

Original Article

Odontogenic and Nonodontogenic Cysts: An Analysis of 526 Cases in Turkey

A Kilinc, B Gundogdu¹, N Saruhan, E Yalcin, U Ertas, G Urvasizoglu

Department of Oral and Maxillofacial Surgery, Faculty of Dentistry, Ataturk University,
¹Department of Pathology, Faculty of Medicine, Ataturk University, Erzurum, Turkey

ABSTRACT

Purpose: The aim of this study was to determine the age, gender, and sites of different types of odontogenic cysts (OCs) and non-OCs (nOCs) (seen in eastern Anatolian population in Turkey). **Materials and Methods:** The following data were collected from the clinical records and histopathology reports of the Department of Oral and Maxillofacial Surgery and the Department of Oral Pathology, Ataturk University, Turkey, during a period of 10 years. They were analyzed descriptively in terms of incidence, age, sex, cyst type, and site. **Results:** A total of 526 cysts were diagnosed during a 10-year period. Of these, 330 (62.7%) were in males, and 196 (37.3%) were in females, the male:female ratio was 1.7:1. There were 509 (96.8%) OCs and 17 (3.2%) nOCs. There were 406 (77.2%) inflammatory OCs and 103 (19.6%) developmental OCs. Radicular cysts were the most frequent (66.4%), followed by dentigerous (19.2%) and residual (10.8%) cysts. Only nasopalatine duct cyst was found as nOC in this study (3.2%). **Conclusion:** The distribution of jaw cysts in the Turkish Eastern Anatolian population is relatively similar to that of other populations reported in previous studies in the literature, in which most OCs were of inflammatory origin. However, the relative rates of cysts were higher than those reported in other studies.

KEYWORDS: Histopathological subtypes, nonodontogenic cyst, odontogenic cyst

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INTRODUCTION

Jaw bone cysts are represented by a pathological epithelium-covered cavity that usually contains fluid or semisolid material. Odontogenic cysts (OCs) arise from the epithelial components of structures and remnants associated with tooth development.^[1] OCs, which are one of the most common lesions of the jaws, are divided into two basic groups including developmental or inflammatory.^[2] Non-OCs (nOCs) arising from the ectoderm involved in facial tissue development may also occur in the jaw.^[1]

The prevalence of OCs and nOCs may vary according to the population or geographic location. There have been many studies in various countries on OCs and nOCs. However, there are only a few studies in the English-language literature on OCs in the Turkish population,^[3-5] and there is no information on these cysts in the Turkish Eastern Anatolian population.

Therefore, the purpose of the present study was to determine the age, gender, and sites of different types of OCs and non-OCs seen in eastern Anatolian population in Turkey.

MATERIALS AND METHODS

The clinical records and histopathology reports of patients diagnosed with OCs and nOCs from 2005 to 2015 were obtained from the files of the Department of Oral and Maxillofacial Surgery, Faculty of Dentistry and the Department of Oral Pathology, Faculty of Medicine, Ataturk University, Erzurum, Turkey. All case records were re-evaluated to classify the lesions according to the criteria of the World Health Organization (WHO) 2005. The prevalence, lesion type and site, age and sex of the

Address for correspondence: Dr. A Kilinc,
Department of Oral and Maxillofacial Surgery, Faculty of
Dentistry, Ataturk University, 25040 Erzurum, Turkey.
E-mail: adnankilin@yahoo.com

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patient were recorded and descriptively analyzed. With regard to the cystic sites, the maxilla, and mandible were divided into three anatomic regions: Anterior, premolar, and molar. The molar area of the mandible also included the angle and ramus. Incomplete clinical data reports with a doubtful or controversial diagnosis were excluded from the study.

RESULTS

A total of 526 cysts were diagnosed during a 10-year period. Of these, 330 (62.7%) were in males, and 196 (37.3%) were in females, the male:female ratio was 1.7:1. There were 509 (96.8%) OCs and 17 (3.2%) nOCs. There were 406 (77.2%) inflammatory OCs and 103 (19.6%) developmental OCs.

With regard to the OCs, radicular cysts were the most frequent (66.4%), followed by dentigerous (19.2%) and residual (10.8%) cysts. Only nasopalatine duct cyst (NPDC) was found as nOC in this study (3.2%).

Table 1 shows the distribution sites of the different types of cysts according to gender. The male:female

ratio was 1.4:1 for radicular cysts, followed by 2.7:1 for dentigerous cysts 2:1 for residual cysts, and 2.4:1 for NPDCs.

The age of the patients with OCs and nOCs ranged from 5 to 81 years (mean age: 33.1 years, standard deviation: 15.6 years). Table 2 shows the distribution of the cysts according to the age group. The cysts were most common in the second (92 cases, 17.5%), third (148 cases, 28.1%), fourth (105 cases, 20%), and fifth (75 cases, 14.3%) decades, with a peak in the third decade (148 cases, 28.1%). The radicular and dentigerous cysts were most frequent in the third decade. The residual cysts were most frequent in the fourth and fifth decades.

Table 3 shows the distribution of cysts according to their locations. As shown, 51.5% of cases were located in the maxilla, and 48.5% of cases were located in the mandible, with an almost equal distribution.

The most frequent sites were the maxillary anterior region (33.5%), followed by the mandibular molar/ramus region (22.1%), mandibular anterior region (15.2%),

Table 1: Distribution of odontogenic cysts according to gender

Pathology	Male	Female	Male:Female ratio	Total (%)
Odontogenic				
Inflammatory cysts				
Radicular	205	144	1.4:1	349 (66.4)
Residual	38	19	2:1	57 (10.8)
Total	243	163	1.5:1	406 (77.2)
Developmental cysts				
Dentigerous	74	27	2.7:1	101 (19.2)
Lateral periodontal	1	1	1:1	2 (0.4)
Total	75	28	2.7:1	103 (19.6)
Nonodontogenic				
NPDC	12	5	2.4:1	17 (3.2)
Total	330 (62.7)	196 (37.3)	1.7:1	526 (100)

NPDC=Nasopalatine duct cyst

Table 3: Distribution of odontogenic tumours according to location

Pathology	Maxilla			Mandible		
	Anterior	Premolar	Posterior	Anterior	Premolar	Molar/ramus
Inflammatory cysts						
Radicular	134	37	26	69	38	45
Residual	4	7	12	6	9	19
Developmental cysts						
Dentigerous	20	4	9	5	11	52
Lateral periodontal	1				1	
Nonodontogenic						
NPDC	17	0	0	0	0	0
Total	176	48	47	80	59	116
All of total	271			255		

NPDC=Nasopalatine duct cyst

Table 2: Distribution of odontogenic tumours according to age group

Pathology	0-9	10-19	20-29	30-39	40-49	50-59	60-69	>70	Mean
Inflammatory cysts									
Radicular	6	63	110	79	46	31	8	6	31.4
Residual	1	2	3	8	13	15	8	7	48.8
Developmental cysts									
Dentigerous	5	23	31	15	13	9	4	1	29.5
Lateral periodontal	0	1	0	1	0	0	0	0	24.5
Nonodontogenic									
NPDC	0	3	4	2	3	2	3	0	36.1
Total	12	92	148	105	75	57	23	14	33.1

NPDC=Nasopalatine duct cyst

Table 4: Prevalence of cysts in the some studies according to contain odontogenic keratocyst

	Radicular			Residual			Dentigerous			Lateral periodontal			NPDC			OKC			Other			Total		
	n	Percentage	%	n	Percentage	%	n	Percentage	%	n	Percentage	%	n	Percentage	%	n	Percentage	%	n	Percentage	%	n	Percentage	%
Our study	349	66.35		57	10.84		101	19.2		2	0.38		17	3.23		-	-		-	-		526		100
Grossmann <i>et al.</i> (Brazil) ^[15]	1772	65.7 (61.0)		-	-		735	27.25 (25.3)		7	0.26 (0.2)		64	2.37 (2.2)		-208	-7.2		119	4.42 (4.1)		2697 (2905)		100 (100)
Avelar <i>et al.</i> (Brazil) ^[16]	265	52.26		30	5.92		156	30.77		11	2.17		-	-		-	-		45	8.88		507		100
Prock <i>et al.</i> (Brazil) ^[6]	493	72.5 (69.63)		29	4.26 (4.09)		151	22.2 (21.33)		2	0.29 (0.28)		-	-		-28	-3.95		5	0.74 (0.71)		680 (708)		100 (100)
Ochsenius <i>et al.</i> (Chile) ^[8]	1494	59.22 (50.75)		328	13 (11.14)		546	21.64 (18.54)		17	0.67 (0.58)		-	-		-421	-14.3		138	5.47 (4.69)		2523 (2944)		100 (100)
Meningaud <i>et al.</i> (France) ^[12]	372	66.19 (53.53)		32	5.69 (4.60)		154	27.4 (22.16)		2	0.36 (0.29)		-	-		-133	-19.13		2	0.36 (0.29)		562 (695)		100 (100)
Sharifian <i>et al.</i> (Iran) ^[17]	465	47.06 (37.90)		99	10.02 (8.07)		303	30.67 (24.69)		7	0.71 (0.57)		-	-		-239	-19.47		114	11.54 (9.29)		988 (1227)		100 (100)
Tortorici <i>et al.</i> (Italy) ^[14]	1107	85.61 (84.5)		-	-		149	11.52 (11.37)		-	-		-	-		-17	-1.30		37	2.86 (2.82)		1293 (1310)		100 (100)
Ali (Kuwait) ^[3]	95	53.37		8	4.49		51	28.65		-	-		11	6.18		-	-		13	7.3		178		100
Mosqueda-Taylor <i>et al.</i> (Mexico) ^[9]	342	50.89 (39.95)		19	2.83 (2.22)		283	42.11 (33.06)		7	1.04 (0.82)		-	-		-184	-21.50		21	3.12 (2.45)		672 (856)		100 (100)
Nuñez-Urrutia <i>et al.</i> (Spain) ^[2]	210	50.24		18	4.31		91	21.77		7	1.67		-	-		-	-		92	22.01		418		100
Jones <i>et al.</i> (UK) ^[7]	3724	59.18 (52.30)		573	9.11 (8.05)		1292	20.53 (18.14)		28	0.44 (0.39)		-	-		-828	-11.62		676	10.74 (9.49)		6293 (7121)		100 (100)
Daley <i>et al.</i> (USA) ^[8]	4468	64.31 (61.36)		-	-		1662	23.92 (22.82)		106	1.53 (1.46)		295	4.25 (4.05)		-335	-4.6		416	5.99 (5.71)		6947 (7282)		100 (100)

Prevalence of cysts excluding OKC (prevalence of cysts including OKC). NPDC=Nasopalatine duct cyst; OKC=Odontogenic keratocyst

mandibular premolar region (11.2%), maxillary premolar region (9.1%), and maxillary molar region (8.9%).

Radicular cysts were the most frequently seen cysts in all the regions, except for the mandibular molar/ramus. Dentigerous cysts were the most frequent (52 cases, 9.9%) in the molar/ramus of the mandible.

DISCUSSION

Cysts are more common in the jaws than in the other bones in the body due to tooth development.^[4] The WHO classified jaw cysts, including OCs and nOCs. According to the latest WHO update in 2005,^[6] odontogenic keratocysts involved in the developmental OC class are now included in the classification of benign odontogenic epithelial tumors as a keratocystic odontogenic tumor. The present study was based on the 2005 classification, and odontogenic keratocysts were excluded. Table 4 provides a comparison of the findings of our study with those of earlier work. As can be seen from the table, many other studies also adopted the 2005 classification system.

In this study, cysts were more frequent in men than in women, similar to the findings of previous studies.^[3,4,6-14] The maxilla was the most frequently affected anatomical site, which is in agreement with the findings of some^[6,8,10] but not all studies.^[2,12]

Inflammatory OCs accounted for a large percentage of the cysts, similar to the findings of previous studies.^[2,3,6,7,9,11,15] Radicular cysts are the most common type of jaw cyst and are generally found in the apex of a tooth. They usually occur following the development of periapical granuloma from the necrotic remnants of the dental pulp. Chronic inflammation of this tissue initially stimulates the cell rests of Malassez, resulting in epithelial proliferation. This initiation phase is followed by a phase of cystic development, followed by cystic growth.^[1,6]

In this study, radicular cysts were the most commonly observed lesions. They were most common in the maxillary anterior region, similar to that reported in most studies.^[3,4,6-8,14,15] This situation can be caused by patients not wanting to lose their teeth in this region due to aesthetic concerns, even when treatments fail.^[5,6,8] As a result, long-term chronic inflammation may occur and induce cyst development in periapical tissues.^[6] In the present study, radicular cysts were most common in the second, third, and four decades, with a peak incidence in the third decade, similar to that found in other large series.^[6-8,10,11]

With regard to gender, in the current study, radicular cysts were the most prevalent in males (M:F, 1.5:1), in

agreement with the findings of some^[4,7,10,12] but not all studies.^[8-11] In the literature, the higher prevalence of radicular cysts in males was attributed to men usually having poorer oral hygiene habits than women and to them being more susceptible than women to oral trauma.^[12]

Dentigerous or follicular cysts are fluid-filled expansions of the dental follicles and are attached to the crown of the unerupted tooth at the cemento-enamel junction.^[1] Dentigerous cysts were the second most frequent OCs in this study, in agreement with most previous reports.^[3,6-12] The higher male prevalence among those with dentigerous cysts in the present study is in agreement with the findings of many studies,^[3,4,7-12,14] although one study^[6] reported a slight female predominance. In this study, the prevalence of dentigerous cysts was highest in the second and third decades of life, in accordance with most other studies.^[6,11,15] A study reported a greater prevalence of dentigerous cysts in the fifth and sixth decades.^[7] In the current study, the most common settlement areas were the mandibular ramus/molar region, followed by the anterior maxilla, which is in agreement with that of other studies.^[6-8,10] This may be due to the fact that mandibular third molars and maxillary canines are the most commonly impacted teeth.^[6]

Residual cysts develop from residual periapical infections or cystic fragments left following extraction of a nonvital tooth.^[1] In this study, residual cysts were the third most common cyst, in agreement with the findings of some studies.^[13,16,17,18] However, in the majority of studies including odontogenic keratocysts were reported to be the fourth most frequent type of cyst.^[7-12] In this study, the cases occurred more often in males than in females in accordance with previous reports,^[6-10,12] and those in the fourth decade of life and later were most affected. The peak age of incidence was the sixth decade of life. Most studies reported that these cysts were more common in the fourth decade of life and later.^[6-8] Similar to an earlier study,^[6] the mandible was more frequently affected than the maxilla in the present study. In other studies,^[3,8] residual cysts were most frequently found in the maxilla. In this study, residual cysts were seen most frequently in the maxillary and mandibular molar region. This may be due to the loss of more molars.

Nasopalatine or incisive canal cysts are nOCs that arise from the epithelial remnants of the embryonic nasopalatine ducts. They occur during the creation of the incisive canal by the fusion of the premaxilla with the palatine processes of the maxillary bones.^[1] In the present study, NPDCs were only non-OC, accounting for 3.2% of cases. Previous studies reported a prevalence of

NPDCs of between 1.3% and 2.2%,^[3,7,11,15] which is lower than what was found in our study.

CONCLUSION

Based on our findings, the distribution of jaw cysts in the Turkish eastern Anatolian population is relatively similar to that of other populations reported in previous studies in the literature, in which most OCs were of inflammatory origin. However, the relative rates of cysts were higher than those reported in other studies. The difference is likely due to the fact that we did not include odontogenic keratocysts in the present study.

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Conflicts of interest

There are no conflicts of interest.

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