Pesquisa Brasileira em Odontopediatria e Clínica Integrada 2024; 24:e220113
https://doi.org/10.1590/pboci.2024.024
ISSN 1519-0501 / eISSN 1983-4632

ORIGINAL ARTICLE

Epidemiological and Clinicopathological Analysis of Odontogenic Tumors: A 20-Year Study

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Academic Editor: Wilton Wilney Nascimento Padilha

Received: June 22, 2022 / **Review:** September 22, 2022 / **Accepted:** July 01, 2023

How to cite: Torabi M, Khosrozamiri M, Hashemipour MA. Epidemiological and clinicopathological analysis of odontogenic tumors: A 20-year study. Pesqui Bras Odontopediatria Clín Integr. 2024; 24:e220113. https://doi.org/10.1590/pboci.2024.024

ABSTRACT

Objective: To perform the epidemiological and clinicopathological analyses of odontogenic tumors in Kerman for 20 years. **Material and Methods:** The present study investigated collected records from pathology departments of the Faculty of Dentistry, Bahonar, and Shafa teaching-medical hospitals for 20 years. Data on odontogenic tumors was recorded based on age, sex, and tumor location in the information forms. The statistical t-test and the Kappa coefficient computer codes were utilized for data analysis. **Results:** 38 samples of odontogenic tumors were considered in the present study. The mean age of participants was 31.7± 10.3 years. The frequency of tumors was higher in women (63.2%) and in the lower jaw) 78.9%). Among various tumors, ameloblastoma (63.1%) and odontoma (18.4%) were the most common tumors, respectively. The correlation between clinical and histopathologic diagnoses was 71.8% using the kappa coefficient. **Conclusion:** Ameloblastoma is the most common odontogenic tumor. The incidence of lesions was higher in the mandible, and odontogenic tumors were higher in women. Since the diagnosis of odontogenic tumors is based on radiographic and histologic appearances, clinical physicians and pathologists should collaborate for the definitive diagnosis of the disease.

Keywords: Odontogenic Tumors; Epidemiology; Diagnosis; Pathology, Clinical.

Introduction

Odontogenic tumors include a heterogeneous group of lesions with histopathologic features and various clinical features with origins of odontogenic and ectomesenchymal epitheliums or both [1-3]. The prevalence of odontogenic tumors was reported in different studies at different intervals of 3.75% in Sri Lanka, 5.45% in India, and 4.44% in Iran [4-6]. Among odontogenic tumors, ameloblastoma has a higher infiltration potential and increased recurrence and prevalence among other odontogenic neoplasms [7,8].

Ameloblastoma is a common, odontogenic, and clinically important tumor. Some sources have reported its prevalence almost equal to other odontogenic tumors except for odontoma [9]. Research results by Da Silva et al. [10] indicated the same recurrence capacity for ameloblastoma.

The author was motivated to do the present work because of the racial and geographical diversity of odontogenic tumors [11]. Besides, some studies lack clinical symptoms and non-referral of patients with odontogenic tumors in countries with undesired economies [11-13]. There are many similar studies on the prevalence of odontogenic tumors based on the 2017 WHO classification. Al-aroomy et al. [14] showed that intraosseous odontogenic tumors constituted 2.56% of all 8974 registered oral and maxillofacial. A total of 990 cases were included in the study by Okoh et al. [15]. The highest prevalence of OT was in the third decade of life. Most lesions were benign with a slight male preponderance, and the mandible was the commonest site biopsies [15]. Also, Kokubun et al. [16] showed that the most common types of tumors were odontoma (42.5%) and ameloblastoma (41.9%). Ameloblastoma and ameloblastic fibroma occurred more commonly in male patients, whereas odontogenic fibroma and cemento-ossifying fibroma affected female patients primarily. Syed et al. [17] showed that the most common OT encountered was ameloblastoma, and the posterior aspect of the mandible was the most favored site (77.2%). This finding is similar to Mehngi et al. [18].

The present study evaluated the frequency of odontogenic tumors based on the WHO classification in Kerman and assessed the compliance of clinical diagnosis with histopathologic diagnosis.

Material and Methods

Study Design and Ethical Clearance

This research is a retrospective, cross-section, and epidemiological study. The present study was conducted from September 1997 to March 2018. Data has been collected from patient records in archives of teaching medical hospitals and dental schools in Kerman, Iran. Before starting the present work, this dissertation was approved by the university's Ethics Committee with the code of ethics IR.KMU.REC.1398.566.

Data Collection

The 2017 WHO classification [19] was utilized for the inclusion criteria of odontogenic tumors. The cases that lacked complete clinical data, including sex, age, and location of the tumor or a definite microscopic diagnosis, were excluded from the obtained data. Cases that matched target criteria were recorded in a checklist, which the last year students completed.

Data Analysis

The recorded data was statistically analyzed using the SPSS22 and the statistical T-test, ANOVA, and Kappa coefficient. The last software was used to examine the compliance of histopathologic diagnosis with clinical diagnosis. The significance level was $p< 0.05$.

Results

In the present study, 38 cases of odontogenic tumors were observed. The mandible with 30 cases (78.9%) had the most involved location, and the maxilla involved 8 cases (21.1%). There were 14 cases of tumors in men (36.8%) and 24 cases (63.2%) in women. The participants' mean age was 31.7± 10.3 years (Table 1).

Table 1. Frequency of odontogenic tumor based on age, gender, location, and Clinical and histopathologic compatibility.

Type of Tumor	Age	Gender		Location		Compatibility
	Mean (SD)	Male	Female	Maxilla	Mandibula	Yes
		N	N	N	N	N (%)
Ameloblastoma	37.7±13.1	9	15	2	22	21 (87.5)
AOT	16	1	0	1	0	1 (100.0)
CEOT	38	1	0	1	0	1 (100.0)
Ameloblastic Fibroma	22±1.14	2	0	0	2	2 (100.0)
Complex Odontoma	61	0	1	0	1	1 (100.0)
Compound Odontoma	23.4±22.6	1	6	4	3	5 (71.4)
Odontogenic Myxoma	23.5±0.1	0	2	0	2	2 (100.0)
Total	31.7±10.3	14	24	8	30	56 (71.8)

AOT: Adenomatoid Odontogenic Tumor; CEOT: Calcifying Epithelial Odontogenic Tumor.

Based on the histopathologic diagnosis, the highest number of odontogenic tumors was seen in ameloblastoma, with 24 cases (63.2%). The maximum age of involvement was seen in a 61-year-old woman with a complex odontoma. The minimum age belongs to a person with an Adenomatoid odontogenic tumor (AOT). In all cases of odontogenic myxoma, AOT, Calcifying epithelial odontogenic tumor (CEOT), Amelobaltic fibroma, and the odontoma complex of clinical and histopathologic diagnosis were consistent.

There was no significant difference between mean age in women and men with ameloblastoma (p=0.430). The statistical analysis was impossible since some tumors were not observed in men or women in other odontogenic tumors. The highest clinical diagnosis of ameloblastoma was 28 cases. In the second clinical diagnosis, unicystic ameloblastoma was the most common tumor, with 8 cases (Figure 1).

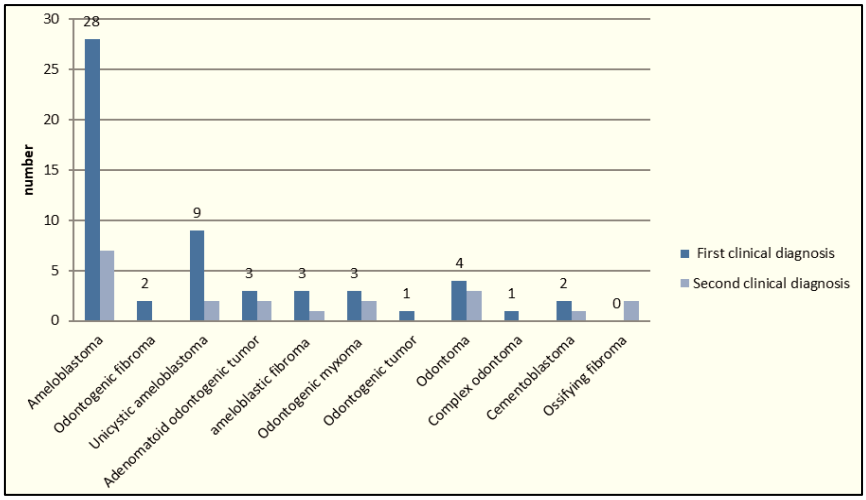

Figure 1. Frequency distribution of odontogenic tumors according to type.

The compliance of clinical diagnosis 1 and histopathologic diagnosis was 71.79%, and between clinical diagnosis 2 and histopathologic diagnosis, it was 13.6%.

Discussion

Odontogenic tumors include a non-common group of jaw lesions with a variety of histopathologic patterns. Many are correctly diagnosed based on clinical presentation and radiographic and histopathological manifestations. Significant differences in the clinicopathologic appearance of odontogenic tumors can lead to confusion and increase the chance of misdiagnosis [20].

For accurate differential diagnosis and determining risk factors associated with odontogenic tumors, knowledge of clinical features and their prevalence in different populations is essential [21,22]. Variation in the prevalence of oral lesions reflects cultural and socio-economic differences and can influence the habits and diseases of a population [23].

The mean ratio of OT between oral and maxillofacial ranges from 3% (±2.9%) in studies that used WHO 1992 to 4.0% (±1.3%) in later classifications [24]. These changes in the frequency of OTs may be because pathologists are more likely to examine inflammatory and reactive lesions in developed countries. At the same time, the number of these clients is lower in developed countries [25,26]. Also, the changes that have occurred over the years in the criteria for the classification of OTs have caused some pathological cases to be removed and new cases to be introduced.

Differences in the distribution of odontogenic tumors could be due to geographic and cultural variation among different study populations [27]. In the present study, the ratio of lesions was 1: 1.7 in men to women. The results were consistent with studies by Kadeh et al. [6], who found that odontogenic tumors are higher in women, but inconsistent with studies by Sharma et al. [2], Kebede et al. [27] and Varkhede et al. [28] who found the higher prevalence of odontogenic tumors in males.

In the present study, the prevalence of lesions in the mandible was higher than in the maxilla. The results were consistent with other studies [4,6,22,27,29-31]. However, Jing et al. [11] reported the prevalence of odontogenic tumors in the maxilla.

In this study, the mean age was 31.7 years, and it is consistent with other studies by Kadeh et al. [6] (30.5 years), Osterne et al. [31] (30.5 years), Avelar et al. [32] (30.7 years), and Okada et al. [33] (31.4 years). Also, this study showed that the prevalence of odontogenic tumors at younger ages is lower, which can indicate that these tumors are more associated with permanent teeth.

In the present investigation, the first most common odontogenic tumor was ameloblastoma, with 24 cases (63.2%). Ameloblastoma was the second most common tumor in a study by Rubini et al. [34] and Servato et al. [35] in Brazil, which is inconsistent with the present work. However, the results are in agreement with other studies by Saghravanian et al. [1] in Mashhad, Sharma et al. [2], Siriwardena et al. [4] in Sri Lanka, Egal et al. [3], Jing et al. [11] in China as they reported that the ameloblastoma is the most common tumor.

The higher incidence of ameloblastoma in this study and other similar studies may indicate that these lesions in Asians compared to Caucasians are more common. Age variation in ameloblastoma among countries may be due to accelerated aging in developing countries and poor nutrition and health care [36]. In general, epidemiological data show significant differences in prevalence in different countries, and this lesion seems more common in Asian and African countries than in North America.

In the present study, the frequency of ameloblastoma was higher in women, and the participants' mean age was 37.71 years. Results of research by Abdennour et al. [37] indicated that the incidence of ameloblastoma is higher in women than men in Asia and Africa, which is in agreement with our findings..

According to Carvalho et al. [38], ameloblastoma was more common in men, and the third decade was the most common age of involvement. Filizzola et al. [39] also found that the incidence of ameloblastoma was higher in men. In the present study, the mandible was the most common place of ameloblastoma, so the results are consistent with other studies [2,6,27,30,40].

In the present investigation, there were 7 cases (18.4%) of odontoma, including six females and one male. In a study by Kadeh et al. [6], there were 6 cases, including five women. Studies by Siadati et al. [30], who reported 4 cases in women, and Siriwardena et al. [4], with a reported prevalence equal to 10.1%, are consistent with the results of this study. But there isn't any consistency between the studies by Tawfik and Zyada [36] (25%), Sharma et al. [2] (23.8%), Varkhede et al. [28] (21.79%), and Avelar et al. [32] (42.1%) with the present investigation. In the present study, two cases (2.56%) of odontogenic myxoma were observed, and both of them were in women. In a study by Francisco et al. [40], during a 30-year interval, 14 cases were seen, and most cases were female. Furthermore, Titinchi et al. [41] found a male to female ratio of 1 to 2.6.

The present study showed only two cases (0.5%) of odontogenic myxoma. Titinchi et al. [41] mentioned the prevalence of odontogenic myxoma rose from 0.5% to 17.7% in South Africa. Odontogenic myeloma is a rare and local invasive tumor. There is no golden standard for the surgical management of this lesion; the individual decision should be made to treat patients based on the lesion's characteristics and development [41].

In the present study, a case of AOT (0.26%) was seen in the maxilla of a 16-year-old man. Results obtained by Varkhede et al. [28] indicated that the Adenomatoid Odontogenic Tumor is more common in maxilla and in adolescents.

In the present study, two cases (0.56%) of COT were observed. In a study by Kadeh et al. [6], three cases (6%), and in a study by Siadati et al. [30], four cases of COT were observed. One case of CEOT was seen in the present research. Three cases were reported in a study by Siadati et al. [30], two cases by Kadeh et al. [6], and two cases by Gaitán-Cepeda et al. [42]. In a study by Sekerci et al. [22], 24 (11.01%) out of 281 odontogenic tumors were CEOTs, which were more common in men. In a study by Sharma et al. [2], 14 out of 84 odontogenic tumors were CEOTs.

The calcifying epithelial odontogenic tumor is a rare tumor and may present in some cases with pleomorphic characteristics, especially when it is present in the maxilla. Its pathological diagnosis is complex, and the clinical-radiological correlation is key to diagnosing this tumor [42].

Studies have also shown that in Asia and Africa, odontogenic lesions are identified in maxillofacial surgery departments, while in Europe and North America, patients can be treated in hospitals and dental schools [27,41].

Mascitti et al. [26] showed that the mean age of onset for primary odontogenic tumors is 49.7 ± 20.1 years. Twenty-seven patients developed recurrences, showing a mean age of 54 ± 19.7 years and a mean recurrence time of 51.2 ± 34 months.

Conclusion

Ameloblastoma is the most common odontogenic tumor. This study contributes to establishing a comprehensive loco-regional epidemiological database on OTs in Iran, aiding research on their aetiopathogenesis and diagnosis. Additionally, it helps assess the occurrence of the odontogenic tumor and may be a valuable key for identification and clinical management.

Authors' Contributions

MT	https://orcid.org/0000-0002-6030-3164	Formal Analysis and Investigation.
MK	https://orcid.org/0000-0001-5958-2971	Methodology, Investigation and Data Curation.
MAH	https://orcid.org/0000-0002-4515-8974	Conceptualization, Writing - Original Draft, Writing - Review and Editing and Project Administration.

All authors declare that they contributed to a critical review of intellectual content and approval of the final version to be published.

Financial Support

None.

Conflict of Interest

The authors declare no conflicts of interest.

Data Availability

The data used to support the findings of this study can be made available upon request to the corresponding author.

Acknowledgments

This research has been carried out as an approved research project with the support of the Vice Chancellor for Research and Technology of Kerman University of Medical Sciences from the Research Center for Social Factors Affecting Oral Health. (Ethical code: IR.KMU.REC.1398.566).

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