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| RESEARCH ARTICLE

Overview of Salivary Gland Tumors of General Hospitals in Iraq Over 8-Years

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| ABSTRACT

Salivary gland tumors (SGTs) are considered rare tumors, which generate attention because of their clinical behavior and clinicopathologic variety. The study objective is to explore clinicopathological characteristics of salivary gland tumors analyzed at different hospitals in Iraq and compare the results with epidemiological results from different governments. This study was manually collected from different hospitals of tumors between 2010 and 2017. Demographic parameters, such as age, gender, and sites, as well as clinical behavior and histological type of tumor, were analyzed. Descriptive statistical analysis was achieved utilizing categorical frequency variables. In 715 cases of tumors, 328 cases (45.90%) of males and 387 cases (54.10%) of females were included. The mean patient age was (42.10) years. Pleomorphic adenoma had 464 cases (64.90%), and adenoid cystic carcinoma had 141 cases (19.70%), which were the common benign and malignant SGTs, respectively. For experimental results, some demographic appearances and the predominance of malignant tumors varied in different geographic regions as compared with other studies.

| KEYWORDS

Salivary Glands Tumors; Clinicopathological Characteristics; Epidemiological data; Pleomorphic Adenoma; Adenoid Cystic.

| ARTICLE INFORMATION

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1. Introduction

The salivary gland is an exocrine tubulo-acinary structure that is comprised of saliva that is secreted. It contains the chief three types: sublingual glands, submandibular, and parotid glands (Krishnamurthy, 2015). Moreover, another hundred small glands are commonly disseminated through the oropharyngeal sub-mucosa and oral and underlying muscle in particular cases (Nolte, 2016). In the upper breathing and sinonasal tracts, similar seromucous glands are introduced (Bullock, 2016). Myoepithelial cells, associated with ducts and secretory acinus, are the salivary glands' functional unit (De-Paula, 2017). Acini might be combined, mucous, or serious (Asakawa, 2015). Serous acini with basal nuclei form wedge-shaped secretion of cells (Molavi, 2018). These have edged the lumens that become the observer ship basis of ducts. Serous cell cytoplasm comprises highly basophilic, refractile zymogen pellets, which are periodic acid–Schiff (PAS) positive and diastase resistant (Eveson, 2015). Furthermore, the nuclei have been essentially presented by mucous acinar cells, and their cytoplasm is comprised of sialomucin vacuoles and cells (Hellquist, 2014). These cell secretions go over the collecting ducts, and they are regularly unnoticeable in clinicopathological subdivisions of the routine that are ruled by a particular relatively large layer, essential nuclei of cuboid cells (Lőw, 2016). The striated ducts join the interlobular and excretory ducts. These are presented by columnar epithelium with pseudo-stratification that commonly comprises scattered mucous cells. Myoepithelial cells are a regular constituent of the salivary acini, and fewer ducts exist between the epithelial cells and the basement membrane (Redder, 2013).

The current study aims to identify the main features of salivary gland tumors in Iraq by exploring the related factors. It also obtained the clinicopathological findings of cases that were operated on the head and neck, especially in salivary gland surgery, over the 8-year period in Iraq. Moreover, it is to study the comparison of these findings with the previous studies.

2. Materials and Methods

The study was conducted at the Department of Oral and Maxillo-Facial Pathology, University of Karbala. A total of 715 diagnosed cases of different governments of general hospitals in Iraq from 2010 to 2017 for eight years. This study comprised (715) cases in which analyses of salivary gland tumors were clinicopathologically established. The demographic parameters using cases and cancer sites were reported, and their relations with clinicopathological findings were evaluated. These results were assessed with respect to the 2017 WHO clinicopathological categorization standards for salivary gland tumors (Skálová, 2022).

2.1 Statistical analysis

The whole data was manually collected, and it must be converted into a computerized database format. These data must be examined for errors using different techniques. Different detailed clinical data was recovered from the respective departmental records analyzed using the statistical package for social sciences (SPSS) version 26 for Windows and Microsoft Excel 2016. T-test and one-way-ANOVA tests were used, and a p-value <0.05 was examined to be statistically significant.

3. Results:

The data collection was 715 cases of salivary gland tumors, which were collected in (10) Iraq governorates from 2010 to 2018: Baghdad (350), Diyala (96), Babil (57), Kut (56), Sulaymaniyah (38), Karbala (35), Basrah (28), Diwaniyah (23), Erbil (18) and Najaf (14). The maximum value (350) was reported in the Baghdad governorate, and the minimum value (14) was reported in the Najaf governorate, as displayed in Table 1.

Table 1. The frequency distribution of Iraq governorates.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	**Baghdad**	350	49.0	49.0	49.0
	Diyala	96	13.4	13.4	62.4
	Babil	57	8.0	8.0	70.3
	Kut	56	7.8	7.8	78.2
	Sulaymaniyah	38	5.3	5.3	83.5
	Karbala	35	4.9	4.9	88.4
	Basrah	28	3.9	3.9	92.3
	Diwaniyah	23	3.2	3.2	95.5
	Erbil	18	2.5	2.5	98.0
	Najaf	14	2.0	2.0	100.0
	Total	715	100.0	100.0	

The frequency of analysis categories of salivary gland tumors by annual patients during the period 2010-2017: 2010 (64), 2011 (108), 2012 (79), 2013 (100), 2014 (84), 2015 (119), 2016 (133), and 2017 (28). The highest value (133) was recorded in the 2016 year, and the lowest value (28) was recorded in the 2017 year, as illustrated in Table 2.

Table 2. Frequency distribution of annual patients.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	**2010**	64	9.0	9.0	9.0
	2011	108	15.1	15.1	24.1
	2012	79	11.0	11.0	35.1
	2013	100	14.0	14.0	49.1
	2014	84	11.7	11.7	60.8
	2015	119	16.6	16.6	77.5
	2016	133	18.6	18.6	96.1
	2017	28	3.9	3.9	100.0
	Total	715	100.0	100.0	

The frequency of analysis categories of salivary gland tumors by gender that were comprised (387) cases, with (54.10%) percentage of females and (328) cases with (45.90%) percentage of males. The female number is higher than the male number, and the ratio of females to males is (1.18:1), as displayed in Figure 1.

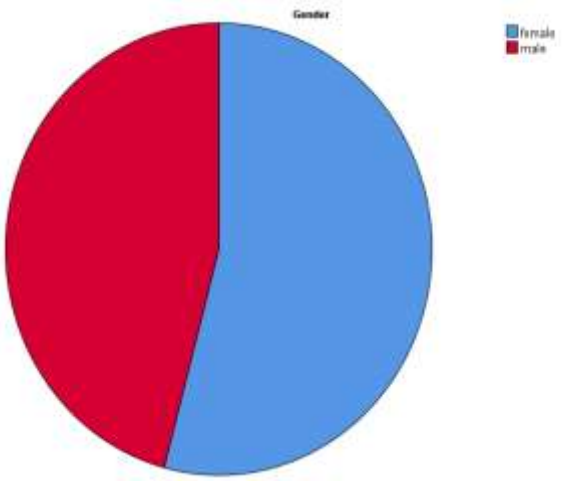

Figure 1. The pie chart of gender.

The mean age of salivary gland tumors for all cases is (42.1), and the standard deviation is (16.428), as shown in Figure 2.

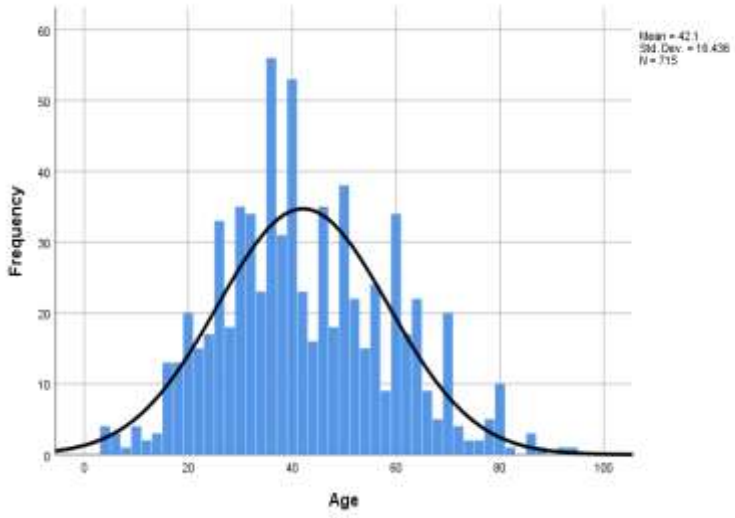

Figure 2. The histogram of age.

The frequency of analysis categories of salivary gland tumors by types was divided into 8 categories: Pleomorphic adenoma (465), Adenoid cystic (14), and Mucoepidermoid Ca. (65), Warthin's tumor (25), Acini cell carcinoma (14), Ductal cell carcinoma (2), Myoepithilioma (2) and Basal cell adenoma (1). The maximum value (465) cases were recorded in pleomorphic adenoma, and the minimum value (1) case was recorded in basal cell adenoma, as displayed in Table 3.

Table 3. Frequency distribution of salivary gland tumors.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Pleomorphic adenoma	465	65.0	65.0	65.0
	Adenoid cystic	141	19.7	19.7	84.8
	Mucoepidermoid Ca.	65	9.1	9.1	93.8
	Warthin's tumor	25	3.5	3.5	97.3
	Acini cell carcinoma	14	2.0	2.0	99.3
	Ductal cell carcinoma	2	.3	.3	99.6
	Myoepithilioma	2	.3	.3	99.9
	Basal cell adenoma	1	.1	.1	100.0
	Total	715	100.0	100.0	

The frequency of analysis categories of salivary gland tumors by gender showed that the maximum frequency of benign behavior is (263) cases of pleomorphic adenoma in females and (202) cases in males. The minimum frequency is (1) case of basal cell adenoma in males. For malignant behavior, the maximum frequency is (73) of adenoid cystics in males and (68) in females. The minimum frequency is (1) cases of myoepithilioma in males and females, as shown in Table 4.

Table 4. The frequency distribution of benign and malignant behavior by gender.

lGender		Diagnose	Frequency	Percent	Valid Percent	Cumulative Percent
male	Valid	Acini cell carcinoma	6	1.8	1.8	1.8
		Adenoid cystic	73	22.3	22.3	24.1
		Basal cell adenoma	1	.3	.3	24.4
		Ductal cell carcinoma	2	.6	.6	25.0
		Mucoepidermoid Ca.	25	7.6	7.6	32.6
		Myoepithilioma	1	.3	.3	32.9
		Pleomorphic adenoma	202	61.6	61.6	94.5
		Warthin's tumor	18	5.5	5.5	100.0
		Total	328	100.0	100.0	
Female	Valid	Acini cell carcinoma	8	2.1	2.1	2.1
		Adenoid cystic	68	17.6	17.6	19.6
		Mucoepidermoid Ca.	40	10.3	10.3	30.0
		Myoepithilioma	1	.3	.3	30.2
		Pleomorphic adenoma	263	68.0	68.0	98.2
		Warthin's tumor	7	1.8	1.8	100.0
		Total	387	100.0	100.0	

The frequency of analysis categories of the behavior of salivary gland tumors comprised (493) benign cases and (222) malignant cases, as shown in Figure 3.

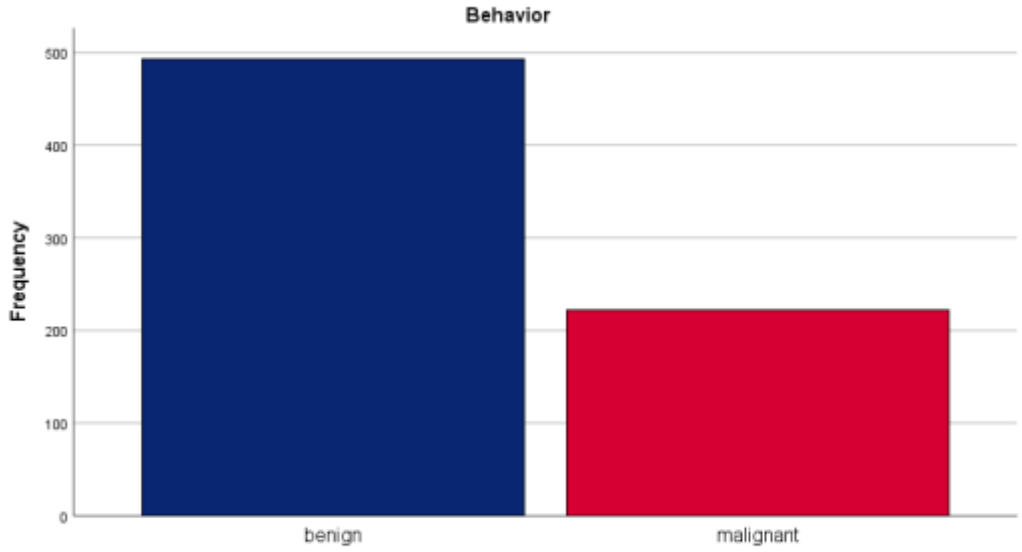

Figure 3. Occurrence of benign and malignant tumors.

The incidence of analysis categories of behavior tumors by gender comprised (224) benign cases in males and (269) cases in females, while (104) cases of malignant in males and (118) cases in females. The behavior tumors (benign and malignant) with gender showed a highly significant difference (p=0.000). The mean age of benign is (41.88) and (42.58) of malignant.

The frequency of analysis categories of salivary gland tumors by the site included (256) cases of the parotid, followed by (91) cases of the palate and (83) cases of submandibular, while the other site is (285) cases.

The frequency of analysis categories of behavior tumors by the three common sites comprised (206), (61), and (49) benign cases for parotid, submandibular, and palate, respectively. Meanwhile, (50), (42), and (22) cases of the malignant parotid, palate, and submandibular, respectively, are shown in Figure 4.

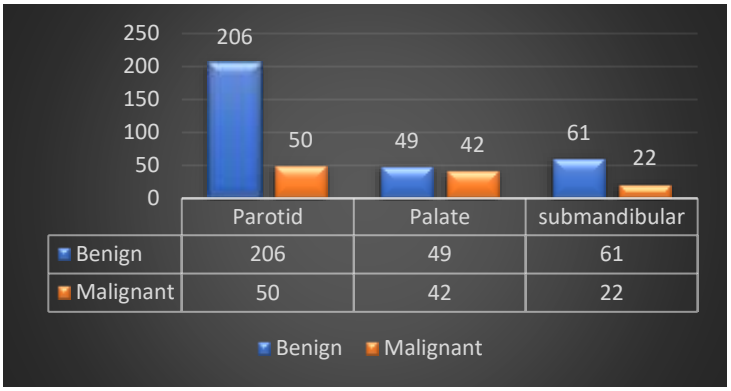

Figure 4. The distribution of behavior tumor by site.

The frequency of analysis categories of salivary gland tumors by age group was classified into five groups. The most affected age group in salivary gland tumors was (25-39) (252) cases. The highest percentage (35.24 %) was found in the age group (25-39), and the lowest percentage (2.37 %) was obtained in the age group (<15), as shown in Table 5.

Table 5. The frequency of analysis categories by age group.

Diagnosis	Age group (yrs)									
	<15		(15-24)		(25-39)		(40-59)		60+	
	No.	%	No.	%	No.	%	No.	%	No.	%
Salivary gland tumors	17	2.37	69	9.65	252	35.24	240	33.56	137	19.16

The frequency of analysis categories of salivary gland tumors by age group and gender showed that the most affected age group and in salivary gland tumors was (25-39) (162) cases of females while the lowest was (5) cases in age group (>15) of female, as shown in Table 6.

Table 6. The frequency of analysis categories by age group.

Gender	Age group (yrs)									
	<15		(15-24)		(25-39)		(40-59)		60+	
	No.	%	No.	%	No.	%	No.	%	No.	%
Male	12	1.67	31	4.34	90	12.58	105	14.68	90	12.58
Female	5	0.70	38	5.31	162	22.66	135	18.88	47	6.57

4. Discussion

Salivary gland tumors can be classified into two behaviors, benign or malignant, that display so different clinicopathological features (Mengi, 2020). Thereby, the precise categorization of these cancers with respect to their clinicopathological features is very significant for the correct behavior strategy. The categorization of salivary gland tumors, as suggested by the WHO and revised in 2017, is generally utilized all over the world (Gao, 2017).

The two different behavior types of tumors arise from salivary gland tumors. Epidemiologic research introduced in different studies of the world report differences in the incidence. The current study presented the demographic and clinicopathologic aspects of (715) cases of salivary gland tumors diagnosed at different hospitals in Iraq.

Salivary gland tumors can be shown in both genders (male and female). The female-to-male ratio was obtained as (1.18:1) for all cases. This ratio was (1.20:1) and (1.13:1) for benign malignant tumors, respectively. These tumors are more frequently displayed in females. Though previous research has recorded salivary gland tumors more frequently impacted men (Vasconcelos, 2015), a few studies have recorded female predominance (Moghadam, 2010) and (Mengi, 2020). The high occurrence of pleomorphic adenoma tumors of the existence of important female dominance in the tumors is obvious as the most significant feature detecting the female: male ratio. This is in agreement with the results that were presented by (Araya, 2015) and (Da-Silva, 2018).

The increase in salivary gland tumors was rare in kids, but their occurrences increased after the age of 40 years. Benign behavior tumors were recorded to become the most generally shown between the 4th and 5th years, and malignant behavior tumors after the 7th decade (18). (42.1) years represented the mean age of the whole cases, and (40) years represented the median age. Moreover, malignant behavior tumors were more significant than benign behavior tumors with respect to mean age.

The three common salivary gland tumors were positioned in the parotid, palate, and submandibular and were displayed at different rates. The incidence has been recorded as follows: (206) cases of benign parotid and (50) cases of malignant. For palate (49) cases of benign and (42) cases of malignant. For submandibular (61) cases of benign and (22) cases of malignant. Salivary gland tumors were the most commonly determined in the parotid (36%), followed by the palate (13%) and the submandibular (12%). These results were in acceptance with (Sowa, 2018) and (Galdirs, 2019).

In this study, pleomorphic adenoma was the most commonly determined benign salivary gland tumor. Warthin's tumor was the second most commonly determined benign behavior tumor. Pleomorphic adenoma comprised (94%) of benign behavior tumors, and Warthin tumor comprised (5%). Several studies showed that pleomorphic adenoma has been recorded to be the most general benign tumor in the whole of salivary gland tumors (Vasconcelos, 2015) (Israel, 2016). Nevertheless, in this study, pleomorphic adenoma was determined in the parotid gland more than Warthin's tumor, similar to (Hmidi, 2015).

For malignant behavior, adenoid cystic was the most frequently determined malignant salivary gland tumor (Sarmento, 2016). Meanwhile, mucoepidermoid Ca. was the second most frequently determined malignant tumor (Tabatabai, 2015). Adenoid cystic included (64%) of malignant tumors, while mucoepidermoid Ca included (29%). Many studies showed that adenoid cystic has been recorded to be the most common malignant tumor in the whole of salivary gland tumors (Kalburge, 2014).

5. Conclusion

The incidence of salivary gland tumors determined in the head and neck region from 2010 to 2017 was investigated to be significantly similar to other global succession. The first most common benign tumor impacting the head and neck region was pleomorphic adenoma. The first most public malignant tumor impacting the head and neck region was adenoid cystic. Furthermore, salivary gland tumors are the most benign tumor, damaging, and changeable tumors of the head and neck, occurring primarily between the 4^{th} and 5^{th} decades and after the 7^{th} decade of malignant tumors in human life. From experimental results, the three common sites were parotid, palate, and submandibular salivary gland tumors. The ratio of female to male is (1.18:1). The most affected salivary gland tumor of the age group (25-39).

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