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Primary Osseous Lesions of the Jaw in Iranian Population: A Study Based on Biopsy Material Over a 19-year Period

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Objectives Intraosseous pathological lesions of the jaw include a wide range of benign to aggressive or malignant lesions with different clinical and histopathological characteristics and require various treatments. This study was designed to assess the frequency and characteristics of primary jaw lesions in a defined group of an Iranian population.
Methods In this retrospective study, 6676 biopsy reports from the Oral and Maxillofacial Pathology Department, Shahid Beheshti University of Medical Sciences, were assessed. In cases with primary jaw lesions, other variables such as age, gender, location of lesions, and microscopic diagnosis were recorded. The lesions were categorized into "benign /malignant" and "inflammatory" /"non-inflammatory" groups. Chi-square, Kruskal-Wallis, and Fisher exact were used for statistical analysis.
Results In total, 395 (5.91%) cases (63.70% female, 36.29% male) with a mean age of 32.37±16.94 had a primary osseous lesion. About 74% of the lesions were found in the mandible with posterior predilection. Fibro-osseous lesions (28.72%), central giant cell granuloma (22.45%), and osteomyelitis (9.13%) were the most common histopathologic diagnoses. The most common malignant tumor was osteosarcoma (8.61%). Of the total lesions, 10.2% were inflammatory lesions. The most common lesions in children and adolescents were fibro-osseous lesions (24.7%), central giant cell granuloma (24.7%), and simple bone cysts (18.8%).
Conclusion The main findings of this study were similar to those of most previous studies in different countries. Fibro-osseous lesions and central giant cell granuloma were the most common primary osseous lesions of the jaw in older adults and children with a female predilection. Malignancies included about 9% of all lesions.
Keywords Jaw; Ossifying fibroma; Giant cell granuloma; Osteosarcoma

Introduction

Head and neck neoplasms can cause facial deformities, social damage, and affect the sufferer's beauty, speaking, swallowing, etc. [1] One of the most comprehensive categories of jaw lesions is based on the primary origin of the lesions. [2] Odontogenic cysts and tumors are the most common lesions of the jaw, although bone tumors, soft tissue neoplasms, and hematopoietic malignancies can also affect the jaw. Intra-osseous lesions of the jaw show a wide spectrum of clinical and microscopic characteristics from benign to aggressive or malignant neoplasms that necessitates different treatments. [3] Clinical parameters are reported to differ in geographic regions and ethnicities. [2] Some authors have assessed the maxillofacial lesions in a special group of patients, such as children and adolescents. [1, 3] Several studies have reported the relative frequency of odontogenic lesions [4-8], and a limited number of studies have investigated the frequency of non-odontogenic lesions of the jaws. [2, 9] The records available at oral and maxillofacial pathology centers are main material sources for epidemiologic studies of oral cavity lesions. Health systems in each country need detailed information concerning disease incidence to make monitoring decisions and establish guidelines and policies for health planning and to successfully allocate resources [9]; therefore, epidemiologic studies are necessary to provide a better understanding of intraosseous lesions of the jaw which leads to appropriate therapeutic interventions.

Methods and Materials

This study was approved by the ethics committee of Shahid Beheshti University of Medical Sciences (IR.SBMU.DRC.REC.1398.189). Files from the Oral and Maxillofacial Pathology Department of Shahid Beheshti University of Medical Sciences, which were recorded for the 19 years from 2001 to 2019, constituted the source of the data for this descriptive, retrospective cross-sectional study. Inclusion criteria comprised a microscopic diagnosis of primary osseous lesions of the jaws. Cases of metastatic tumors of the jaw, odontogenic cysts and tumors, or those with unclear microscopic reports or lacking demographic information were excluded. Patient age, gender, tumor location, and microscopic diagnosis of primary jaw lesions were measured and categorized in tables. Available radiographs were also evaluated. The lesions were categorized into "benign or malignant" and "inflammatory or non-inflammatory" groups. Twelve patients were excluded from the tables because of two different lesions in the jaw and the impossibility of statistical analysis. Pearson Chi-Square, Kruskal-Wallis, and Fisher exact test were used in SPSS software version 21 (IBM Corp., Armonk, N.Y., USA) for statistical analysis, and statistical significance was set at $p\text{-value} < 0.05$.

Results

A total number of 6676 cases were recorded in the named center from 2001-2019. Of these, 395 cases (5.91%) were

primary jaw lesions. They generally had the highest frequency in the 21-30 decades of life with a mean age of 32.44±16.93 years. There was a female predilection with a female-to-male ratio of 1.75:1. The most involved site was the posterior mandible (50.7%). Overall, there were 348 (88.10%) benign and 35 (8.86%) malignant lesions. According to the Pearson Chi-Square test, there was a significant relationship between gender and benign or malignant lesions (p-value = 0.007). Fisher's exact test indicated no statistically significant difference between age groups and benign or malignant lesions (p-value = 0.410); however, it showed a significant relationship between benign or malignant lesions and lesion site (p-value = 0.039). Table 1 shows the characteristics of inflammatory and non-inflammatory lesions. The most frequent primary jaw lesions were fibro-osseous lesions (28.72%), central giant cell granuloma (CGCG) (22.45%), osteomyelitis (9.13%), and osteosarcoma (8.61%). Table 2 shows microscopic subgroups of fibro-osseous lesions. Ossifying fibroma typically showed a well-defined radiolucency or mixed radiolucent-radiopaque lesion. The common radiographic finding of fibrous dysplasia was a ground-glass opacification with poorly defined margins (Figure 1). Common radiographic features of cement-osseous dysplasia ranged from a well-defined radiolucency to a predominantly radiopacity with only a thin radiolucent rim. CGCG frequently showed a well-defined non-corticated radiolucency (Figure 2). The most common radiographic finding of osteomyelitis was ill-defined radiolucency that contained radiopaque sequestrum. Radiographic features of osteosarcoma ranged from radiolucency with ill-defined borders to mixed radiolucent-radiopaque lesions and sun-ray appearance. The most common lesions in children and adolescents were fibro-osseous lesions and CGCG. In this group, only 3.5% of the lesions were malignant.

Figure 1: A large radio-opaque lesion with ground glass appearance in left mandible with ill-defined borders.

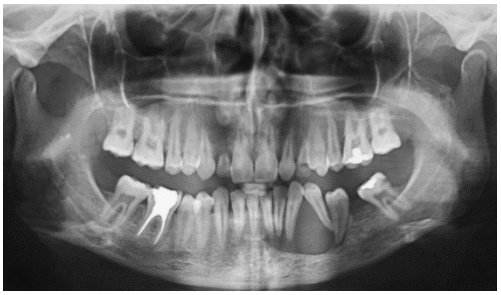

Figure 2: A non-corticated radiolucent lesion in left mandible with tooth displacement.

Table 1- Distribution of inflammatory and non-inflammatory primary jaw lesions based on mean age, gender and location

Type of lesions	N (%)	Mean age ±SD	Gender		Lesion location	
			M	F	Mandible	Maxilla
Inflammatory	39 (10.2%)	46.08±19.078	14 (35.89%)	25 (64.10%)	35 (92,10%)	3(7.89%)
Non-inflammatory	344 (89.8%)	30.83±15.939	125 (36.33%)	219 (63.66%)	233(71.47%)	93(28.52%)
Total	383		139	244	268	96

Table 2- Microscopic types of fibro-osseous lesions based on mean age, gender and location.

Types of fibro-osseous lesions	N	Mean Age	Gender M:F	Maxilla:Mandible
Ossifying Fibroma	44 (37.3%)	31.02±14.014	14(31.11%):31(68.88%)	11(25.58%):32(74.41%)
Cemento Osseous Dysplasia	35 (29.7%)	37.5±12.515	4(11.42%):31(88.57%)	2(5.71%):33(94.28%)
Fibrous Dysplasia	23 (19.5%)	23.27±11.255	11(50%):11(50%)	13(65%):7(35%)
Unspecified	16 (13.6%)	26.43±13.352	6(37.5%):10(62.5%)	2(13.33%):13(86.66%)
Total	118	30.65	35:83	28:85

Discussion

In this study, primary intra-osseous jaw lesions accounted for about 6% of all lesions, consistent with other studies reporting rates between 1.34% and 4.47%. [2, 10, 11] Jamshidi et al.[12], however, reported a lower percentage (0.5%). This low percentage may be explained by the higher prevalence of odontogenic cysts and tumors compared to non-odontogenic bone lesions. In confirmation of this content, Johnson et al. [13] and Jafari Ashkundi et al. [2] reported the frequency of odontogenic lesions of the jaw as 94% and 75%, respectively. In another study, odontogenic lesions accounted for 73.5% of jaw samples. [9] Nevertheless, Kilinc et al. [10] reported the frequency of odontogenic lesions (57%) and non-odontogenic lesions (43%) to be close to each other. In the current study, women were more commonly affected compared to men in the fourth decade of life and with a mandibular predilection. These findings are in accordance with those of other studies. [2, 9, 10, 12, 13] The most common bone lesions in the current study were

fibro-osseous lesions, followed by CGCG and osteomyelitis; these results are similar to those of Naini et al. [9] and Jafari Ashkundi et al. [2] Two other studies, though, reported the third most common lesions were osteoma [10] and osteosarcoma. [12] In another study, common lesions included osteoma, fibro-osseous, and osteosarcoma. [11]

In the current research, fibro-osseous lesions had a frequency of 28.72%. The average age of the patients was about 32 years, and higher tendencies were seen in females and the mandible. Ossifying fibroma was the most common subgroup of fibro-osseous lesions, which is similar to the study of Al-sharif et al. [14] On the other hand, Kato et al. [15] found the most common lesion to be cement-osseous dysplasia, and other studies found the most common microscopic subtype to be fibrous dysplasia. [16, 17] In said studies, the mandible was the most common site. [14-17] Although most studies have reported a higher prevalence of these lesions in women [15-17], in a study by Al-sharif et al. [14] conducted in China, fibro-osseous lesions were found to have a higher tendency in men. In the current study, CGCG accounted for 22.45% of bone lesions and had a predilection for patients in the third decade of life, the female gender, and the mandible. These findings were similar to those of previous studies. [18, 19]

In the present research, malignancies comprised about 9% of the bone lesions. Other studies have reported the percentage of malignant tumors to range from 4.24% to 21.95% [2, 9, 11, 13], and yet another study found that the frequency of malignant and benign tumors were almost equal. [12] The most common malignant tumor in the current study was osteosarcoma with a frequency of about 8.5%. Contrary to this finding, Jamshidi et al. [12] reported a higher percentage (14.63%), possibly because of the small sample size in their study. In the current research, the most common decade of life in which lesions presented was the fourth decade, with tendencies in males and the mandible. These findings were in accordance with those of Wang et al. [20] Atarbashi-Moghadam et al. [21] noted that osteosarcoma of the jaw had a tendency toward the fourth decade of life, the mandible and females. Conversely, Lee et al. [22] reported that there was no gender predilection, and this type of lesion affects the maxilla more than the mandible.

In the current study, inflammatory lesions (suppurative and sclerosing osteomyelitis) comprised about 9.13% of the bone lesions. This rate has been reported as 3.62% to 11.56% in other studies. [2, 9, 12] Moreover, the average age of patients with osteomyelitis in the current study was 46.08 years, and a higher tendency for women and the mandible was seen. Other studies have also shown a female predilection [2, 12, 23, 24], but yet another study found a male tendency with the mean age of 38 years. [9]

One limitation of the present study was inadequate data regarding the clinical and radiographic features of patients. Furthermore, no information regarding the follow-up of patients with a malignancy was available.

Conclusion

The main findings of this study were very similar to most previous studies in various countries. Fibro-osseous lesions and CGCG were the most common primary osseous lesions of the jaw in older adults and children with a female predilection. Malignancies comprised about 9% of all lesions. The current study provides a large collection of demographic and microscopic data on primary osseous lesions that will help in determining accurate diagnosis and appropriate treatment of these lesions.

Conflict of Interest

No Conflict of Interest Declared ■

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