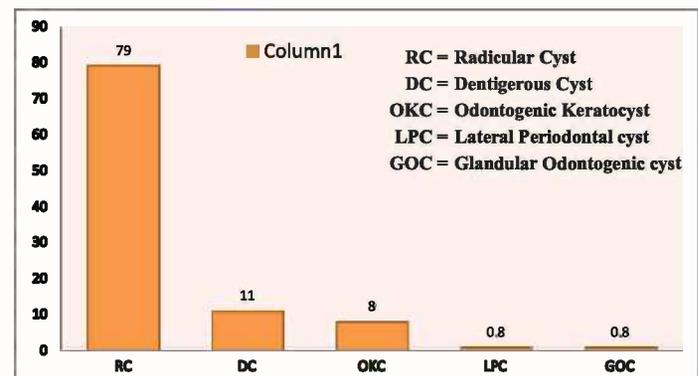


Figure 2: Relative frequency percent distribution of odontogenic cysts.

DISCUSSION

Cysts are more common in the jaws than any other bone because of the ubiquitous presence of epithelial rests after odontogenesis.^{8,9} These lesions are often difficult to evaluate on the basis of their radiographic features alone. The final diagnosis must be done based on macroscopic and microscopic examination because several other lesions (including ameloblastoma, adenomatoid odontogenic tumor, calcifying odontogenic cysts, etc.) show similar radiographic findings.¹⁰ In addition many of odontogenic cysts share similar clinical and radiographic features.¹¹ Therefore, the diagnosis of odontogenic cysts should be based on careful examination of clinical, radiographic and histopathologic features. Most of the information regarding the prevalence of odontogenic cysts comes from oral pathology diagnostic services and despite sampling bias these services represent a reliable source of information regarding the relative frequency and clinical-pathologic features of odontogenic cysts.^{4,12}

The cases of odontogenic cysts identified in the present study accounted for 13.0% of all specimens stored in the archives of the Oral Pathology Laboratory. Similar results have been reported in previous studies involving populations from Brazil¹³, Chile⁴, Sicilia¹⁴ and the United Kingdom.¹¹ Studies involving Mexican populations have shown lower frequencies of odontogenic cysts ranging from 7.8% to 8.4%.^{6,12} Nevertheless, OCs may account for 0.8% to 45.9% of all specimens submitted to histopathologic analysis at oral pathology services.^{5,16} This wide range in the frequency of odontogenic cysts probably reflects differences in referral practice or biased data.

In the present study, odontogenic cysts occurred in adult men with more frequency than in women which is in accordance with other studies.^{4,5,17} With respect to anatomic location, most odontogenic cysts affected the mandible, particularly the posterior region (38.2%), followed by the anterior region of the maxilla (33.6%). Coherently, these regions have been reported as the most common location of odontogenic cystic lesions in other studies.^{11,18} In contrast, a study conducted in Lithuania found a higher frequency of odontogenic cysts in the maxilla with proportion of 1.5:1.¹⁹ It is emphasized that the study evaluated radicular and dentigerous cysts, a fact that might explain the difference in the results.

Our results showed a higher prevalence of inflammatory cysts (78.6%). A higher proportion of inflammatory cysts has also been observed in other studies involving different populations with frequencies ranging from 58.2% to 74.3%.^{4,11,20,21,22} On

the other hand, studies involving populations from Mexico^{5,14} demonstrated a higher frequency of developmental cysts. It is possible that the socioeconomic conditions of the population might influence the relative frequency of inflammatory and developmental odontogenic cysts. Mosqueda-Taylor et al.¹² observed a higher frequency of developmental odontogenic cysts in patients seen at a private clinic and a higher proportion of inflammatory odontogenic cysts in some patients at a public health service centre.

Radicular cysts are the most frequent type of odontogenic cyst accounting for 39.9% to 86.2% of all odontogenic cysts stored in the archives of oral pathology services.^{2,4,5,7,8,15,17-19} As observed in the present study and in other studies^{2-4, 5,18,19}, the anterior region of the maxilla is the most common location of radicular cysts. According to Ochsenius et al esthetic factors may cause individuals to conserve these teeth and these patients are therefore more prone to long-term chronic inflammatory processes in the absence of adequate endodontic treatment.⁴ In our study it has been observed that radicular cysts were more prevalent among males which is in accordance with other studies.^{2,8, 17-19} In contrast, a study involving other Brazilian population³ has shown a slightly higher prevalence among females which is in agreement with other studies conducted in Latin American countries.^{4,5,7} The male predominance of radicular cysts might be related to the fact that men are more likely to neglect their oral hygiene and are more prone to trauma to the maxillary anterior teeth.⁸

Dentigerous cysts have been described as the second most common odontogenic cyst, with frequencies ranging from 11.4% to 33.0%.^{1,3,4,8,10,11} Most cases are diagnosed in men.^{2,3,13} The posterior region of the mandible is the site most frequently affected by these lesions followed by the anterior region of the maxilla.² Similar findings were observed in the present study. According to Jones et al², the high frequency of dentigerous cysts at these sites is not a surprising finding since the lower third molars and upper canines are the teeth most commonly impacted. Most cases of dentigerous cysts are diagnosed between the first and second decades of life^{4,5,18,19}, which is also observed in the present study. However, Jones et al² reported a peak incidence between the fifth and sixth decades. Dentigerous cysts were identified as the most common OC in the pediatric population in the present study which is in accordance with the study of Ochsenius et al⁴, however Jones et al² identified radicular cysts as the most frequent OC in children (43.6%). Whether this peak incidence of dentigerous cysts in older age groups is a particular characteristic of the European population is still a matter of discussion.

Carrillo et al²³ have suggested that pulpectomy is the treatment of choice in the case of a radio transparent lesion measuring under 10-15 mm in diameter and associated to a necrotic tooth. In the presence of signs and symptoms or an increase or persistence of the radio transparent image six

months after root canal treatment, the recommended procedure is periapical surgery of the tooth with complete removal of the cyst, apicoectomy and retrograde filling. In the case of lesions over 30 mm in size, with the displacement of adjacent structures or with buccal/lingual bone plate perforation, surgical decompression with or without extraction of the causal tooth is recommended and this is the routine technique employed.

CONCLUSION

The present study shows prevalence of odontogenic cysts. Radicular cysts, dentigerous cysts, and odontogenic keratocysts were the most common cystic lesions accounting for 88.9% of all odontogenic cysts. Knowledge of the biological and histological behaviour of odontogenic cysts and their distribution in various parameters are key aspects for ensuring early detection and adequate treatment.

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