Salivary gland tumors: A review of 171 cases, with particular reference to histological types, site, age and gender distribution

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ABSTRACT

Background: Salivary tumors are uncommon, being of low incidence worldwide. This study aimed to assess cases collected in this series of salivary gland tumors in regard to histopathological typing, in relation to age, site and gender.

Materials and methods: This is a retrospective study; cases were collected from public and private laboratories. A total number of 171 cases were collected. The slides were reviewed and reclassified for histopathological typing according to WHO classification 2005.

Results: Benign tumors were more common than malignant tumors. The most common histological type was benign mixed tumor, followed by Warthin's tumor. The most common malignant tumor was adenoid cystic carcinoma. One hundred twenty three cases out of 171 cases developed in the parotid, the most common site for salivary tumors, with a low risk for malignancy, while minor salivary glands show higher risk for malignancy. Salivary tumors developed in females more than males with a ration 1.4:1, the peak incidence in the sixth and seventh decades for both benign and malignant tumors. There was no significant difference between right and left tumors, bilateral tumors were uncommon.

Conclusions: The results of this study reveal similarity to the findings of other studies on salivary tumors done in Iraq and the neighboring countries.

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INTRODUCTION

Salivary gland tumors are uncommon, accounting for about 3-6% of head and neck neoplasms[1]. Most of tumors develop in major salivary glands, so 43-90% occurs in the parotid gland, 8-19.5% in submandibular gland, uncommon in sublingual glands and only 14-22% occurs in minor salivary glands [2].

Salivary tumors show marked variation and morphological overlap, which resulted in repeated new classifications [3-6], the first classification was done by Foote et al in 1954[3]. Currently, the most widely used classification is the World Health Organization (WHO) classification, which primarily stresses distinction into benign and malignant tumors[7]. In most studies, salivary tumors are generally more common in females in their 3rd to 5th decades of life[8,9] . They are rare in pediatric age group, the most common tumors seen are benign mixed tumors, but the ratio of malignancy is higher than in adults[10]. Most of salivary gland tumors are unilateral, with no significant difference between right and left. Bilateral tumors are uncommonly seen, and occur mostly with Warthin's tumors [11].

Benign salivary gland tumors are more common than malignant tumors; the most common type is the benign mixed tumor or pleomorphic adenoma. These vary greatly in morphologic features, composed basically of epithelial and mesenchymal elements, they have a potential to recur [12], because they are partially encapsulated and difficult to excise completely in many cases. Malignant transformation is uncommon. However, it has been reported to occur more in submandibular gland tumors[13,14]. Warthin's tumor, also called cystadenoma lymph-omatosum papilliferum, seen almost exclusively in major glands [15]. The tumor has a higher risk for bilateralality[16], and it's incidence is higher in smokers[17].Other benign salivary adenomas are collectively much less common; the least uncommon are canalicular adenomas and basal cell adenomas.

It has been reported in most studies that Mucoepidermoid carcinomas are the most common malignant tumor in the parotid gland[18]. Acinic cell carcinomas and adenocarcinoma are less common, while adenoidcystic carcinomas are the most common malignancy in the minor salivary glands[11]. Malignant lymphoma can be seen as part of a systemic disease, or more commonly a primary neoplasm. Most of the cases are B cell type, often seen on a background of Miculisz disease or other autoimmune diseases [19]. Immunohistochemistry can be useful as an ancillary aid in diagnosis of specific histologic types of salivary gland tumors [20,21], particularly in uncommon adenomas and in malignant tumors: These tumors are uncommon in general pathology practice, and because these tumors frequently show morphological overlap. Therefore, This retrospective study is aimed to assess collected series of cases of salivary gland tumors, in regard to histological typing, site, age and gender.

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MATERIALS AND METHODS

Cases were collected from private and public laboratories. The total number of cases collected was 171 cases. For all cases, the slides were collected and reviewed. The cases were histologically classified according to the WHO classification[7] .

The following parameters were evaluated and analyzed: age incidence and distribution versus histological type, histological type versus various salivary gland anatomical sites, and the reverse relationship of anatomical sites versus histological typing laterality. Ultimately, results were compared to other national and abroad studies.

RESULTS

The total number of collected cases was 171. Benign tumors made up 141 cases, or 82.5% of total number of cases, while malignant cases were 30 cases, constituted 17.5 % of cases. Age incidence is shown in (Table 1), where age was higher in females over males with a ratio of 1.4:1, both benign and malignant tumors, with a ratio of 1.3:1 and 2.3:1 respectively. The peak incidence for benign tumors was in the sixth decade and for malignant tumors in the seventh decades for both males and females. No case in this series developed in the pediatric age group, age range was 15-91 years. There was no significant difference in the incidence of right versus left salivary gland tumors. Two cases were bilateral, both were Warthin's tumor. In regard to benign tumors, benign mixed tumor was the most common tumor type, with 102 cases, making up 59.7% of cases, the mean age was 49.4 years (Table 2).Age range was between 15 and 90 years. Eighty one cases developed in the parotid, 13 in the submandibular and 8 in minor salivary glands. Warthin's tumor was the second most common benign salivary tumor, with 27 cases (15.8%), mean age 67.2 years, age range 49-91. All other benign tumor types were 12 cases (7%), the mean age 64.8 years and age range 44-77. Seven cases were in the parotid gland and 5 in minor salivary glands. The most common was basal cell adenoma with 8 cases; all were females, with a mean age of 66 years. Five cases were in the parotid and 3 in the minor salivary glands. Other benign tumors included 3 cases of oncocytoma and 1 case of canalicular adenoma. The most common malignant tumor was adenoidcystic carcinoma 7 cases (Table 3), 5 of them were in the minor salivary glands, while 2 cases were submandibular. No cases were seen in the parotid gland.

Five cases of acinic cell carcinoma were seen, 4 of them in the parotid. Also five cases of pleomorphic low grade adenocarcinoma, all were in the minor salivary glands. Three cases of mucoepidermoid carcinoma and 4 cases of malignant lymphoma were seen. Other types of malignancy collectively accounted for 6 cases. The parotid gland was the most common site of salivary tumors, with 123 cases (Table 4). However, only 9 cases (7%) in this series were malignant. According to Table-4, Benign tumors were 114 cases, or 93%, the most common type was pleomorphic adenoma, 81 cases (66%), followed by Warthin's tumor 26 cases (21%). Other benign tumors were rare. Submandibular gland tumors were 20 cases in this series, 13 benign, all pleomorphic adenomas, and 7 malignant, so malignant risks is higher than the parotid gland. Sublingual gland tumors were rare, 2 cases were diagnosed, both malignant. While minor salivary gland tumors were 26 cases, malignancy 12 cases, most commonly adenoidcystic carcinoma and pleomorphic low grade adenocarcinoma.

Table 1: Age and gender distribution and percentage of salivary gland neoplasm

Age(years)	Benign			Malignant		
	Males	Females	Total	Males	Females	Total
11-20	3	4	7(5.0%)	0	0	0
21-30	5	4	9(6.4%)	0	2	2(6.7%)
31-40	7	7	14(9.9%)	0	1	1(3.3%)
41-50	10	11	21(14.9%)	2	1	3(10%)
51-60	14	20	34(24.1%)	3	5	8(26.7%)
61-70	11	19	30(21.3%)	4	7	11(36.6%)
71-80	9	10	19(13.4%)	0	5	5(16.7%)
81-90	3	3	6(4.3%)	0	0	0(0%)
91-100	0	1	1(0.7%)	0	0	0(0%)
Total	62(44.0%)	79(56.0%)	141(100%)	9(30%)	21(70%)	30(100%)

Table 2: Tumor types mean age, standard deviation and age range, with anatomical site distribution

Tumor types	Number	Mean Age±S.D.	Age Range	Sal. gland anatomical site			
				Parotid	Submand	Sublingual	Minor
Pl.Ad.	102(59.7%)	49.4±17.3	15-90	81	13	---	8
Warthin's	27(15.8%)	67.2±7.7	49-91	26	---	---	1
Benign	12 (7.0%)	64.8±8.4	44-77	7	---	---	5
Malignant	30(17.5%)	59.9±13.2	24-80	9	7	2	12
Total	171(100%)	55.1±14.4	15-91	123	20	2	26

Table 3: Malignant salivary gland tumors: Histological types vs. age, sex and anatomical site

Tumor type	Case Number	Mean Age	Sex F:M	Site Parotid	Submand	Sublingual	Minor
Adenoidcystic	7(23.3%)	60	5:2	----	2	---	5
Acinic	5(16.7%)	55	4:1	4		1	
Mucopeidermoid	3(10.0%)	70	1:2	2			1
PLGA	5(16.7%)	53	4:1				5
Pl. adenoca.	2(6.7%)	58	0:2		2		
Basal cell ad.	1(3.3%)	59	0:1				1
Epi.myoep. ca.	1(3.3%)	69	1:0		1		
Adenoca.NOS	1(3.3%)	26	1:0			1	
Lymphoma	4(13.4%)	74	4:0	2	2		
Metastastatic	1(3.3%)	60	1:0	1			
Total	30(100%)		21:9	9	7	2	12

Table 4: Salivary gland tumor case distribution according to gland site

Salivary Gland	Tumor types and % per site				Total
	Pl.adenoma	Warthin	Benign	Malignant	
Parotid	81(65.9%)	26(21.1%)	7(5.7%)	9(7.3%)	123(100%)
Submandibular	13(65%)	-----	-----	7(35%)	20(100 %)
Sublingual	----	-----	-----	2(100%)	2(100%)
Minor	8(30.8%)	1(3.8%)	5(19.2%)	12(46.2%)	26(100%)
Total	102(59.7%)	27(15.8%)	12(7.0%)	30(17.5%)	171(100%)

DISCUSSION

Salivary gland tumors are interesting, because of their uncommon incidence in the routine pathology practice and their varied histology. This variation resulted in their complex and constantly changing classifications. Currently, the WHO classification is most widely used, which stresses mainly on the distinction between benign and malignant tumors[7]. Age incidence showed peak value in the sixth and seventh decades (Table 1), which is slightly higher than other studies, with no significant difference. Incidence was higher in females than males in most of salivary tumor types. The exception was Warthin's tumor, more common in males. This is in concordance with other studies[9]. Histological typing of this series revealed that benign tumors were much more common, the most common type in our series was pleomorphic adenoma, 102 cases of total 171 cases collected(or 59.7%), most of the cases are in the parotid gland. The second most common tumor was Warthin's tumor with 15.8% (27 cases); cases were seen almost exclusively in the parotid gland. The same result was seen in other studies [3,5,15]. Other benign tumors were much less common, so a total of 12 cases (7%) were collected, 8 cases were basal cell adenoma. There is some variation between studies in regard to the incidence of benign salivary tumors, and which of the types are more common, whether canalicular[11] or basal cell adenomas[22]. A probable cause for this discrepancy is the low incidence rate of these tumors resulting in small number of cases in many of the studies, including ours.

Malignant tumors were 17.5%(30 cases), most commonly adenoidcystic carcinoma, matching some studies [8], and pleomorphic low grade carcinoma. Cases of mucoepidermoid carcinoma were seen less in this series.

The parotid gland was the most common site of salivary gland tumors, with 123 cases, which outweigh the mere size and weight difference[11]. Most of the tumors were benign, as most other studies [4,9]. Pleomorphic adenoma was the most

common tumor type, then Warthin's tumor and other benign tumors. Malignant tumors were seen in 9 cases, slightly less than other studies. The most common parotid malignant tumors in our series were acinic cell carcinoma, mucoepidermoid carcinoma and adenocarcinoma, matching other studies. Submandibular gland tumors were less common, mostly benign. Minor salivary gland tumors were also less common, but with 46% malignancy. Immunohistochemical markers were used in most of the malignant tumors and some of the less common benign tumors, to help in the differential diagnosis and to confirm diagnosis. The most commonly used markers were AE1/AE3, actin, S-100, CK-5/6, CK -7, CD-117 and Ki-67. Other uses of markers in cases of specific diagnoses as in suspected lymphoma or metastatic tumors. Review of previous studies on salivary gland tumor from Iraq[23-26] and from neighboring countries [27-29] show resemblance in most of the results in regard to histological types and incidence of malignancy. Minor differences were noted as slight male preponderance in some of these studies [27], and no difference in others [8].

The conclusions that can be drawn from this study were that most of the studied parameters regarding salivary gland tumors match those published in the scientific journals.

REFERENCES

1. Leegard T, Lindman H. Salivary gland tumors, clinical picture and treatment. Acta Otolaryngol 1970; 263:155-9.
2. Eveson JW, Cawson RA. Tumours of minor (oropharyngeal) salivary glands: A demographic study of 336 cases. J Oral Pathol 1985; 14: 500–9.
3. Foote FW Jr, Frazell EL. Tumors of the major salivary glands. Cancer 1953; 6: 1065-135.
4. Batakis JG. Tumors of the head and neck: clinical and pathologic considerations, 2nd ed. Baltimore: Williams and Wilkins Co.; 1979.
5. Thackney AC, Sobin LH. Histological typing of salivary gland tumors. Geneva: WHO; 1972.
6. Simpson RHW. Classification of tumors of the salivary glands. Histopathology 1994; 24:187-91.
7. Barnes L, Eveson J W, Reichart P, Sidransky D (eds). World Health Organization Classification of Tumors: Pathology and Genetics of the Head and Neck Tumors. IARC Press; Lyon, France: 2005.
8. Sirohi D, Sharma R, Sinha R, Menon S. Salivary gland tumors: An analysis of 74 cases. J Maxillofac Oral Surg 2009; 8(2):164-6.
9. Claudia-Patricia Mejía-Velázquez C,Durán-Padilla M, Gómez-Apo E, Quezada- Rivera D, Gaitán-Cepeda L. Tumors of the salivary gland in Mexicans. A retrospective study of 360 cases. Med Oral Patol Oral Cir Bucal 2012; 17 (2):e183-9.
10. Krolls SO, Trodahl JN, Boyers RC. Salivary gland lesions in children.A survey of 430 cases. Cancer 1972; 30: 459-69.
11. Rosai J, Ackerman L. Surgical Pathology. 10th ed. Mosby; 2011. pp. 817-55.
12. Patey DH, Thackray AC: The treatment of parotid tumours in the light of a pathological study of parotidectomy material. Br J Surg 1958; 45:477-87.
13. Muller S, Vigneswaran N, Gansler T, Gramlich T, DeRose PB, Cohen C. c-erbB-2 oncoprotein expression and amplification in pleomorphic adenoma and carcinoma ex pleomorphic adenoma: relationship to prognosis. Mod Pathol 1994; 7: 628-32.
14. Auclair PL, Ellis GL. Atypical features in salivary gland tumors: their relationship to malignant transformation. Mod Pathol 1996; 9: 652-7.
15. Eveson JW, Cawson RA: Warthin's tumor (cystadeno-lymphoma) of salivary glands. A clinicopathologic investigation of 278 cases. Oral Surg Oral Med Oral Pathol 1986; 61: 256-62.
16. Turnbull AD, Frazell EL: Multiple tumors of the major salivary glands. Am J Surg 1969; 118: 787-9.
17. Kotwall CA: Smoking as an etiologic factor in the development of Warthin's tumor of the parotid gland. Am J Surg 1992; 164: 646-7.
18. Nascimento AG, Amaral ALP, Prado LAF, Kligerma J , Silveira TRP: Mucoepidermoid carcinoma of salivary glands. A clinicopathologic study of 46 cases. Head Neck Surg 1986; 8: 409-17.
19. Kojima M, Shimizu K, Nishikawa M, Tamaki Y, Ito H , Tsukamoto N, Masawa N: Primary salivary gland lymphoma among Japanese: a clinicopathological study of 30 cases. Leuk Lymphoma 2007; 48:1793-8.
20. Nagao T, Sato E, Inoue R, Oshiro H, Takahashi RH, Nagai T, et al. Immunohistochemical Analysis of Salivary Gland Tumors: Application for Surgical Pathology Practice. Acta Histochem Cytochem 2012; 45(5): 269-82.
21. De Araujo VC, de Sousa SO, Carvalho YR, de Araujo NS. Application of immunohistochemistry to the diagnosis of salivary gland tumors. Appl Immunohistochem Mol Morphol 2000; 8:195–202.
22. Ibrahim Bello, Tuula Salo, Marilena Vered. Epithelial salivary gland tumors in two distant geographical locations:A 10-year retrospective comparative study of 2218 cases. Head and neck Pathol 2012; 6(2):224-231.
23. Ahmed ST. Salivary neoplasms (Analysis of 108 cases from Mosul). Iraq Med J 2002; 51:27-30.
24. Alash Nl, Al-Saleem T. Tumors of the minor and major salivary glands (analysis of 225 cases). J Fac Med Baghdad 1987; 29:103-9.
25. Badri GH, Al-Nakshabandi SA, Al-Wisasy MK. Salivary gland neoplasm: analysis of 89 cases from Basra. Med J Basrah Un 2004; 22(192): 12-4.
26. ZekiNaji A. Salivary gland lesion in Babil: Clinico-pathological study. Med J Babylon 2012; 9(2): 427-32.
27. Ma'aita JK, Al-KaisiN, Al – Tamimi S, Salivary gland tumors in Jordan: a retrospective study of 221 patients. Croat Med J 1999; 40(4):539-42.
28. Al-Naami MY, Guraya SY, Arofab MM, et al. Clinicopathological pattern of malignant parotid tumor in Saudia Arabia. Saudi Med J 2008; 29(3): 413-7.
29. Kara MI, Göze F, Ezirganl Ş, et al. Neoplasms of the salivary glands in a Turkish adult population. Med Oral Patol Oral Cir Bucal 2010; 15(6): e880-5.