

Odontogenic Cysts: a Clinical and Radiographic Study of 58 Cases

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Abstract: The purpose of our study was to determine the prevalence of odontogenic cysts and their clinical and radiographic characteristics in Mashhad Dental faculty (Iran) and compare the results with other studies. Data were obtained from the files of patients diagnosed with odontogenic cysts between 2002 and 2008 in our archive. The most prevalent cyst was odontogenic keratocyst followed by calcifying odontogenic cyst and infected odontogenic cyst. Posterior mandibular region was the most prevalent area. Mean age of the patients was 23.5 years and most of the patients were males. Unilocular radiolucency was the most prevalent radiographic feature. Pain feeling and clinical expansion recorded in most of our patients. Awareness about the prevalence and characteristics of odontogenic cysts is important in primary diagnosis and treatment of these lesions.

Key words: odontogenic cysts, cysts, odontogenic keratocyst, radicular cyst, dentigerous cyst, radiographic feature.

INTRODUCTION

A cyst is defined as a pathologic cavity with liquid, semi-liquid or gaseous contents, surrounded by an epithelial tissue membrane (Ledesma-Montes *et al*, 2000; Mosqueda-Taylor *et al*, 2002; Ochsenius *et al*, 2007; Waldron, 1995). Cysts occur more often in the jaws than in any other bone because most of them originate from odontogenic epithelial remnants that remain after tooth development (White *et al*, 2004). Odontogenic cysts (OCs) are one of the most common destructive lesions affecting the jaw bones (Daley *et al*, 1994; Avelar *et al.*, 2009). According to different studies, 7 to 12% of oral and maxillofacial biopsies are odontogenic cysts (Mosqueda-Taylor *et al*, 2002; Ledesma-Montes *et al*, 2000).

The most common clinical feature is a painless swelling (unless the cysts become secondarily infected) and sometimes missing teeth, especially third molars. They grow slowly and sometimes cause tooth displacement or root resorption. They can expand cortical plate, usually in a smooth, curved manner, and change the buccal or lingual cortical plate into a thin cortical boundary. They may also displace alveolar inferior nerve canal in inferior direction or invaginate the maxillary antrum (White *et al*, 2004). Odontogenic cysts are often found in tooth-bearing region (White *et al*, 2004).

They are classified in two groups according to their pathogenesis: inflammatory and developmental (Ochsenius *et al*, 2007).

Inflammatory cysts are associated with inflammation including radicular cysts but developmental cysts originate from the odontogenic epithelial remnant or apparatus that remains trapped within the jaw bone or gingival tissues including odontogenic keratocyst and dentigerous cysts (Jones *et al*, 2006; Grossmann *et al*. 2007; Koseoglu *et al.*, 2004; Mosqueda-Taylor *et al*, 2002).

Radiographically odontogenic cysts present predominantly as a well defined corticated uni-multi locular radiolucencies (MacDonald-Jankowski, 2010)

Odontogenic cysts are different in behavior, location, radiographic and clinical features. Despite the large number of studies on OCs in the literature (Mosqueda-Taylor *et al*, 2002; Bataineh *et al.*, 2004; Franklin *et al.*, 2006; Varinauskas *et al.*, 2006; Koseoglu *et al.*, 2004; Ledesma-Montes *et al*, 2000), information about demographic profile and behaviors in Iranian population is scarce.

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The purpose of this study was to determine the frequency, clinical and radiographic characteristics of odontogenic cysts diagnosed at an oral medicine department in a city in northeastern Iran and compare the findings with other similar studies following the new WHO classification.

MATERIALS AND METHODS

After approval by the Ethics Committee of Mashhad University of Medical Sciences (MUMS), records of patients with diagnosis of OCs referring to Mashhad Dental Research Center and Faculty of Dentistry from January 2002 to March 2008 were extracted from the archive. Demographic data and clinical characteristics including sign and symptoms of these patients were recorded in prepared checklists based on the existing records. Radiographies of all patients were reevaluated by an oral and maxillofacial radiologist and abnormal changes were recorded in check lists. Histopathological examination was also made by an oral pathologist based on the criteria of the World Health Organization (Kramer *et al.*, 1992).

Data were subjected to descriptive statistical analysis using SPSS version11 Statistical package (SPSS Inc., Chicago, USA)

RESULTS AND DISCUSSION

Among the 4215 records from the Archive of Oral Medicine Department at MUMS during a period of six years, 58 presented criteria of OCs. 35 cases (60.3%) were observed in men and 23 (39.7%) in women. Most of OCs were presented in the second decades of life (18 cases). The prevalence of the cysts was decreased with increasing the age.

Odontogenic Keratocyst (OKC) was the most common diagnosis (34.5%). Calcifying Odontogenic cyst (COC) (22.4%) and Infected Odontogenic cyst (17.2%) were other most common diagnosis. The prevalence of these lesions is shown in Table-1.

Most cases were located in mandible (65.5%). All the patients had clinical symptoms in referring time except one case whose lesion was accidentally diagnosed in dental radiography. The most common clinical presentation was cortical expansion (55%). Cortical perforation was reported in 12.5% of cases. (Table-2, Table-3)

Dental luxation was found only in 3 cases. 60.7% of lesions were painless and most of painful cases were infected. 3 cases (2 OKC and one COC) were reported in both jaws. Most of mandibular lesions were located in premolar and molar area but anterior and posterior parts of maxilla were equally involved. 80% of the lesions appear as solitary lesions.

In radiography, 94.8% of the lesions were radiolucent and the others were mixed. Most of radiolucent lesions were unilocular. Multilocular features were observed in COC and OKC cases. Well defined border was observed in 96.4% of cases which most of them were corticated. Scalloped border was reported in 40% of OKC cases. (Table-4)

Most of the cysts were associated with teeth (70%) and in 40.6% of cases this association was pericoronary, 24.6% was periapical and 5.8% of cases were inter-radicular.

Tooth displacement, root resorption was observed in 40% and 20% of cases respectively.

Table 1: Rank order distribution of odontogenic cysts by frequency 2002-2008

Cysts	Number	%	Females	Males	Most common decade
OKC	20	34.5	7	13	2
COC	13	22.4	5	8	4
Infected odontogenic cyst	14	24.1	5	10	2
Dentigerous cyst	5	8.6	3	2	1
Eruption cyst	2	3.4	1	1	1
Glandular odontogenic cyst	2	3.4	1	1	3,5

Table 2: Clinical characteristics of odontogenic cysts

Tooth displacement	Dental luxation	Bucco-lingual expansion	Pain	Swelling	
25%	8.3%	58%	50%	91.7%	OKC
70%	20%	80%	15%	80%	Dentigerous
11%	0%	44.4%	11%	100%	COC
0%	0%	25%	100%	100%	Radicular cyst
-	-	50%	100%	100%	Eruption cyst
-	-	-	-	-	Glandular odontogenic cyst

Table 3: Distribution of location of odontogenic cysts

	Maxilla	Mandible	Both jaws
OKC	25%	65%	10%
Dentigerous cyst	20%	80%	-
COC	46.2%	46.2%	7.7%
Radicular cyst	55.6%	44.4%	-
Glandular odontogenic cyst	50%	50%	-
Eruption cyst	-	100%	-

Table 4: Radiographic characteristics of odontogenic cysts

	Round	Scalloped	Irregular	Lucent	Mixed	Unilocular	Multilocular	Well defined	Ill defined
OKC	60%	40%	-	100%	-	56.3%	43.8%	100%	-
COC	50%	41.7%	8.3%	77%	23%	62.5%	37.5%	83.3%	16.6%
Radicular cyst	75%	25%	-	100%	-	100%	-	100%	-
GOC	50%	50%	-	100%	-	100%	-	100%	-
Eruption cyst	100%	-	-	100%	-	100%	-	100%	-

Discussion:

OCs are one of the most prevalent oral lesions that have similar clinical and radiographic features and their diagnosis should be based on careful examination of clinical, radiographic and histopathological characteristics (Jones *et al*, 2006).

Awareness of incidence of OCs and their prevalent sites of presentation may help practitioners to make a likely clinical diagnosis (Jones *et al*, 2006).

Comparing the results of our study with those published by other authors showed some differences. In contrast with many other studies the most common cyst in our study was OKC, but in other studies radicular cyst was the most frequent type (Jones *et al*, 2006; Ochsenius *et al*, 2007; Ledesma-Montes *et al*, 2000; Mosquita-Taylor *et al.*, 2002; Meningaud *et al*, 2006; Gultelkin *et al*, 2003). Although, in studies involving Mexican population developmental cysts were more prevalent than inflammatory cysts (Ledesma-Montes *et al*, 2000; Tortorici *et al*, 2008).

This difference may show the effect of socioeconomic factors on frequency of OCs. On the other hand the place that the studies have been done seems to influence the results of the study. Our study was done in an academic place and radicular cysts are usually treat in private and didn't refer to oral medicine departments. Mosquita-Taylor *et al.* observed a higher frequency of developmental OCs in patients attending in private clinics and higher prevalence of inflammatory OCs in patients referring to public health services (Mosquita-Taylor *et al.*, 2002).

The mean age at diagnosis was significantly lower than most studies (De Souza *et al*, 2010; Jones *et al.*, 2006). It may be as the result of early referral or diagnosis of these lesions or may be related to more exposure of patients to predisposing factors of OCs in our province.

Males were predominantly involved with an M/F ratio of 1.5 which was in agreement with some studies (De Souza *et al*, 2010; Jones *et al.*, 2006; Avelar *et al.*, 2009; Tortorici *et al*, 2008; Kaplan *et al.*,2005) but in disagreement with the study of Ochsenius and Ledesma-Montes (Ledesma-Montes *et al*, 2000; Ochsenius *et al.*, 2007).

This higher prevalence in men in our study may be related to worse oral hygiene and more susceptibility to trauma (Prock *et al.*, 2008).

Most of mandibular lesions were located in posterior area and OKC was more prevalent in mandible which has been reported as the most common location of OCs in other studies (Avelar *et al.*, 2009; Koseoglu *et al.*, 2004, Tortorici *et al*, 2008, Jones *et al*, 2006). Maxillary OKCs were more prevalent in anterior area.

The most common clinical feature was swelling in patients with OKC and fifty percent of them had complained of pain feeling. Dental luxation and tooth displacement was also observed in some cases.

Predominant radiographic feature of OKC was a well defined, corticated, unilocular radiolucency (56.3%), although multilocular radiolucency was observed in panoramic radiography in some patients. Seven cases were peri-coronary, one case was inter-radicular and 2 cases were peri-apically located.

Most cases of OKC were diagnosed in second and third decades of life respectively. This finding was in concordance with most of studies (Jones *et al.*, 2006; Ochsenius *et al.*, 2007; Ledesma-Montes *et al*, 2000; Meningaud *et al*, 2006), but in some researches higher age distribution was found (De Souza *et al*, 2010;)

This finding was compatible with other studies (Kaplan *et al.*, 2005; MacDonald-Jankowski *et al.*, 2010) Tooth displacement and root resorption was reported in 8 and 4 cases respectively.

Calcifying odontogenic cyst (COC) was a term first described by Gorlin in 1962; it can present in a solid or cystic variant. The solid kinds tend to more aggressive behavior (Hong *et al*, 1991). Controversy exists in classification of COC as a cyst or tumor or both (Hong *et al*, 1991; Buchner *et al*, 1991). World Health Organization describes these lesions as a benign cystic neoplasm of odontogenic origin (Praetorius *et al*, 2005). In order to compare we included these lesions under the category of odontogenic cysts. The second most prevalent cyst in our study and bucco-lingual expansion, tooth displacement, dental luxation and pain feeling was reported in most cases. COC was found to occur in fourth decade of life in this study which was different with other similar studies (Eshghyar *et al.*, 2006; Jones *et al*, 2006). They had more tendencies to premolar area of mandible which was anterior in comparison with other studies (Eshghyar *et al.*, 2006). Most of COCs were seen as unilocular radiolucency in radiography, but multi-locular radiolucency and mixed radiolucencies were also observed in some cases.

An important finding in our study was the tendency of COC to inter-radicular area (57.1%), which is rare for these lesions and most cases of tooth contacting COCs are peri-coronal lesions in radiography (Eshghyar *et al.*, 2006; Wood and Goaz, 1997).

In disagreement with other studies radicular cysts in our study were painful (Koseoglu *et al.*, 2004; Cawson *et al.*, 2002). This can be the result of late referral of patients for treatment and secondary infection. Radicular cysts were reported as round, corticated unilocular radiolucency. Tooth displacement and root resorption were also observed. These findings were compatible with other studies. (Koseoglu *et al.*, 2004; Scholl *et al.*, 1999).

Dentigerous cysts were presented as well-defined, corticated, unilocular radiolucency in radiography. Root resorption was more common in dentigerous (40%) cyst compared with OKC (20%). In clinical examination bucco-lingual expansion, tooth displacement, dental luxation and pain feeling was reported. In agreement with other studies, these cysts were more common in the mandibular third molar area in our study (Ochsenius *et al.*, 2007; De Souza *et al*, 2010; Jones *et al.*, 2006)

The results of our study were in concordance with earlier studies in some aspects, but some differences were also observed which is probably relates to differences in lifestyle, racialism and living environment.

Conclusion:

This paper reports the prevalence of OCs and explains clinical and radiographic characteristics of these lesions in our center. These findings are key aspects of early detection and adequate treatment of odontogenic cysts.

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