

Clinicopathological characteristics of tumours of the intraoral minor salivary glands in 170 Brazilian patients

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Abstract

Tumours of the minor salivary glands are relatively uncommon, and publications from around the world normally include tumours of both the minor and major salivary glands, making it difficult to assess their prevalence and distribution. Our aim was to evaluate retrospectively the clinicopathological features of a series of tumours of the intraoral minor salivary glands from two universities in Rio de Janeiro, Brazil, and to compare the data with those from other epidemiological studies. A total of 170 such tumours were diagnosed from 1942 to 2012, and were selected from two university departments of oral pathology. Eighty-nine of the tumours were benign (52%). Pleomorphic adenoma (n=75) and mucoepidermoid carcinoma (n=23) were the most common benign (44%) and malignant tumours (14%), respectively. There were 104 female patients (61%) and both benign and malignant tumours affected more women than men. Significantly more tumours were in the palate (n=95, 56%; p=0.001). We conclude that these tumours had features similar to those from other studies from North and Latin America, but differ from the results presented from Asia. Further studies should be designed to highlight possible geographical and population-specific characteristics of these tumours.

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Keywords: Minor salivary gland; Tumours; Neoplasms; Pleomorphic adenoma; Mucoepidermoid carcinoma.

Introduction

Tumours of the minor salivary glands are relatively uncommon neoplasms of the head and neck.^{1,2} Specific data about their incidence and clinicopathological features are sometimes difficult to retrieve, as many studies include tumours of both major and minor salivary glands or malignant neoplasms alone.^{3,4} During the last 15 years there have been several published studies of tumours that affect only the minor salivary glands, but few have included Brazilian patients,^{5,6} though previous epidemiological data have shown that clinicopathological characteristics of these tumours vary among populations.^{7,8} These data reinforce the importance of more specific studies designed to understand their profile. It is accepted that pleomorphic adenoma and mucoepidermoid

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Table 1
Distribution and ratios (:) of benign:malignant intraoral tumours of the minor salivary glands by decades. Data are number or number (%).

Decade	Benign	Malignant	Benign:malignant	Total
1950	4	0	1:0	4 (2)
1960	1	2	1:2	3 (2)
1970	8	4	1:0.5	12 (7)
1980	5	3	1:0.6	8 (5)
1990	7	5	1:0.7	12 (7)
2000	51 (55)	41 (45)	1:0.8	92 (54)
2010	13 (33)	26 (67)	1:2	39 (23)
Total	89 (52)	81 (48)	1:0.9	170

carcinoma are the most common intraoral tumours of the minor salivary glands, but it is still difficult to calculate the incidence of other benign and malignant salivary gland tumours because they are so rare.⁷

The purpose of the present study was to evaluate retrospectively the clinicopathological features of a series of the tumours from two public universities in Rio de Janeiro, Brazil, and compare these data with those from studies from other countries.

Patients and methods

The files of two public oral pathology services in Rio de Janeiro, Brazil (School of Dentistry, Federal University of Rio de Janeiro and School of Dentistry, State University of Rio de Janeiro) were reviewed and all cases diagnosed as intraoral tumours of the minor salivary glands were retrieved. Histological slides containing 5 µm-sections stained with haematoxylin and eosin from each case were reviewed under light microscopy, and all in which the final diagnoses were confirmed were selected. Clinicopathological data including

age, sex, anatomical site of the tumour, and histological type were recorded from paper records that were retrieved from the laboratories. All histological slides were analysed by three of the authors to confirm the diagnosis according to criteria laid down in reference texts.^{1,2} When needed, special stains (mucicarmin and periodic acid-Schiff) were used to aid in the final diagnosis. Cases for which we had no representative sections of tissue or that had been diagnosed exclusively by fine-needle aspiration biopsy were excluded, as were tumours in which the final diagnosis could not be characterised in more detail than “adenoma” or “adenocarcinoma”, or when clinicopathological information was not available. Those that had more than one biopsy (incisional and excisional biopsy specimens) were recorded only once.

Statistical analyses were made with the aid of IBM SPSS software (version 20, IBM Corp, Armonk, NY), and the chi square test and Student's *t* test were used to assess the significance of differences, as appropriate. Probabilities of less than 0.05 were accepted as significant.

Results

A total of 174 tumours were selected, and four with inconclusive final diagnoses were excluded, leaving 170 cases of which 108 were diagnosed in the Oral Pathology Laboratory, Federal University of Rio de Janeiro (0.8% of all biopsies recorded in the laboratory) and 62 in the Oral Pathology Laboratory, State University of Rio de Janeiro (1.3% of all biopsies recorded in the laboratory). On histological classification 89 tumours were benign (52%) and 81 were malignant (48%). The ratio of benign:malignant tumours was higher throughout most of the decades, with the exception of the 1960s and the 2010s (Table 1). Table 2 shows the incidence, and

Table 2
Comparative incidence, sex, and mean (SD) age distribution according to histological subtypes of 170 intraoral minor salivary gland tumours.

Histological subtype	No	% of Group	% of Total	Sex (%)		Mean (SD) age (years)
				Male	Female	
Benign intraoral minor salivary gland tumours:						
Pleomorphic adenoma	75	84	44	41	59	45 (20)
Cystadenoma	9	10	4	33	67	61 (19)
Canalicular adenoma	3	4	2	33	67	54 (9)
Basal cell adenoma	1	1	1	0	100	60
Myoepithelioma	1	1	1	100	0	NS*
Total	89	100	52	40	60	47 (20)
Malignant intraoral minor salivary gland tumours:						
Mucoepidermoid carcinoma	23	28	14	35	65	52 (19)
Polymorphous low-grade adenocarcinoma	21	26	12	29	71	60 (12)
Adenoid cystic carcinoma	19	24	11	47	53	56 (19)
Adenocarcinoma, not otherwise specified	6	7	4	33	67	58 (16)
Basal cell adenocarcinoma	4	5	2	25	75	49 (8)
Carcinoma ex-pleomorphic adenoma	4	5	2	50	50	45 (22)
Acinic cell adenocarcinoma	3	4	2	33	67	57 (20)
Mucinous adenocarcinoma	1	1	1	100	0	74
Total	81	100	48	37	63	55 (17)
Total (benign and malignant)	170	100	100	39	61	51 (19)

* NS=not stated.

Table 3

Distribution according to histological subtype and anatomical site of 170 tumours of the intraoral minor salivary glands. Data are number or number (%).

Histological subtype	Site of tumour						Total
	Palate	Buccal mucosa	Upper lip	Floor of mouth	Alveolar ridge	Others	
Benign tumours:							
Pleomorphic adenoma	48 (64)	11 (15)	10 (13)	1 (1)	2 (3)	3 (4)	75
Cystadenoma	0	4	3	1	0	1	9
Canalicular adenoma	0	1	2	0	0	0	3
Basal cell adenoma	0	0	1	0	0	0	1
Myoepithelioma	0	0	0	0	0	1	1
Total (benign)	48 (54)	16 (18)	16 (18)	2 (2)	2 (2)	5 (6)	89
Malignant tumours:							
Mucoepidermoid carcinoma	13	4	2	1	2	1	23
Polymorphous low-grade adenocarcinoma	16	2	1	0	1	1	21
Adenoid cystic carcinoma	8	3	1	5	2	0	19
Adenocarcinoma, not otherwise specified	3	0	0	1	2	0	6
Basal cell adenocarcinoma	2	1	1	0	0	0	4
Carcinoma ex-pleomorphic adenoma	4	0	0	0	0	0	4
Acinic cell adenocarcinoma	0	1	1	0	1	0	3
Mucinous adenocarcinoma	1	0	0	0	0	0	1
Total (malignant)	47 (58)	11 (14)	6 (7)	7 (9)	8 (10)	2 (2)	81
Total	95 (56)	27 (16)	22 (13)	9 (5)	10 (6)	7 (4)	170

sex and age distribution according to histological subtypes. Mucoepidermoid carcinomas were additionally subclassified into low-grade (30%), intermediate grade (48%), and high-grade tumours (22%), according to Ellis and Auclair.²

Table 3 shows the distribution of tumours according to histological subtype and site. There was a significant difference in the anatomical distribution of the tumours when the whole sample was compared ($p=0.001$), but there were no significant differences in the distribution of the type of tumours (benign and malignant), histological subtype, and anatomical sites between the sexes (Table 4).

Discussion

Intraoral tumours of the minor salivary glands account for 12%–30% of all neoplasms of the salivary glands^{1,8–11}

Table 4

Sex distribution according to the tumour group, most common histological subtypes and anatomical location of the tumours. Data are number (%).

Variable	Sex		p value
	Male	Female	
Type of tumour:			0.648
Benign	36 (40)	53 (60)	
Malignant	30 (37)	51 (63)	
Histological type:			0.891
Pleomorphic adenoma	31 (41)	44 (59)	
Mucoepidermoid carcinoma	8 (35)	15 (65)	
Polymorphous low-grade adenocarcinoma	6 (29)	15 (71)	
Adenoid cystic carcinoma	9 (47)	10 (53)	
Site of tumour			0.837
Palate	37 (39)	58 (61)	
Buccal mucosa	10 (37)	17 (63)	
Upper lip	8 (36)	14 (64)	
Floor of the mouth	5 (56)	4 (44)	
Alveolar ridge	3 (30)	7 (70)	

and 0.4%–1.9% of all biopsies in oral pathology laboratories.^{3,7,8,12–15} Some histological types are rare, and specific subtypes show a predilection for involvement with the minor salivary glands. Recent publications have shown that malignant tumours are more likely to develop in minor rather than major salivary glands.^{4,9,10}

The true incidence and the clinicopathological characteristics of tumours of the minor salivary glands are difficult to ascertain, because most studies include tumours in both major and minor salivary glands. The source of the sample is a bias that may influence the reported prevalence for site. While general hospitals commonly receive specimens of major salivary gland tumours, oral pathology laboratories and dental schools tend to deal with biopsy specimens from intraoral salivary glands (Table 5).^{3,11,16,17}

Our results shown an almost equivalent number of benign ($n=89$) and malignant ($n=81$) tumours, whereas most studies from North and Latin American countries have reported a predominance of benign tumours.^{3,5,7,12,19} In contrast, series reported from African, European, and Asian countries predominantly describe malignant tumours.^{8,14–17,21–25} An exception to this is Japan, where benign tumours are more prevalent (Table 5).^{13,18} Geographical variations seem to exist, but the ratio of benign:malignant tumours is also dependent on the source of the study. As expected, studies from departments of oncology and head and neck surgery report more malignant tumours.^{6,16,17}

Pleomorphic adenoma is the most common reported such tumour, making up 16%–66% of all neoplasms.^{3,5,7,8,11–14,18,19} In general, studies that report large series of malignant tumours agree that mucoepidermoid carcinomas (25%–41%)^{6,15,20,21} and adenoid cystic carcinomas (15%–45%)^{8,15–17,22} are the two most common malignant subtypes. Curiously, polymorphous low-grade adenocarcinoma has been reported less often in

Table 5
Clinicopathological characteristics of intraoral minor salivary gland tumours included in epidemiological studies published in English since 1995.

First author and reference	Year	Country	Source *	N **	Tumours (%)		Mean age (years)	M:F *** ratio	Histological subtype (%) ****		
					Benign	Malignant			PA	MEC	ACC
Loyola ⁵	1995	Brazil	Oral	164	62	38	41.5	1: 1.3	53	17	13
Rivera-Bastidas ¹²	1996	Venezuela	Oral	62	55	28	NS *****	1: 1.8	39	29	10
Kusama ¹³	1997	Japan	Oral	129	62	38	47.1	1: 1.4	57	19	13
Lopes ⁶	1999	Brazil	Other	196	35	65	NS	1: 1	33	39	17
Jansisyanont ²⁰	2002	United States	Oral	80	24	76	NS	1: 1.6	21	41	9
Toida ¹⁸	2005	Japan	Other	82	67	33	51.4	1: 1.9	66	10	12
Yih ¹⁹	2005	United States	Oral	213	56	44	NS	1: 1.9	44	21	10
Jaber ²¹	2006	Libya	Oral	75	39	61	44.1	1: 1.4	31	25	17
Buchner ³	2007	United States	Oral	380	59	41	NS	1: 1.7	39	22	6
Pires ⁷	2007	United States	Oral	546	56	44	60.2	1: 1.6	33	23	6
Wang ⁸	2007	China	Oral	737	46	54	NS	1.1: 1	38	12	19
Copelli ²³	2008	Italy	Oral	43	—	43	53.9	1:1	—	27.9	60.6
Dhanuthai ¹⁴	2009	Thailand	Oral	311	47	53	41.6	1: 1.4	43	23	18
Adeyemi ²²	2010	Nigeria	Other	92	38	62	44.7	1: 1	33	12	38
Jaafari-Ashkavandi ¹¹	2011	Iran	Other	82	54	46	41.4	1: 1.3	44	12	28
Venkata ¹⁵	2011	India	Oral	185	25	75	46.1	1.1: 1	22	34	15
Vaidya ¹⁶	2012	India	Other	104	16	84	45	1: 1	16	18	45
Wyszynska-Pawelec ¹⁷	2012	Poland	Other	57	37	63	NS	1: 1.8	30	14	32
Dalgic ²⁵	2014	Turkey	Oral	23	48	52	31.3	2.3:1	30	50	50
Ramesh ²⁴	2014	India	Oral	30	8	22	44.2	1:2	87.5	68.2	27.3
Present study	2014	Brazil	Oral	170	52	48	51	1: 1.6	44	14	11

* Oral=oral pathology services; Other=other sources; ** Total number of patients; *** M=male; F=female; **** PA=pleomorphic adenoma; MEC=mucoepidermoid carcinoma; ACC=adenoid cystic carcinoma; and ***** NS - not stated.

studies from Asia and Europe^{8,11,14,16–18} than in studies from America,^{3,7,20} possibly because of geographical differences in specific subtypes of tumour, although the number of biopsy specimens and difficulties in classification must also be considered. The present results indicate that pleomorphic adenomas make up 44% of the tumours that we found, followed by mucoepidermoid carcinomas (14%), polymorphous low-grade adenocarcinoma (12%), and adenoid cystic carcinomas (11%) (Table 2). Other malignant variants that occurred less often were adenocarcinoma not otherwise classified, basal cell adenocarcinoma, carcinoma ex-pleomorphic adenoma, acinic cell adenocarcinoma, and mucinous adenocarcinoma, which is similar to other studies from North and Latin America (Table 5). No carcinomas of the salivary duct were found. However, these have been reported to be more common in the major salivary glands.² In the minor salivary glands they accounts for less than 2% of the malignant subtypes.^{6,15} In general, throughout the decades, benign tumours were more prevalent. However, differences in the benign:malignant ratio were not remarkable (Table 1).

Thirteen of 20 previous studies that concentrated on these tumours reported since 1995 have showed female predominance (Table 5), as did we. Women outnumbered men in the main histological subtypes except adenoid cystic carcinoma. This predilection is usually seen in both benign and malignant tumours of the minor salivary glands, though some studies have shown that malignant tumours are more common in men.^{6,8,15,18,22} In previous reports the mean age of patients affected by these tumours was in the fifth to sixth decades of

life (Table 5), while in Brazilian series, they were more common in adults in their forties.^{4,5,9} In general, patients who develop benign tumours are usually younger than those who develop malignant ones, as we found.^{5–8,11–15,18,22} When the most common histological subtypes are analysed specifically, it is also possible to observe that the mean age of the patients with pleomorphic adenomas is usually lower than that of patients with mucoepidermoid carcinomas and adenoid cystic carcinomas, as we found.^{3,5,7,13,15,18,19,22}

It is accepted that these tumours are most likely to develop in the palate, followed by the buccal mucosa and the upper lip.^{3,5,7,8,12,18–21} Our results confirm these data and reinforce the fact that there are some striking differences in their anatomical distribution. Other series that included predominantly malignant tumours have shown that sites such as the alveolar mucosa (including the retromolar area) and the floor of the mouth can follow the palate as the sites most likely to be affected.^{6,13–16,24}

The clinicopathological features of the present series are similar to those reported by other studies from North and Latin America, and differ from most reports from Asia, Africa, and Europe. Further studies from different places are encouraged to highlight the possible geographical and population-specific characteristics of these tumours.

Conflict of Interest

We have no conflicts of interest.

Ethics statement/confirmation of patients' permission

The protocol of the study complied with the Declaration of Helsinki. Patients' permission was not required as we used only laboratory slides and anonymised records.

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