

Salivary Glands Tumors: A Single Institution Experience in Saudi Arabia

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Salivary gland tumors (SGTs) are relatively uncommon with considerable variations in demographic distribution. Epidemiological data in relation to SGTs in Saudi Arabia are limited. The aim of this study was to determine the relative frequency of SGTs and to compare the data with studies from different parts of the globe. The records of the Histopathology Laboratory of College of Dentistry, King Saud University during the period from 1985 to 2011 were reviewed. Tumors were classified according to the 2005 WHO classification of SGTs. Patient's age, gender, and anatomical location of the tumors were recorded. SGTs were identified in 71 (1.54%) out of 4,613 cases accessed during the period specified. Benign tumors were diagnosed in 39 cases (54.93%) and 32 (45.07%) were malignant. Pleomorphic adenoma was the most frequent benign tumor (42.25%) and mucoepidermoid (26.76%) was the most common malignant tumor. The palate (45.1%) was the most affected site by benign and malignant tumors followed by parotid gland (16.9%). Male to female ratio was 1.22:1. Benign SGTs peaked at the second decade of life and malignant tumors were more frequent in 5th decade. Comparing with reports from other countries, findings indicate that SGTs originate more in minor salivary glands with slight male predominance.

Key words: Salivary Gland Tumors, Pleomorphic Adenoma,
Mucoepidermoid Carcinoma, Saudi Arabia.

Salivary gland tumors (SGTs) are relatively uncommon lesions with considerable variations in racial and geographical distribution.¹ The benign tumors of salivary glands are more common than malignant and more than 50% of them in the parotid gland.²⁻³ The most frequent benign and malignant tumors are

pleomorphic adenoma and mucoepidermoid carcinoma respectively.² A propensity toward females in their 3rd to 5th decades of life has been reported.⁴ There are clinicopathological variations between tumors originating in major and minor salivary glands from different geographic areas. Studies from Iran, Israel, and Sri Lanka reported higher incidence of malignant tumors in minor salivary glands compared to benign tumors^{5,6,7}, while the opposite has been reported from USA and China.^{8,9} A slow growing painless mass is a common presentation of early benign and malignant tumors, hence the clinician should be aware of that to avoid late diagnosis.¹ The epidemiological data related to the SGTs and their relative frequency from Middle East is limited and particularly from Saudi Arabia.^{10,5} The aim of this study is to determine the relative frequency and

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distribution of various histological types of SGTs diagnosed at College of Dentistry, King Saud University, Riyadh and to compare the findings with other epidemiological studies from different geographic areas.

MATERIAL AND METHODS

The study protocol was approved by the Committee of Ethics in Research from the College of Dentistry Research Center, King Saud University, Riyadh, KSA. The Histopathology records of the Histopathology Laboratory of College of Dentistry, King Saud University from January 1985 to December 2011 were retrospectively reviewed for tumors of major and minor salivary glands. H&E Slides were re-evaluated according to the 2005 World Health Organization Classification of head and Neck Tumors.¹ Available data regarding age, gender, and anatomical location of the tumors were recorded. The recurrences were excluded as well as those of intra-osseous origin. Data were analyzed using the Statistical Package for Social Sciences for Windows version 17.0 (SPSS Inc., Chicago, IL, USA). When applicable, Mann-Whitney test was applied to analyze the statistical significance of the data. The critical level of significance was set at $p < 0.05$.

RESULTS

Salivary gland tumors were identified in 71 (1.54%) cases out of 4,613 accessed during the period from 1985 to 2011. The relative frequency of the tumors is presented in Table 1. Benign tumors were diagnosed in 39 cases (54.93%) and 32 (45.07%) were malignant.

Out of the 71 cases, 32 tumors (45.1%) were located in the minor salivary glands of the palate followed by 14 cases (19.7%) in the parotid gland. The palatal minor salivary glands were involved by benign and malignant tumors in (41%) and (50%) respectively. Pleomorphic adenoma was the most frequent tumor (40.6%) in that location, while mucoepidermoid carcinoma constituted 34.4% of the palatal tumors. Table 2 shows the topographic distribution of all tumors.

The age ranged from 11 to 61 years with the mean age of benign tumors being 35.3 year and 38.2 year for malignant. The most common age period for developing benign salivary gland tumors was between 21 and 30 years and between 41 and 50 years for malignant. Table 3 shows the age distribution of the tumors. The female to male ratio for all tumors was 1:1.22. Both genders were equally affected by pleomorphic adenoma, while (63.2%) of mucoepidermoid carcinomas were in males. Table

Table 1. Relative frequency of 71 cases of benign and malignant salivary gland tumors according to WHO classification, 2005

	Count	% of Group	% of All
Benign	39	100.00%	54.93%
Pleomorphic adenoma	30	76.92%	42.25%
Myoepithelioma	4	10.26%	5.63%
Cystadenoma	3	7.69%	4.23%
Canalicular Adenoma	2	5.13%	2.82%
Malignant	32	100.00%	45.07%
Mucoepidermoid carcinoma	19	59.38%	26.76%
Adenoid cystic carcinoma	5	15.63%	7.04%
Polymorphous low-grade adenocarcinoma	3	9.38%	4.23%
Adenocarcinoma not otherwise specified	2	6.25%	2.82%
Acinic cell carcinoma	1	3.13%	1.41%
Lymphoepithelial carcinoma	1	3.13%	1.41%
Carcinoma ex pleomorphic adenoma	1	3.13%	1.41%
Grand Total	71		100.00%

Table 2.Topographic distribution of 71 cases of salivary gland tumors.

	Buccal Mucosa	Palate	Parotid	Retero-molar	SLG	SMG Lip	Upper Total	Grand
Benign	4	16	10			4	5	39
Myoepithelioma		3	1					4
Pleomorphic adenoma	1	13	8			4	4	30
Cystadenoma	2		1					3
Canalicular Adenoma	1						1	2
Malignant	3	16	4	1	2	3	1	32
Mucoepidermoid carcinoma	2	11	1	1	2	1	1	19
Adenoid cystic carcinoma	1	1	2			1		5
Polymorphous low-grade adenocarcinoma		3						3
Adenocarcinoma not otherwise specified	1					1		2
Acinic cell carcinoma			1					1
Lymphoepithelial carcinoma						1		1
Carcinoma ex pleomorphic adenoma		1						1
Grand Total	7	32	12	1	2	7	6	71

SLG= sublingual salivary gland, SMG= submandibular salivary gland

Table 3. Age distribution of the 71 cases of benign and malignant salivary glands.

	Age group						NA	Total
	11-20	21-30	31-40	41-50	51-60	61-70		
Benign	6	11	7	9	4	1	1	39
Myoepithelioma	1	1	1		1			4
Pleomorphic adenoma	5	9	6	7	2		1	30
Cystadenoma		1		1		1		3
Canalicular Adenoma				1	1			2
Malignant	3	5	6	8	4	1	5	32
Mucoepidermoid carcinoma	2	5	4	2	1	1	4	19
Adenoid cystic carcinoma	1		1	2	1			5
Polymorphous low-grade adenocarcinoma				2	1			3
Adenocarcinoma not otherwise specified			1				1	2
Acinic cell carcinoma				1				1
Lymphoepithelial carcinoma				1				1
Carcinoma ex pleomorphic adenoma					1			1
Grand Total	9	16	13	17	8	2	6	71

NA= Not available

Table 4. Gender distribution of benign and malignant salivary gland tumors.

Type	Sex		Total	F:M
	F	M		
Benign				
Myoepithelioma	1	3	4	1:3
Pleomorphic adenoma	15	15	30	1:1
Cystadenoma	2	1	3	1:0.5
Canalicular Adenoma		2	2	
Malignant				
Mucoepidermoid carcinoma	7	12	19	1:1.71
Adenoid cystic carcinoma	2	3	5	1:1.5
Polymorphous low-grade adenocarcinoma	1	2	3	1:2
Adenocarcinoma not otherwise specified	2		2	
Acinic cell carcinoma	1		1	
Lymphoepithelial carcinoma	1		1	
Carcinoma ex pleomorphic adenoma		1	1	
Grand Total	32	39	71	1:1.22

F= Female, M= Male

4 shows the gender distribution of the tumors.

A significant difference of the mean age between benign and malignant tumors was not observed ($p > 0.05$, Mann-Whitney test), but the statistical significance was marginal between benign and malignant tumors in males ($p = 0.059$, Mann-Whitney test).

DISCUSSION

In this study, all the cases were from a single academic institution histopathology laboratory service which serves as one of the largest specialized referral centers in oral and maxillofacial pathology in the Riyadh area. Tumors of salivary glands are uncommon with global annual incidence of 0.4 to 13.5 cases per 100,000 population.¹¹ In the current study, SGTs constituted 1.54% of all oral and maxillofacial lesions accessed over a 26 year period. The minor salivary glands were involved in 67.6% of all SGTs and accounted for 1.04% of all accessed cases. Reports from different parts of the globe showed that tumors of minor salivary glands accounted for 0.28–1.9% of all specimens.^{9,12,13} It worth mentioning that this study was conducted in a dental institution where there might be a bias

toward oral lesions rather than major salivary glands which are sometimes managed in ENT hospital department.

Pleomorphic adenoma was the most frequent benign tumor with a percentage of (42.25%) of all SGTs and the majority (43.3%) was in the palate. Pleomorphic adenoma has been well documented as the most frequent benign tumor of major salivary glands; however there are controversial reports on the tumors affecting minor salivary glands in which malignant tumors might be more predominant.^{11,14,15}

The mucoepidermoid carcinoma was the most prevalent malignant tumor followed by adenoid cystic carcinoma with percentage of (26.76%) and (7.04%) respectively. An interesting finding is the mucoepidermoid carcinoma predilection for minor salivary glands which is in agreement with few report from Mexico, Sri Lanka and USA, but contradicts with more studies showing that adenoid cystic carcinoma being more prevalent.^{5,10,15,16} No explanation has been identified to justify this ratio. Such high predilection of mucoepidermoid carcinoma in minor salivary glands was linked to high female to male ratio^{4,10}, however in the present study the female to male ratio for mucoepidermoid carcinoma was 1.71:1. The

highest prevalence of benign SGTs was in 3rd decade of life while the malignant tumors were more in the 5th. The average age of patients with malignant tumors was 3 years older than those with benign tumors. These findings are in agreement with previous reports.^{4,15} In general, there was increased male to female ratio which does not concord with most of the reports showing female predominance.^{2,7,12,13} Some studies from China, Iran and Tanzania reported slight male predominance,^{5,8,17} however, these data from large series studies should be carefully assessed because some gender variations according to tumor type should be considered. Warthin tumor is one of benign tumors with prominent male predilection which might be attributed to the increased male to female ration in some studies but not in the current study as no Warthin tumor was included.¹¹

In conclusion, the present study is a single institution experience that shows salivary gland tumors to be found mainly in minor salivary glands with slight male predominance. Pleomorphic adenoma and mucoepidermoid carcinoma were the most frequent benign and malignant tumors respectively. The palate was the most affected site by benign and malignant tumors. The benign SGTs peaked at the second decade of life while the malignant tumors were more frequent in 5th decade of life. It is of paramount importance to document the cases with complete clinical and pathological features, but due to lack of electronic record or archiving system, data on clinical, radiographic or management and follow up could not be collected. It is recommended that similar studies are conducted to include cases from different regions of the country so a large data base can be constructed to allow for comparative researches.

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Conflict of interest

I declare no conflicts of interest.

REFERENCES

1. Barnes L, Eveson JW, Reichart P, Sidransky D, editors. World health organization classification of tumours: Head and neck tumours. Lyon, France: IARC Press; (2005).
2. Ito FA, Ito K, Vargas PA, de Almeida OP, Lopes MA. Salivary gland tumors in a Brazilian population: a retrospective study of 496 cases. *Int J Oral Maxillofac Surg.* **34**(5):533–6 (2005).
3. Subhashraj K. Salivary gland tumors: a single institution experience in India. *Br J Oral Maxillofac Surg.* **46**(8):635–8(2008).
4. Mejia-Velazquez C, Duran-Padilla M, Gomez-Apo E, Quezada-Rivera D, Gaitan-Cepeda L. Tumors of the salivary gland in mexicans. A retrospective study of 360 cases. *Medicina Oral Patología Oral y Cirugía Bucal.* 0–0 (2011).
5. Shishegar M, Ashraf MJ, Azarpira N, Khademi B, Hashemi B, Ashrafi A. Salivary gland tumors in maxillofacial region: a retrospective study of 130 cases in a southern Iranian population. *Patholog Res Int.* 934350 (2011).
6. Bello IO, Salo T, Dayan D, Tervahauta E, Almangoush A, Schnaiderman-Shapiro A, et al. Epithelial Salivary Gland Tumors in Two Distant Geographical Locations, Finland (Helsinki and Oulu) and Israel (Tel Aviv): A 10-Year Retrospective Comparative Study of 2,218 Cases. *Head and Neck Pathology.* 2012 Jan 7;
7. Tilakaratne WM, Jayasooriya PR, Tennakoon TMPB, Saku T. Epithelial salivary tumors in Sri Lanka: a retrospective study of 713 cases. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* **108**(1):90–8 (2009).
8. Tian Z, Li L, Wang L, Hu Y, Li J. Salivary gland neoplasms in oral and maxillofacial regions: a 23-year retrospective study of 6982 cases in an eastern Chinese population. *Int J Oral Maxillofac Surg.* ;**39**(3):235–42 (2010).
9. Buchner A, Merrell PW, Carpenter WM. Relative frequency of intra-oral minor salivary gland tumors: a study of 380 cases from northern California and comparison to reports from other parts of the world. *J. Oral Pathol. Med.* **36**(4):207–14 (2007).
10. Al-Khateeb TH, Ababneh KT. Salivary tumors in north Jordanians: a descriptive study. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* **103**(5):e53–59 (2007).
11. Ellis GL, Auclair PL, Gnepp DR. Surgical pathology of the salivary glands. Philadelphia: *Saunders;* (1991).
12. Dhanuthai K, Boonadulyarat M, Jaengjongdee T, Jiruedee K. A clinico-pathologic study of 311

- intra-oral salivary gland tumors in Thais. *J. Oral Pathol. Med.* **38**(6):495–500 (2009).
13. Jaber MA. Intraoral minor salivary gland tumors: a review of 75 cases in a Libyan population. *Int J Oral Maxillofac Surg.* **35**(2):150–4 (2006).
 14. Wang D, Li Y, He H, Liu L, Wu L, He Z. Intraoral minor salivary gland tumors in a Chinese population: a retrospective study on 737 cases. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* **104**(1):94–100 (2007).
 15. Conceição B, Gurgel S, Gomes C, Agra G, Kruschewsky de, Dos S. Minor salivary gland tumors in a south American population. *Archive of oncology.* **18**(3):56–9 (2010).
 16. Sirohi D, Sharma R, Sinha R, Suresh Menon P. Salivary gland neoplasms: an analysis of 74 cases. *Journal of Maxillofacial and Oral Surgery.* **11**;8(2):164–6 (2009).
 17. Masanja MI, Kalyanyama BM, Simon ENM. Salivary gland tumours in Tanzania. *East Afr Med J.* **80**(8):429–34 (2003).