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Original article

Relative frequency of odontogenic tumors in Sri Lanka: Analysis of 1677 cases

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ABSTRACT

Odontogenic tumors (OTs) constitute a heterogeneous group of lesions with diverse histopathological features and clinical manifestations. The present study is to determine the frequency of odontogenic tumors (OTs) in Sri Lankan population.

A total of 1677 cases of OTs were retrieved and analyzed for age, gender and primary site of the tumors. Cases were re-classified according to the 2005 WHO classification of OTs. The relative frequency of different types of tumors was also analyzed and compared with the literature.

OTs represent 3.75% of all cases received during a period of 30 years. Ninety-eight percent of these tumors were benign and the rest malignant. Mandible to maxilla ratio is 2.8:1. The posterior part, the molar region, is the most frequently affected site for the mandible whilst it is the anterior region for the maxilla. The age ranges from 1 to 80 years, with a mean age of 30.6 years. Ameloblastoma of solid/multicystic and unicystic types showed a high preponderance for the mandible (>90%) with a ratio of 12.9:1 and 10.8:1, respectively. Out of 1677 cases, 48.7% were ameloblastoma, and other tumors, such as keratocystic odontogenic tumor (KCOT) and odontoma, were 25.7% and 10.1%, respectively. There is a significant change in the frequency of OTs after the inclusion of odontogenic keratocyst as a tumor.

Although odontoma is said to be the commonest in western countries, our results showed ameloblastoma as the commonest followed by KCOT, and the relative frequencies of different tumors have changed significantly as a result of inclusion of KCOT in the new classification.

Introduction

Odontogenic tumors (OT) are lesions derived from epithelial, ectomesenchymal and/or mesenchymal elements of the tooth-forming apparatus. It constitutes a heterogeneous group of lesions with diverse histopathological features and clinical manifestations, and the spectrum of the biological behavior of these lesions ranges from hamartomatous or non-neoplastic tissue proliferations to malignant neoplasms.

The majority of studies [8,12,17] from various parts of the world were based on the 1971 [20] and 1992 [10] WHO histological classification, and few on the recently published updated edition of WHO [3] classification. Several retrospective studies carried out in Asia, Africa, Europe and America reveal that differences exist in the relative frequency of various histological types [7,9,13,16,19,22]. Therefore, the purpose of this study was to determine the relative frequency of odontogenic tumors with regard to the new WHO classification and to compare these data with previously published reports after the 2005 OT classification from other parts of the world. Further, we intended to analyze the changing pattern of frequency with the inclusion of keratocystic odontogenic tumor (KCOT) in the new classification.

Materials and methods

The surgical histopathology records of the Department of Oral Pathology, Faculty of Dental Sciences, University of Peradeniya were reviewed retrospectively from January 1980 to August 2011. A total of 1677 cases of OTs were collected and reviewed. Recurrent tumors were considered as a single case. Two investigators (WMT, SS) evaluated the hematoxylin and eosin-stained sections, and the diagnosis in each case was either re-confirmed or modified in accordance with the third edition of the WHO classification. The frequency and distribution regarding age, sex and primary site of the lesion were analyzed and compared with the studies which were published before and after 2005 WHO classification in the English literature. Each jaw was divided into three anatomical parts as anterior, premolar and molar in order to decide the location of the tumor.

Results

During the period of 30 years, a total of 44,458 biopsies were received, and 3.8% of them were OTs. Of a total of 1677 cases

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Table 1
Frequency and gender distribution of odontogenic tumors.

	Abbreviation	Total cases	Female	%	Male	%	Male:Female
Benign							
Solid/multicystic ameloblastoma	S/MA	520	259	49.8	261	50.2	1:1
Peripheral ameloblastoma	PA	6	4	66.7	2	33.3	1:2
Desmoplastic ameloblastoma	DA	29	15	51.7	14	48.3	1:1.1
Unicystic ameloblastoma	UA	261	124	47.5	137	52.5	1.1:1
Squamous odontogenic tumor	SOT	7	6	85.7	1	14.3	1:6
Calcifying epithelial odontogenic tumor	CEOT	25	15	60.0	10	40.0	1:1.5
Adenomatoid odontogenic tumor	AOT	78	52	66.7	26	33.3	1:2
Keratocystic odontogenic tumor	KCOT	431	192	44.5	239	55.5	1.2:1
Ameloblastic fibroma	AF	15	5	33.3	10	66.7	2:1
Ameloblastic fibro-odontoma	AFO	9	5	55.6	4	44.4	1:1.3
Odontoma	ODT	169	82	48.5	87	51.5	1.1:1
Calcifying cystic odontogenic tumor	CCOT	24	7	29.1	17	70.8	2.4:1
Dentinogenic ghost cell tumor	DGCT	5	2	40.0	3	60.0	1.5:1
Odontogenic fibroma	OF	7	4	57.1	3	42.9	1:1.3
Odontogenic myxoma	OMYX	64	32	50.0	32	50.0	1:1
Odontogenic myxo fibroma	OMF	3	3	100.0	0	0.0	NA
Cementoblastoma	CMB	1	1	100.0	0	0.0	NA
Malignant							
Malignant ameloblastoma	MA	1	1	100.0	0	0.0	NA
Clear cell odontogenic carcinoma	CCOC	5	3	60.0	2	40.0	1:1.5
PIOSCC arising from OKC	PIOSCC ex OKC	2	0	0.0	2	100.0	NA
PIOSCC arising from odontogenic cysts	PIOSCC ex OC	1	0	0.0	1	100	NA
Ameloblastic carcinoma	AC	3	2	66.7	1	33.3	1:2
Ameloblastic fibrosarcoma	AFS	1	0	0.0	1	100.0	NA
Primary intraosseous carcinoma	PIOC	10	5	50.0	5	50.0	1:1

PIOSCC – primary intra-osseous squamous cell carcinoma, NA – not applicable.

of OTs, 1654 (98.6%) were benign and 23 (1.4%) were malignant. Ameloblastoma was the most common tumor (48.7%), and the solid/multicystic (S/MA) variant was the commonest type (31%) followed by KCOT (25.7%) and odontoma (10%). Table 1 shows the frequency and gender distribution of OTs. Out of all S/MA, 31.9% and 34.2% were plexiform and follicular ameloblastoma, respectively. There were 858 males and 819 females. Although there is no gender predilection (1:1) for most OTs, there is a female preponderance for squamous odontogenic tumor (SOT). The age of the patients ranges from 1 year to 86 years, with a mean age of 30.6 years. The majority of cases were distributed between age 10 and 49 with a peak incidence in the second and third decades (Table 2). As described in the literature, the mean age for odontoma, adenomatoid odontogenic tumors (AOT) and unicystic ameloblastoma (UA) was 19, 18 and 29.9 years, respectively. Desmoplastic ameloblastoma (DA) and peripheral ameloblastoma (PA) tend to occur in older individuals. Most malignant OTs also predominantly occurred in older patients (Table 2). There were 5 cases of Dentinogenic ghost cell tumor (DGCT), which is a new entity according to the 2005 WHO classification. The affected age groups were 10–19 (2 cases)

Table 2
Distribution of odontogenic tumors in different age groups.

	Age group (years)											
	0–9	10–19	20–29	30–39	40–49	50–59	60–69	70–79	80–89	NS	Total	Mean
Solid/multicystic ameloblastoma	6	82	139	98	75	57	34	10	4	15	520	34.2
Peripheral ameloblastoma	–	–	–	1	3	1	–	–	–	1	6	39.0
Desmoplastic ameloblastoma	–	–	3	3	9	6	6	–	1	1	29	47.1
Unicystic ameloblastoma	7	68	66	49	36	12	13	4	2	4	261	29.9
Squamous odontogenic tumor	–	1	–	2	–	3	1	–	–	–	7	45.3
Calcifying epithelial odontogenic tumor	–	5	8	2	3	5	–	–	–	2	25	30.4
Adenomatoid odontogenic tumor	2	53	14	4	3	–	–	–	–	2	78	18.0
Keratocystic odontogenic tumor	8	78	124	87	55	41	20	6	1	11	431	31.3
Ameloblastic fibroma	2	3	3	1	1	–	4	–	–	1	15	29.4
Ameloblastic fibro-odontoma	7	1	–	–	–	–	–	–	–	1	9	6.0
Odontoma	16	94	31	8	5	5	3	1	–	6	169	19.0
Calcifying cystic odontogenic tumor	2	4	2	2	3	4	4	3	–	–	24	43.0
Dentinogenic ghost cell tumor	–	2	–	–	–	–	1	2	–	–	5	46.0
Odontogenic fibroma	1	2	–	1	–	3	–	–	–	–	7	33.0
Odontogenic myxoma	5	15	24	9	2	4	1	3	–	1	64	27.0
Odontogenic myxo fibroma	–	2	–	–	1	–	–	–	–	–	3	25.0
Cementoblastoma	–	–	1	–	–	–	–	–	–	–	1	29.0
Malignant ameloblastoma	–	–	–	–	1	–	–	–	–	–	1	43.0
Clear cell odontogenic carcinoma	1	–	–	–	1	2	–	1	–	–	5	44.8
Carcinoma arising from OKC	–	–	–	–	1	1	–	–	–	–	2	55.5
PIOSCC arising from odontogenic cysts	–	–	–	–	–	1	–	–	–	–	–	57.0
Ameloblastic carcinoma	–	–	1	–	–	–	2	–	–	–	3	48.7
Ameloblastic fibrosarcoma	–	–	1	–	–	–	–	–	–	–	1	22.0
Primary intraosseous carcinoma	–	–	–	–	4	1	5	–	–	–	10	55.8
Total	57	410	417	267	203	146	94	30	8	45	1677	30.8

PIOSCC – primary intra-osseous squamous cell carcinoma.