

Odontogenic tumors: analysis of 289 Nigerian cases

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Two hundred and eighty-nine cases of odontogenic tumors that accumulated in the files of the biopsy service of the Lagos University Teaching Hospital during a period of 21 years were analysed and categorised according to the most recent WHO classification of odontogenic tumors. Odontogenic tumors constituted 19% of all oral/jaw tumors and tumor-like lesions. Ameloblastoma, which accounted for 58.5% of odontogenic tumors in the series, was the most common, and showed a predilection for males and the posterior mandible. 94.8% of odontogenic tumors were benign, while malignant odontogenic tumors accounted for 5.2%. Odontogenic carcinoma was the most prevalent malignant odontogenic tumor; it showed a predilection for the mandible and occurred at a mean age of 37 years.

Key words: Nigerians; odontogenic; tumors

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Odontogenic tumors are uncommon lesions of the mandible and maxilla that constitute proportions varying from 1.11% (1) to 1.3% (2) of all oral specimens. Reports on series of odontogenic tumors from different centres have been documented (1-4). Odontogenic tumors have been defined as lesions derived from epithelial or mesenchymal elements, or both, that are part of the tooth-forming apparatus (5). Going by this definition, only tumors classified under "neoplasms and other tumors related to the odontogenic apparatus" in the latest WHO histological classification of odontogenic tumors (6) should strictly be considered as odontogenic tumors.

Although a small series of 29 cases of odontogenic tumors seen over a five-year period has been previously reported from Lagos University Teaching Hospital (4), it was decided to examine a larger series seen over a longer period for a more comprehensive study. Furthermore, the present series has been reviewed in line with the latest WHO classification of odontogenic tumors (6).

Material and methods

Biopsy records of all histologically diagnosed cases of oral tumors and tumor-like lesions of the oral cavity and the jaws during the period from 1971 to

1991 inclusive were retrieved from the files of the biopsy service of the Department of Oral Biology and Oral Pathology of the Lagos University Teaching Hospital. From these cases, 289 examples of odontogenic tumors were selected for detailed analysis. Hematoxylin and eosin stained sections of the odontogenic tumor cases were retrieved for review. Information sought on each case included age, sex, clinical diagnosis, site of lesion and histological diagnosis. The odontogenic tumors selected were those classified under "neoplasms and other tumors related to the odontogenic apparatus" in the WHO histological typing of odontogenic tumors (6).

Results

Observation from this series shows that odontogenic tumors constituted 19% of tumors and tumor-like lesions of the oral cavity and the jaws seen during the

period of study (Table 1). Ameloblastoma, which accounted for 58.5%, was the most common odontogenic tumor. Distribution of other odontogenic tumors is presented in Table 2. Both benign and malignant odontogenic tumors occur slightly more often in males (56%) than in females (44%). The age range varied from 2½-82 years. The youngest patient was a case of ameloblastic fibroma and the oldest in the series was a case of ameloblastoma (Table 3). Benign odontogenic tumors were seen more frequently (94.8% or 274 cases) than malignant odontogenic tumors (5.2% or 15 cases). Ameloblastoma (97.7% or 169 from 173 cases) was the most commonly observed odontogenic tumor categorised as comprising "odontogenic epithelium without odontogenic mesenchyme" (Table 4). Adenomatoid odontogenic tumor, which occurred more than twice as commonly in females (72.2%) as in males (27.8%),

Table 1. Odontogenic tumors in relation to tumors and tumor-like lesions of the oral cavity and the jaws

Tumors	No.	Percentage
Odontogenic tumors	289	19.13
Benign non-odontogenic tumors and tumor-like lesions of oral cavity/jaws	763	50.50
Malignant non-odontogenic tumors and tumor-like lesions of oral cavity/jaws	459	30.38
Total	1511	100

Table 2. Distribution of histological types of odontogenic tumors

Type of tumor	Abbreviation	No.	Percentage
Ameloblastoma	AMEL	169	58.47
Squamous odontogenic tumor	SOT	3	1.04
Calcifying epithelial odontogenic tumor	CEOT	1	0.35
Ameloblastic fibroma	AMF	13	4.50
Odontoameloblastoma	OAM	2	0.69
Adenomatoid odontogenic tumor	AOT	18	6.23
Calcifying odontogenic cyst	COC	7	2.42
Odontoma	ODTM	12	4.15
Odontogenic fibroma	ODF	13	4.50
Myxoma	MXM	34	11.76
Benign cementoblastoma	BCB	2	0.69
Odontogenic carcinoma	ODC	14	4.84
Odontogenic sarcoma	ODS	1	0.35
Total		289	100.00

Table 3. Age distribution of odontogenic tumors

Lesion	Age range (years)	Mean age (yr)±SD	Median age (years)
Benign odontogenic tumors			
(A) Odontogenic epithelium without odontogenic mesenchyme			
AMEL	10-82	31±13.8	28.0
SOT	35-45	40±5.0	40.0
CEOT	-	21	21.0
Group (A)	10-82	31.1±13.8	29.0
(B) Odontogenic epithelium with odontogenic ectomesenchyme, with or without dental hard tissue formation			
AMF	2½-45	20.9±13.4	16.0
OAM	40-50	45±7.1	45.0
AOT	10-35	18.4±5.9	17.5
COC	14-50	26.4±14.5	26.0
ODTM	10-54	20.7±11.7	18.0
Group (B)	2½-54	22.3±15.4	18.0
(C) Odontogenic ectomesenchyme with or without included odontogenic epithelium			
ODF	5-50	25.5±15.1	25.0
MXM	8-78	24±16.5	19.5
BCB	16-25	20.5±6.4	20.5
Group (C)	5-78	24.9±15.4	20.0
Malignant odontogenic tumors			
ODC	14-85	36.8±18	36.0
ODS	-	35	35.0

was the most frequently observed odontogenic tumor categorised as being composed of "odontogenic epithelium with odontogenic mesenchyme with or without dental hard tissue formation". Ameloblastic fibroma and odontoma were other relatively common tumors in this category (Table 4). Myxoma, which was the second most common odontogenic tumor in this series (Table 2), was the most commonly observed odontogenic tumor categorised as exhibiting "odontogenic ectomesenchyme with or without included odontogenic epithelium" (Table 4). Benign odontogenic tumors categorised as of "odontogenic epithelium without odontogenic ectomesenchyme" were more common in males (65.3%) than females (37.7%),

whereas those categorised as of "odontogenic epithelium with odontogenic mesenchyme, with or without dental hard tissue formation" occurred more frequently in females (63.5%) than in males (36.5%). Further observation showed that malignant odontogenic tumors were slightly more common in males (53.3%) than females (46.7%). Furthermore, odontogenic carcinoma (93.3% or 14 from 15 cases) was the most common malignant odontogenic tumor (Table 4).

Odontogenic tumors, in this series, have a predilection for the mandible, although adenomatoid odontogenic tumor, calcifying odontogenic cyst and odontogenic fibroma showed a predilection for the maxilla (Table 5).

Analysis of 169 cases of ameloblastoma in this series showed that it occurred at an age range from 10-82 years with a mean age of 31 years (Table 3), was more common in males (Table 4) had a site predilection for the posterior mandible (74%), with occurrence in the anterior mandible being 26% (Table 6). Follicular ameloblastoma (55.1%) was the most common histological type, followed by the plexiform type (33.3%). The mixed type (11.6%), consisting of the two major histological types, was observed less frequently (Table 7). Forty-seven cases (28% of all ameloblastomas) qualified as variants of the major histological types of ameloblastoma. The acanthomatous variant (78.7%) was the most common of these, followed by the granular cell variant (14.9%). Clear cell, basal cell and plexiform unicystic variants were scarce (Table 8).

Discussion

Odontogenic tumors comprised 19.1% of all tumors and tumor-like lesions of the oral cavity and the jaws in the present series, which is close to a previous report of 15% from the same centre (4), thereby suggesting that odontogenic tumors are not uncommon lesions in the Nigerian environment. Ameloblastoma was the most common odontogenic tumor in this exclusively Black population series; this is consistent with a similar report in an exclusively Caucasian series (3), in which ameloblastoma accounted for 36.5% of odontogenic tumors and was found to be the most common. Although these findings could suggest that ameloblastoma is unlikely to have a racial predilection for either Blacks or Caucasians, a study from a South African population has reported that ameloblastoma is more common in Blacks than Whites (7). However, it is also noted that ameloblastoma has been reported in two predominantly Caucasian series (1, 2) to be the second most common odontogenic tumor, and occurred at a frequency of 10% (2) or 13.52% (1), while an opinion has been expressed that ameloblastoma comprises 5% of all odontogenic tumors (8). The male sex predilection observed for ameloblastoma in this series differs from previous reports from Nigeria (4) and elsewhere (3, 9), in which an equal sex distribution was documented, and a female predominance reported in another series (2). It is important for investigators in the Nigerian environment

Table 4. Sex distribution of odontogenic tumors

Lesion	Male		Female		Total No.
	No.	%	No.	%	
Benign odontogenic tumors					
(A) Odontogenic epithelium without odontogenic mesenchyme					
AMEL	112	66.3	57	33.7	169
SOT	0	0	3	100	3
CEOT	1	100	0	0	1
Subtotal	113	65.3	60	34.7	173
(B) Odontogenic epithelium with odontogenic ectomesenchyme, with or without dental hard tissue formation					
AMF	6	46.2	7	46.2	13
OAM	1	50.0	1	50.0	2
AOT	5	27.8	13	72.2	18
COC	2	28.6	5	71.4	7
ODTM	5	41.7	7	58.3	12
Subtotal	19	36.5	33	63.5	52
(C) Odontogenic ectomesenchyme with or without included odontogenic epithelium					
ODF	6	46.2	7	53.8	13
MXM	12	35.3	22	64.7	34
BCB	1	50.0	1	50.0	2
Subtotal	19	38.8	30	61.2	49
Subtotal for benign odontogenic tumors					
	151	55.1	123	44.9	274
Malignant odontogenic tumors					
ODC	8	57.1	6	42.9	14
ODS	0	0	1	100.0	1
Subtotal for malignant odontogenic tumors					
	8	53.3	7	46.7	15
Total for benign and malignant odontogenic tumors					
	162	56.1	127	43.9	289

Table 5. Site distribution of odontogenic tumors*

Lesion	Site			
	Mandible		Maxilla	
	No.	Percentage	No.	Percentage
AMEL	142	97.9	3	2.1
SOT	3	100	0	0
CEOT	1	100	0	0
AMF	8	88.9	1	11.1
OAM	2	100	0	0
AOT	6	37.5	10	62.5
COC	1	20	4	80
ODTM	4	50	4	50
ODF	5	38.5	8	61.5
MXM	23	76.7	7	23.3
BCB	2	100	0	0
ODC	12	100	0	0
ODS	1	100	0	0
Total	210	85	37	15

* Only tumors with known sites (mandible or maxilla) were considered for analysis.

to look into social or other habits of Nigerian males that seem to make them more susceptible to ameloblastoma.

The predilection of the posterior mandible for ameloblastoma in this series differs from a previous report in Nigerians (10) in which the anterior

mandible was most affected (74%) among a series of 76 cases of ameloblastoma; however, it is consistent with reports from elsewhere (2, 3).

Observation from this series suggests that the most likely variant of ameloblastoma that is encountered in the

Table 6. Site distribution of ameloblastoma* of the mandible

Site	No.	Percentage
Right posterior mandible	49	40.5
Left posterior mandible	41	33.9
Anterior mandible	31	25.6
Total	121	100

* Only tumors with known specific side/part of mandible were considered for analysis.

Table 7. Distribution of major histological types of ameloblastoma*

Histological type	No.	Percentage
Follicular ameloblastoma	81	49.0
Plexiform ameloblastoma	49	33.3
Mixed type	17	11.6
Total	147	100.0

* Only tumors for which the record of histological diagnosis specified any of the major types or which, on review of available H&E sections could be categorised into any of the major types, were considered for analysis.

Table 8. Distribution of histological variants of ameloblastoma

Histological variants	No.	Percentage
Acanthomatous type	37	78.7
Granular cell type	7	14.9
Basal cell type	1	2.13
Plexiform unicystic type	1	2.13
Clear cell ameloblastoma	1	2.13
Total	47	99.99

Nigerian environment is the acanthomatous type. Squamous metaplasia, such as that seen in acanthomatous ameloblastoma, may be attributed to chronic irritation. Calculus and oral sepsis (which could be a source of chronic irritation) have been suggested to play a role in the etiology of ameloblastoma (10).

Clear cell odontogenic tumor was not observed in this series, but the only previously diagnosed case of clear cell ameloblastoma (11) had biological and clinical behavior that led to it being initially diagnosed as an odontogenic carcinoma.

Odontogenic myxoma cannot be considered rare in this series as it was observed to be the second most common odontogenic tumor. While an exclusively Caucasian series (3) supports the finding that odontogenic myxoma is not rare, another predominantly White series reports that the lesion is rare (2). Although an equal sex distribution has

been suggested for odontogenic myxoma (5), the present series reports a higher frequency of occurrence in women and is supported by a report from a Caucasian series (3). Female sex predilection for adenomatoid odontogenic tumor, also reported in this series, has been consistently reported by others (2, 3, 5, 12, 13), and a site predilection for the maxilla, as observed in this series, is also the currently held opinion (5, 8, 14).

The observed proportions of ameloblastic fibroma and odontogenic fibroma as related to odontogenic tumors is similar in this series to the findings in a Caucasian series (3). No case of ameloblastic fibro-odontoma was seen during the period of analysis. Odontoma, which is top of the list of odontogenic tumors in two reports (1, 2), was seen much less frequently in this series.

Although only seven cases of calcifying odontogenic cyst were observed, their analysis gives an age, sex and site distribution that is consistent with what otherwise obtains in the scientific literature (15).

Squamous odontogenic tumor, which was observed exclusively in females in this series, has been observed exclusively in males in the series reported by GUNHAN *et al.* (3). However, the squamous odontogenic tumor, which was first described by PULLON *et al.* in 1975 (16), is believed overall to have no gender predilection (5).

The observed rarity of cementoblastoma in this series is supported in the scientific literature (2, 5, 17). Only two cases of cementoblastoma from a series of 37 cases of cementoma (personal communication) have been documented in this series because cementoblastoma is the only type of cementoma listed un-

der "neoplasms and other tumors related to the odontogenic apparatus" in the recent WHO classification of odontogenic tumors (6).

Odontogenic carcinoma, which is otherwise considered rare (5), constitutes 5% of odontogenic tumors in this series and cannot be considered rare in the Nigerian environment. The present series includes two previously reported cases (18, 19). Observation in this series that odontogenic carcinoma constitutes an overwhelming majority of malignant odontogenic tumors is supported by another report of five cases of odontogenic carcinoma among a series of six malignant odontogenic tumors (3).

In conclusion, odontogenic tumors are not considered rare in the Nigerian environment.

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