Received: 6 June 2016 **Accepted: 3 Oct. 2016**

Frequency of oral and maxillofacial giant cell lesions in Iran in a period of 22-year (1991-2012)

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Original Article

Abstract

BACKGROUND AND AIM: Giant cell lesions as a group of the oral and maxillofacial lesions are common and potentially destructive. The aim of this study was to assess the frequency of oral lesions containing giant cells in a 22-year period in Isfahan Dental School, Iran.

METHODS: In this epidemiological, cross-sectional, retrospective study the archive information in the Department of Oral Pathology, School of Dentistry between 1991 and 2012 was used. All information obtained from the patients records with giant cell lesions [peripheral giant cell granuloma (PGCG), central giant cell granuloma (CGCG), aneurysmal bone cyst, and Cherubism and Brown tumor] were analyzed using SPSS, chi-square test and Fisher ($P < 0.050$).

RESULTS: Of the 8217 cases with pathology records, 591 cases (7.1%) were giant cell lesions. The most common lesion was PGCG (68.5%). The prevalence of lesions in the mandible was more than the maxilla ($P = 0.039$), and also the prevalence of these lesions in woman was slightly more than men ($P = 0.078$).

CONCLUSION: The giant cell lesions were more common in women and in the mandible. They were seen more frequently in the second decade of life. Regards the results of this study, we can prevent PGCG using methods such as improvement of oral hygiene.

KEYWORDS: Epidemiology; Giant Cells; Granuloma

Citation: Kargahi N, Keshani F, Fanaei M, Arefian M. **Frequency of oral and maxillofacial giant cell lesions in Iran in a period of 22-year (1991-2012).** J Oral Health Oral Epidemiol 2017; 6(1): 48-53.

Knowledge of clinical epidemiology and clinical features of lesions can lead to early diagnosis and proper control of each lesion. This could be avoided the affected areas from further damages. Giant cell lesions are some of the potentially destructive oral jaw lesions which have shown significant outbreak in various studies.[1] Giant cell lesions of the jaws were separated from other jaw lesions by Jaffe[2] when they were termed "giant cell reparative granulomas."[1] These lesions which show multinucleated giant cells in histopathologic features composed of central giant cell granuloma (CGCG), peripheral giant cell granuloma (PGCG), giant cell tumor (GCT), aneurysmal bone cysts (ABC), brown tumors associated with hyperparathyroidism and Cherubism disease.[1]

Katsikeri et al.[3] have reported PGCG was more prevalent in the fourth to sixth decades of life and in females. Some researchers believe that this lesion can cause by local irritation factors such as improper prosthesis and accumulation of plaque.[4-6] Neville et al.[7] discussed a wide age range for this lesion

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from first to sixth decades of life. The mean age of the patients ranged from 31 to 41 years in several extensive reviews, and this lesion has been reported in females.[7]

In one study, incidence of CGCG was estimated 0.001% in the general population[8] and Jadu et al.[9] showed 60% of cases occur before age 30. Gungormus and Akgul[10] in a study reported that CGCG has been occurred in 89% of cases before the age of 40% and 78% of cases presented in females.

ABC, at first, was described by Jaffe and Lichtenstein.[11] It is an uncommon lesion which in a 20-year study only 17 cases have been reported.[12] Cherubism is a rare non-neoplastic genetically inherited disease and tends to involve the mandible more than maxilla.[13]

In a study have been carried out by Mohajerani et al.[14] in the central-northern part of Iran, giant cell lesions were most frequently diagnosed among females, in the 2nd and 3rd decade of life and in the anterior part of the mandible. In this study, PCGC is the most common giant cell lesion in both jaws and ABC showed the lowest prevalence (1.4%) among these lesions.

The prevalence of these lesions showed a wide variation which results from differences in population groups, styles of life and some other clinical factors.[6] The most studies have examined each of the giant cell lesions separately.[5,6] Therefore, to achieve the unique and specific result more extensive studies in different geographic regions are required.

This study aimed to evaluate the frequency and demographic specifications of oral and maxillofacial lesions containing giant cells in the central part of Iran (Isfahan).

Methods

This study is a cross-sectional study (Ethical Committee Number: 293011) and has been reported descriptively. Sampling was done using available data (Existing data), from Department of Oral and Maxillofacial Pathology, School of Dentistry, Isfahan University of Medical Sciences. All patients were assessed during 1991-2012.

Available records of giant cells lesions (PGCG, CGCG, ABC, Cherubism and Brown tumor) from diagnostic reports were collected. Name of the lesion and patients information including age, gender, and location of the lesion were assessed. Records that were incomplete and did not have the necessary clinical information were excluded. All microscopic slides (H and E staining) were reviewed by two pathologists simultaneously to confirm the diagnosis. The information was analyzed using SPSS software (version 19, SPSS Inc., Chicago, IL, USA), chi-square test and Fisher's exact test ($P < 0.050$).

Results

Among the 8217 pathologic records in the Isfahan Oral and Maxillofacial Pathology Department, 635 cases were giant cell lesions. Among these, 44 cases were excluded due to incomplete clinical information and 591 cases were analyzed.

The most frequent lesion was PGCG (68.5%). The frequency distribution of the lesions was shown in table 1.

Table 1. The frequency of giant cell lesions

The type of lesion	n (%)
PGCG	405 (68.5)
CGCG	168 (28.4)
ABC	12 (2.0)
Cherubism	2 (0.3)
Brown tumor	4 (0.7)
Total	591 (100)

CGCG: Central giant cell granuloma; PGCG: Peripheral giant cell granuloma; ABC: Aneurysmal bone cysts

In table 2, the dispensation of the lesions according to gender has been shown. The data showed that 47.7% of males and 52.3% of females had PGCG. The difference between males and females was not significant ($P = 0.051$). In CGCG group (the second most frequent lesion), respectively, 37.5% of the patients were males and 62.5% were females, and the differences between them were significant ($P = 0.001$). The

frequency of ABC was not statistically significant differences among males and females with chi-square test (P = 0.378).

Table 2. Frequency of giant cell lesions based on gender

Type of lesion	Gender		
	Male [n (%)]	Female [n (%)]	Total [n (%)]
PGCG	193 (47.7)	212 (52.3)	405 (68.5)
CGCG	63 (37.5)	105 (62.5)	168 (28.4)
ABC	7 (58.3)	5 (41.7)	12 (2.0)
Cherubism	1 (50.0)	1 (50.0)	2 (0.3)
Brown tumor	3 (75.0)	1 (25.0)	4 (0.7)
Total	267 (45.2)	324 (54.8)	591 (100)

P ≤ 0.050 was considered significant.
CGCG: Central giant cell granuloma; PGCG: Peripheral giant cell granuloma; ABC: Aneurysmal bone cysts

The highest incidence rate of giant cell lesions was in the second decade of life, although the most common lesion; PGCG; showed the highest incidence in the fifth decade. One case of Cherubism in the first decade of life and another one in the third decade of life were seen. The distribution of other lesions can be seen in table 3.

According to table 4, 63.3% and 36.7% of the lesions were seen in the upper and lower jaw, respectively. The differences between these were significant (P = 0.039).

Discussion

The data of this study showed that the most common giant cells lesion was, PGCG, similar to the study conducted by Tandon et al.[15] and Gümüşok et al.[16] In contrast, Mullapudi et al.[17] showed that CGCG s constituted the majority of giant cell lesions.

This reactive hyperplastic benign lesion usually occurred due to local trauma and originated from tooth periodontal fibers or mucoperiosteum.[18] Chatherine said that the highest incidence of this lesion was seen in age range 41-50 years. Then, the most common age of onset were the first and fourth decades of life. Reactive lesions such as PGCG, when occurred in children can growth rapidly and within a few months reach to substantial size, interfering with the eruption of the teeth and cause bone resorption. Early detection of these lesions leads to a more conservative surgical approach and create a lower risk for tooth and supporting bone.[19]

In the present study, the prevalence of PGCG was nearly equal in the two genders; this finding is consistent with a number of earlier studies.[17,20,21] In contrast, Salum et al.[22] and Zhang et al.[23] showed the incidence of this lesion was higher in male. The reason of this difference could be explained by different population groups.

In this study, these lesions are more common in the mandible, which is consistent with the results of other studies.[17,20,24,25] According to these results, PGCG as the most common lesion contained giant cell have equal incidence in both genders and its prevalence was higher in the fifth decade of life and in the mandible. Environmental factors which caused this lesion such as calculus, dental plaque, and others irritating factors could indicate poor oral health status in the population study.

Table 3. Frequency of giant cell lesion based on age

Age (year)	Lesion					
	PGCG [n (%)]	CGCG [n (%)]	ABC [n (%)]	Cherubism [n (%)]	Brown tumor [n (%)]	Total [n (%)]
0-10	67 (16.5)	20 (11.9)	2 (16.7)	1 (50.0)	0 (0)	90 (15.2)
11-20	45 (11.1)	70 (41.7)	7 (58.3)	0 (0)	4 (100)	126 (21.3)
21-30	48 (11.9)	23 (13.7)	2 (16.7)	1 (50.0)	0 (0)	74 (12.5)
31-40	69 (17.0)	25 (14.9)	0 (0)	0 (0)	0 (0)	94 (15.9)
41-50	86 (21.2)	11 (6.5)	0 (0)	0 (0)	0 (0)	97 (16.4)
51-60	60 (14.8)	12 (7.1)	1 (8.3)	0 (0)	0 (0)	73 (12.4)
61-70	30 (7.4)	7 (4.2)	0 (0)	0 (0)	0 (0)	37 (6.3)
Total	405 (68.5)	168 (28.4)	12 (2.0)	2 (0.3)	4 (0.7)	591 (100)

P ≤ 0.050 was considered significant.
CGCG: Central giant cell granuloma; PGCG: Peripheral giant cell granuloma; ABC: Aneurysmal bone cysts

Table 4. Frequency of giant cell lesion based on location of lesion

Lesion	Location		
	Maxilla [n (%)]	Mandible [n (%)]	Total [n (%)]
PGCG	152 (37.5)	253 (62.5)	405 (68.5)
CGCG	63 (37.5)	105 (62.5)	168 (28.4)
ABC	0 (0)	12 (100)	12 (2.0)
Cherubism	1 (50.0)	1 (50.0)	2 (0.3)
Brown tumor	1 (25.0)	3 (75.0)	4 (0.7)
Total	217 (36.7)	374 (63.3)	591 (100)

$P \leq 0.050$ was considered significant.
CGCG: Central giant cell granuloma; PGCG: Peripheral giant cell granuloma; ABC: Aneurysmal bone cysts

The second most common lesion in this study is the CGCG. This benign bone lesion was described by Jaffe for the first time in 1935.[2] The clinical behaviors of these lesions show a significant difference, occasionally they are asymptomatic lesions and usually detected on routine physical examination. Sometimes these lesions have been diagnosed with rapid onset, pain, paresthesia, root resorption, and teeth divergence.[20]

In this study, the most patients with CGCG were females that significant differences were found in comparison with males. This finding is consistent with previous results,[7,20] and some studies have been shown this frequency two times greater in females.[9,20] The prevalence of these lesions was higher in the second decade of life. It is also in close agreement with previous studies.[9,20,21] Mullapudi et al.[17] showed CGCG was the most common oral and maxillofacial giant cell lesion and a history of trauma can be ascertained. In previous studies, the incidence of CGCG was higher in the mandible which is consistent with the results of the present study.[7,9,21,26,27]

The third lesion in view of incidence in this study is the ABC with 12 cases (2%). In a similar study, this prevalence is reported 1.39%[14] and in a separate study conducted in China, the prevalence of ABC for a period of 20-year were recorded 17 cases.[28] Several theories have been suggested for the etiology of this lesion. In 1978, Hillerup and Hjorting-Hansen[29] suggested that ABC, simple bone cyst, and CGCG get up some vascular defect. Jaffe and Lichtenstein[27] suggested ABC arises from a pre-existing lesion of bone, frequently. Panoutsakopoulos et al.[30] and Dal et al.[31] demonstrated that primary ABCs represent chromosomal translocation t (16; 17) (q22; p13). These findings show that the primary and secondary ABCs represent different ideas; primary ABCs getting up gene translocation and secondary ones arising from a pre-existing lesion (changes in vascular hemostatic balance).

In this study, all cases with ABC except one case have been seen in patients under 30 y/o and in the mandible. The other studies have shown somewhat similar results. In various studies, 90% of ABC has been reported in the mandible and more cases occur in the posterior part of the mandible.[12,27,32] Results of Sun et al.[12] from 17 patients with ABC showed 9 patients were males and 8 were females. In this study, this lesion was seen in 7 males and 5 females, and there is no significant difference between them. Furthermore, this study is consistent with previous similar study[12] and shows approximately equal prevalence in two genders.

Brown tumor with 4 cases (0.7% of all lesions) has been shown in this study. This non-neoplastic lesion happened in patients with hyperparathyroidism, result to abnormal bone metabolism and local destruction. This condition commonly was seen in the cortical bone, and the mandible shows a higher incidence than maxilla.[33,34] In this study, three cases of this lesion occurred in the mandible that confirms previous findings.

Cherubism in recent literature reviews has been introduced as an autosomal dominant genetic disorder. In this syndrome, normal bone is replaced with fibrous tissue and cellular immature bone. The mandible is affected more than maxilla, usually. Other clinical presentation like bilateral swelling of the cheeks leads to ocular manifestations.[35,36]

In the present study, one case of Cherubism was seen in the first decade and another case in the third decade of life that totally consists 0.3% of all giant cell lesions.

At the end, another lesion that belongs to the group of giant cell containing lesions is GCT. The GCT that occurs in the jaw bone is not definitely known, and there is a controversy about it.[20]

In the present study, no case of GCT was observed. In this regard, many researchers believe that this tumor belongs to the region outside the jaw and basically it is distinguishable from the CGCG. However, some researchers consider this disease as a different appearance of one disorder.[9,37]

Conclusion

According to these results, giant cell lesions were more common in females and in the mandible. Furthermore, they occur more in the second decade of life. Furthermore, PGCG had the higher incidence rate among other giant cell lesions. The results can be useful in various fields such as oral health promotion programs for maintaining good oral health care. In conclusion, this study can be used and helpful as an epidemiological data in conjunction with other similar studies for giant cell lesions.

Conflict of Interests

Authors have no conflict of interest.

Acknowledgments

The authors have special thanks of Faculty of Dentistry, Isfahan University of Medical Sciences, for supporting this project.

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