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Original

Prevalence and distribution of odontogenic cysts in Sicily: 1986 - 2005

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Abstract: The objective of this study was to assess the prevalence of odontogenic cysts (OCs) in Sicily and evaluate their distribution during a 20-year period. A cross-sectional retrospective study was carried out in 1,310 cysts of the jaw diagnosed in 12,197 individuals, who consecutively attended the Odontostomatologic Clinic of Palermo from 1986 to 2005. 1,273 cysts were classified as odontogenic, whereas only 37 were non-odontogenic. In the former group, the most frequent lesions were radicular cysts (84.5%), followed by dentigerous OCs (11.4%). Inflammatory radicular cysts were observed more in male gender, younger age at diagnosis and anterior maxilla as site of presentation. Unlike dentigerous cysts, the frequency of radicular cysts decreased from 10.4% in 1986-1995 to about 8% in 1996-2005 ($P < 0.0001$). Inflammatory radicular cysts are the most represented group among OCs in our area with a higher prevalence than that reported in other countries. The decreasing epidemiologic trend with time could be attributed to the possible changes in individual oral health behavior. (J. Oral Sci. 50, 15-18, 2008)

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Introduction

Odontogenic cysts (OCs) are relatively rare cystic lesions that affect the maxillofacial region. According to the most recent World Health Organization (WHO) International Classification (1), OCs were classified into two main groups that reflect their pathogenesis. The first group includes radicular cysts, recognizing its inflammatory origin and development as the consequence of advanced caries and dental pulpar necrosis (2), whereas in the second group, lesions of developmental origin namely, dentigerous cysts and keratocysts are included.

Although the prevalence of OCs in several European and non-European countries has been reported and different risk factors (dental trauma, sex, long-term chronic phlogistic processes, high caries index in early age and oral hygiene) have been mentioned as contributing to these lesions (2-5), there is still a general lack of data. In Sicily, the only data published is limited to a survey regarding keratocysts observed in the eastern part of the island (6). The aim of this study was to assess the prevalence of OCs in our country and evaluate their distribution in relation to social, demographic and behavioral data of the patients who visited for all oral pathological lesions during 20 years.

Materials and Methods

Study population

A retrospective survey was carried out in 12,197 individuals, who consecutively attended the Odonto-stomatologic Clinic of the University of Palermo from 1986 to 2005 for all oral pathological lesions.

A total of 1,310 patients were diagnosed to be affected by cysts of the jaw (708 males and 602 females; mean age

35.1 years) during the study period, based on histopathological examination and the International Classification of WHO (1).

Demographic and social data of patients, including age, gender, birthplace, residence, marital status and smoking habits, were collected together with clinical records during the visits. The site of the lesion was also registered on the basis of local presentation (maxilla and mandible divided for anterior and posterior, this was further distinguished as premolar and molar region).

Statistical analysis

Data were analyzed by applying the χ^2-test (Mantel-Haenszel) and a P-value ≤ 0.05 was considered significant. The analysis was performed using Microsoft Excel™ version 2003.

Results

A total of 1,310 out of 12,179 patients (10.4%) were affected by cysts of the jaw at the Odontostomatologic Clinic of University of Palermo, during the study period. Table 1 shows the prevalence of odontogenic cysts and non-odontogenic cysts distributed by histological findings, gender and age. Overall, odontogenic cysts were diagnosed more frequently in males (54.4%) with a Male/Female (M/F) ratio of 1.19, higher than that observed in the total patients who attended the clinic for all oral pathological lesions (12,179 with an M/F ratio of 0.86; data not shown). The most frequent lesions were radicular cysts that included 1,107 cases (84.5%) with an M/F ratio of 1.15 and a mean age of 35.6 years at the time of diagnosis.

In the second group, accounting for 149 dentigerous OCs (11.4%), 91 cysts were diagnosed in males and 58 in females with an M/F ratio of 1.57 and a mean age of 31 years. The odontogenic keratocysts represented a minority of the diagnosed lesions of the jaw and affected 17 individuals (1.3%) with an M/F ratio of 1.12 and a mean age at presentation of 39.1 years. Moreover, the distribution of non-odontogenic cysts (pseudocysts and fissural) is also described in Table 1, although this latter group accounted for a non significant number of observations.

Figure 1 depicts the distribution by age (decades) of the two major groups of odontogenic cysts accounting for more than 95% of all cysts observed during the study

Table 1 Distribution of all the cysts according to histopathology, gender and age of affected patients

	Total (%)	Male (%)	Female (%)	Sex ratio (M:F)	Mean age (± SD)
Odontogenic cysts	1,273 (100%)	692 (54.4%)	581 (45.6%)	1.19	35.1 (± 16.7)
Radicular	1,107 (84.5%)	592 (53.5%)	515 (46.5%)	1.15	35.6 (± 16.1)
Dentigerous	149 (11.4%)	91 (61.1%)	58 (38.9%)	1.57	31 (± 19.8)
Keratocyst	17 (1.3%)	9 (52.9%)	8 (47.1%)	1.12	39.1 (± 19.6)
Non odontogenic cysts	37 (100%)	16 (43.2%)	21 (56.8%)	0.76	34 (± 16.7)
Pseudocyst*	28 (2.1%)	12 (42.9%)	16 (57.1%)	0.75	34.3 (± 16.9)
Fissural	9 (0.7%)	4 (44.4%)	5 (55.6%)	0.8	33.1 (± 17)
Total	1,310 (100%)	708 (54%)	602 (46%)	1.18	35.1 (± 16.7)

*Pseudocysts were classified according to the International Histological Classification of tumors, WHO, 1992 (1).

Table 2 Distribution of location of odontogenic cysts

Odontogenic cysts	Maxilla n = 651			Mandible n = 622		
	Anterior	Posterior		Anterior	Posterior	
	(%)	Premolar (%)	Molar (%)	(%)	Premolar (%)	Molar (%)
Radicular	404 (68.6)	103 (17.5)	82 (13.9)	215 (41.5)	126 (24.3)	177 (34.2)
Dentigerous	44 (72.1)	17 (27.9)	0 (0)	22 (25)	62 (70.5)	4 (4.5)
Keratocysts	0 (0)	0 (0)	1 (100)	0 (0)	0 (0)	16 (100)
Total	448 (68.8)	120 (18.4)	83 (12.7)	237 (38.1)	188 (30.2)	197 (31.7)

period. Although dentigerous cysts represent the most prevalent OCs in the first decade of life, with an increase in age, radicular cysts become the most frequently observed, reaching a peak during the third decade and progressively declining, although maintaining a ratio, with the dentigerous ones, ranging from 0.06 to 0.2.

Table 2 shows the site of presentation of odontogenic cysts at diagnosis by location in maxilla or mandible bone. Radicular cysts were located prevalently in the anterior part of both maxilla and mandible (68.6% and 41.5% respectively); whereas dentigerous cysts developed preferentially in the anterior part of maxilla (72.1%) and in the posterior premolar part of mandible (70.5%). Keratocysts were most commonly found in the posterior molar part of the mandible, but for one that was found in the posterior molar part of maxilla.

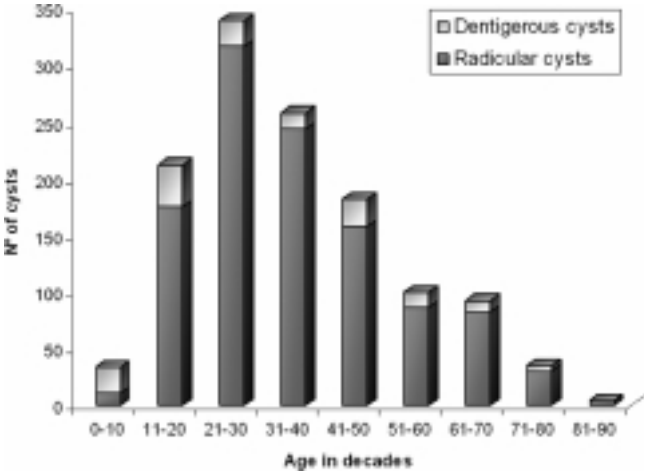

Fig. 1 Distribution of radicular and dentigerous cysts in different decades of age.

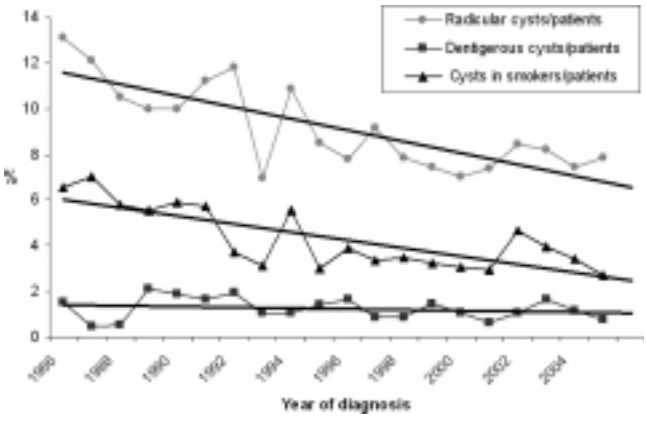

Fig. 2 Prevalence of radicular (—▪—) and dentigerous cysts (—▪—) among the 12,197 individuals with all oral pathological lesions, who visited the Odontostomatology Clinic of the University of Palermo during the study period.

Finally, Fig. 2 presents the temporal trends throughout the study period of the prevalence of odontogenic cysts (radicular and dentigerous) observed among patients, who attended the Odontostomatologic Clinic of the University of Palermo from 1986 to 2005 for all oral pathological lesions. In the same figure, the temporal trend of smoking habits in the same population is also shown. While the prevalence of dentigerous cysts showed a steady trend with time, the frequency of radicular cysts decreased from 10.4% in 1986-1995 to about 8% in 1996-2005 (Chi-square 23.83; $P < 0.0001$).

To a lesser extent, smoking habits also decreased with time among study population, showing an impressive year by year parallelism with the prevalence of radicular cysts.

Discussion

This study examined the distribution and correlations of odontogenic cysts in the Sicilian population. Odontogenic cysts accounted for 1,273 over 1,310 cysts of the jaw in 12,197 patients, who visited the Odontostomatologic Clinic of the University of Palermo during a 20-year period. Although this pathological lesion is considered relatively rare, several authors (7-10) have reported the prevalence of OCs in other countries.

In general, the prevalence and distribution of OCs among Sicilian people shows some similarity to that reported in other studies (5,7), such as the slight predominance of this pathology among males with a higher frequency observed in young adults. In our country, radicular cysts constituted the most prevalent group, accounting for 84.5% of all the cysts of the jaw. This was higher than that reported in the UK, Canada and Mexico, where radicular cysts also represented the main group, but reaching a prevalence of 52.3%, 65.1% and 38.8%, respectively. However, the distribution by gender showed a pattern similar to that reported by others (4,7,8).

The inflammatory genesis of radicular cysts was, to date, related to possible long-term chronic phlogistic processes, more frequently in males who neglected oral hygiene (5,7), as well as to a greater frequency of trauma in the more common site of presentation (anterior maxilla) (9). Ochsenius et al. (2) underlined the possibility that this preferential localization in the upper anterior zone may be due to long-term inflammatory processes in people who, because of aesthetic appearance, retained their teeth with advanced caries. Our results confirm that these explanations may also be applicable in Sicily, since in our study we also found a higher predominance of radicular cysts in men (53.5%), preferred site in the anterior maxilla and a lower mean age of affected patients than previous reported (4,7,9).

Unfortunately, a major limitation of this work is the lack of precise data regarding oral hygiene habits, although the reduction in prevalence of radicular cysts in our population during the 20 years of observation could indirectly suggest an increasing attention to oral health habits. This last data could be confirmed by the decrease in the caries index recently observed by Campus et al. (11) among children living in Sardinia Island.

Furthermore, our results suggest an intriguing parallelism with time between the decrease of smoking habits and the prevalence of radicular cysts in the same population. Data reported by the Italian National Institute for Statistics indicate that in Sicily, the percentage of smokers in both genders decreased from 26.2% in 1995 to 23.3% in 2002 (12). Because of the lack of information from the clinical records of cysts-affected patients, we cannot consider smoking as a risk factor associated with the development of OCs. However, as smoking is an important risk factor for dental caries and chronic inflammatory processes (13), this finding, although it needs to be further confirmed, nonetheless highlights the possible role played by smoking in these pathologies.

Dentigerous cysts were the second most frequently diagnosed lesions with a total frequency of 11.4% and an M/F ratio of 1.57. This result is moderately lower than that observed in other countries (2,4,7), probably because of the high proportion of radicular cysts in our survey. Moreover, dentigerous cysts showed an early mean age at diagnosis than radicular ones (31 vs 35.6 years) with a peak in the first two decades of life, according to the trend reported in other studies (2,4). Odontogenic keratocysts in our survey accounted for 1.3% of all OCs with a prevalence lower than that in the UK and Canada, while the general distribution in Sicily paralleled the M/F ratio and mean age at diagnosis reported in those countries (7,8).

In conclusion, this paper reports the most complete series of OCs yet recorded in our setting, thus contributing to the knowledge regarding global epidemiology of OCs. It also illustrates the importance of implementing clinical records with data regarding the aptitude and behavior in oral hygiene as well as in life style for prevention of oral diseases among the general population.

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