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Original Article

Salivary Gland Tumors-10 years' experience at Peshawar Medical College

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ABSTRACT

Introduction: Salivary gland tumors (SGTs) are a rare disorder of diverse characteristics. Up to 13.5 people per lac population are affected by SGTs each year. Most of studies have shown geographic variation in the incidence and histopathologic types of salivary gland neoplasms.

Objective: This study aimed to evaluate the salivary gland tumors for 10 years duration in patients' specimens received in Peshawar Medical College laboratory.

Material and Methods: This study was conducted at Peshawar Medical College, Peshawar. In this epidemiological study, 100 medical records of patients with salivary gland neoplasms for 10 years duration (January 2011-December 2021) were reviewed. The clinical data and histopathological features were statistically analyzed using SPSS version 25.

Results: Data showed Pleomorphic adenoma as the most prevalent benign Salivary gland tumor whereas adenoid cystic carcinoma ranked as the most common malignant Salivary Gland Tumor. Patients were between the age group 13-100 years. Among these 56 were males and 44 were female. Benign tumors were mainly found in the parotid gland while malignant tumors were more prevalent in minor salivary glands.

Conclusion: Pleomorphic adenoma is the most common benign salivary gland tumor and adenoid cystic carcinoma was the most frequently observed malignant tumor. Although most of the results of this study were similar to those reported in other populations, some differences were observed.

Key Words: Salivary Gland Tumors, Pleomorphic Adenoma, Adenoid Cystic Carcinoma, Mucoepidermoid Carcinoma.

Introduction

Salivary gland tumors (SGTs) are important maxillofacial and oral lesions.[1] They are relatively uncommon having 3% of global prevalence .[2] SGT accounts for 0.5% of human malignant tumors [3] and 3-10% of head and neck tumors. [4]First classification OF SGTs was given in 1972.[5] Most recent WHO classification was given in 2017, classifying salivary gland tumors into 30 different types.[6.]

SGTs arise from both endogenous and differentiated stem cells. [7] In mature gland cells like myoepithelial cells, acini, cells of intercalated ducts, and intra-lobular duct cells are considered responsible for tumor origin.[8]

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No known factors were considered to be responsible for SGT but the factors most commonly associated are chromosomic translocation, secondary radiation, and chemotherapy.[9] Few studies also suggest that epigenetic alterations are also a cause of SGTs but such studies are very few in number.[10] Certain viruses including HPV & EBV are also associated with tumorigenesis according to some researchers.[11]

Most of the SGTs are benign according to different studies. The parotid gland shows the highest tumor incidence (85% of all cases) while the Submandibular glands rank in the second number at 6.8%[2.] Sublingual glands affect the least (1% of cases).[7] Tumors of Minor salivary glands make up 25% of all SGTs among which 80% are malignant in nature.[12]

SGTs are a rare form of tumor. Diagnosis gets difficult because of the wide range of histological and biological variations of these tumors. Considering limited studies on SGTs, our study aimed to evaluate the salivary gland tumors (SGTs) for 10 years duration.

Material and Methods

After getting Ethical approval from the Board of Advance Studies and Research, Riphah International University, and the Institutional Review Board (IRB) of Prime Foundation Pakistan (IRB Approval No: Prime/IRB/2021-360). The sample size was calculated using G Power software, with a one-tail test, having an effective size of 0.5, α 0.05 (margin of type 1 error) with the power of 80 (minimum probability acceptable for type 2 error is 20%)

This study was performed on 100 Pathology Department, Peshawar Medical College (PMC) samples. SGT cases between 2011-2021 were retrospectively retrieved from electronic archives of the Pathology Department of Peshawar Medical College (PMC) and, Pakistan Institute of Medical Sciences (PIMS), Islamabad.

The inclusion criteria were benign and malignant salivary gland tumors. Relevant data included demographic findings like age, gender, site of lesion, and histopathological features. They were entered in proforma. Statistical Package for Social Sciences (SPSS) version 25 was used for the statistical analysis of collected data.

Results

Results indicate the age of patients in the range of 13 - 100 years. The average age of the patients was 43.50±15.2 years. The highest number of cases (42) were observed in the age group of 40-59 years, followed by the age group of 20-39 years(3). On the other hand, the lowest numbers of cases were found in individuals over 80 years of age (2). Benign tumors were most commonly diagnosed in the age group of 20-39 years; while malignant SGTs were predominantly observed in individuals aged 40-59 years. The male-to-female ratio was approximately 1.5:1, with 44 male and 29 female patients.

Among benign SGTs, pleomorphic adenoma was the most prevalent tumor, accounting for 82% of cases (n=41). Adenoid cystic carcinoma was the most common malignant SGT, comprising 38% of cases (n=19). Male predominance (n=29, 58%) was observed in both malignant and benign SGTs (**Table 1**).

Salivary gland tumors can affect both major and minor salivary glands. Benign SGTs were predominantly located in the parotid gland, accounting for 52% of cases (n=26). However, no cases of benign SGTs were reported in the sublingual gland in our study. Among malignant SGTs, the minor salivary glands were the most commonly affected anatomical site, accounting for 46% of cases (n=23). Details regarding the distribution of other salivary gland sites can be found in **Table 2**.

Table 1: Frequencies of Salivary Gland Tumors According to Age and Sex

Tumor Type Benign Tumors	**Age and Gender Correlation**										**Total**		
	<20 year		20-39 year		40-59 year		60-79 years		≥80 years				
	M	F	M	F	M	F	M	F	M	F	**M**	**F**	M+F
Pleomorphic Adenoma	0	2	4	18	11	2	2	2	0	0	**17**	**24**	**41**
Warthin's Tumor	0	0	2	0	1	0	0	0	0	0	**3**	**0**	**3**
Myoepithelioma	0	0	2	0	2	0	0	0	0	0	**4**	**0**	**4**
Oncocytoma	0	0	0	0	0	0	2	0	0	0	**2**	**0**	**2**
Malignant tumors													
	<20 year		**20-39 year**		**40-59 year**		**60-79 years**		**≥80 years**		**Total**		
	M	F	M	F	M	F	M	F	M	F	**M**	**F**	M+F
Mucoepidermoid Carcinoma	2	0	2	3	3	1	5	0	1	1	**13**	**5**	**18**
Adenoid Cystic Carcinoma	0	0	5	1	5	7	1	0	0	0	**11**	**8**	**19**
Acinic Cell Carcinoma	0	0	0	0	2	1	0	0	0	0	**2**	**1**	**3**
Salivary Duct Carcinoma	0	0	0	0	1	0	0	0	0	0	**1**	**0**	**1**
Carcinoma Ex-Pleomorphic Adenoma	0	0	0	0	2	0	0	1	0	0	**2**	**1**	**3**
	0	0	0	2	1	3	0	0	0	0	**1**	**5**	**6**

Table 2: Frequencies of Salivary Gland neoplasms according to location

Tumor Type	Parotid Gland	Submandibular Gland	Sublingual Gland	Minor Salivary Gland
Benign Tumors				
Pleomorphic Adenoma	21	7	0	13
Warthin's Tumor	1	0	0	2
Myoepithelioma	2	0	0	2
Oncocytoma	2	0	0	0
Total	**26**	**7**	**0**	**17**
Malignant Tumors				
Mucoepidermoid Carcinoma	10	1	1	6
Adenoid Cystic Carcinoma	0	5	1	13
Acinic Cell Carcinoma	3	0	0	0
Salivary Duct Carcinoma	1	0	0	0
Carcinoma Ex-Pleomorphic Adenoma	3	0	0	0
Pleomorphic Low-Grade Adenocarcinoma	0	2	0	4
Total	**17**	**8**	**2**	**23**

Discussion

The age of patients was in the range of 13-100 years in our study with a mean age of 43.50 ± 15.215. 42% of our patients were between 40-59 years of age, and 39% belonged to the 20-39 years age group. A study conducted by Yaseer Mahomed and associates atthe University of the Witwatersrand, Johannesburg, South Africa showed a mean age of 44.1 ± 17.8 years for SGTs [12]is consistent with the present study, however,a Brazilian study shows a mean age of 57.9 years [13]which is in contrast to our study.

Our study results were close to a German study held in 2021 where most involved cases were between the age group 41-60 years followed by 20-40 year age group [14] whereas contrary to our study a 2019 Pakistani study showed 55.5% cases between 28-47 year age group. [15.] This difference might be because there were fewer participants and a wider age range in our study.

The mean age for benign SG lesions was reported as 40.50 ± 13.47 in our study. International studies done by Mehmood& Meer and Alaseini, Cunha showed a mean age of 52 years and 55.7 years respectively[12,16,] respectively. Mahomed & Meer declared 39.76±17.46 years as the mean age for benign salivary gland tumors [12]which is consistent with our study. Malignant tumors in our study showed a mean age of 46.50 ± 16.36 which was by a study conducted in 2020 by Agha Khan University and showed a mean age of 45.08 ± 14.57. [17]

Gender distribution of SGTs in our study was found to be 56% in males and 44% in females which makes a ratio of 1.4:1. According to a study by Baloch et., 2019 SGT was 58% in males and 42% in females[15] while another study done by Asif et al reported male to female ratio of 1:1. [5 study] conducted by Wen-Chieh Liao and the team also show male predominance. [18]

In contrast to our findings a multicenter study performed by Alsanie et al at King Saud University, Riyadh, Saudi Arabia, showed more female involvement as compared to the males (54% females, 46% males).[16.] A study conducted by John Lennon and colleagues also showed female predominance with female: male ratio of 1.2:1. [13]Since males are more exposed to the external environment, unhealthy food and narcotics like tobacco and alcohol, therefore, showed a higher predilection for SGTs than females. In regions including America and Europe, there is a high ratio of females, as obesity, tobacco, and alcohol consumption, and use of saturated carbohydrates are found high in the female population.

43% of our tumors were present in parotid gland followed by minor salivary glands which were 40% of all cases, 15% were in the submandibular gland while only 2% cases of sublingual gland tumors were reported. In contrast to our study research done in Brazil 59% of cases and China showed 60% cases in parotid gland.[13, 19]. While another study showed 59% involvement of the parotid gland and 32% cases of the minor salivary gland. [16]

Among benign tumors, Pleomorphic adenoma was the most common benign tumor which was 41/50 benign SGTs which makes it 82% of our benign tumors cases followed by Myoepithelioma and Warthin's tumor.

Our results are comparable with the studies conducted in Pakistan which showed PA as the predominating benign tumor while Warthin's tumor followed PA. [4] Another study done in Korea showed 60% of cases diagnosed as pleomorphic adenoma.[20]Studies conducted in Brazil shared the same result for PA. But unlike our study, Warthin's tumor was the second most common tumor. [13]

This study observed Adenoid Cystic Carcinoma as the predominant malignant tumor with 38% cases followed by MEC (36%), consistent with studies conducted in South Africa and Taiwan with the same results [13, 19].Our results were in contrast with a Brazilian study done in 2020 which show MEC as the most commonly occurring tumor followed by adenocarcinomas.[13]

Conclusion

Pleomorphic adenoma is the most common benign salivary gland tumor and adenoid cystic carcinoma was the most frequently observed malignant tumor. Although most of the results of this study were similar to those reported in other populations, some differences were observed

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