

A Retrospective Clinicopathological Study of Salivary Gland Tumors with Particular Reference to Histological Types, Site, Age, and Sex Distribution

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Abstract:

Background: Salivary gland tumors (SGTs) are the most histologically heterogeneous group of tumors with greatest diversity of morphologic features among their cells and tissues. The present study was aimed at to analyze the relative frequency of individual SGTs and to correlate the various SGTs according to age, sex, anatomical site, and duration of the lesion by retrieving them from the registry of Department of Oral Pathology and Microbiology, Government Dental College and Hospital Nagpur, from 1977 to July 2008 (31 years).

Materials and Methods: 82 cases of SGTs were retrieved from the registry of Department of Oral Pathology and Microbiology, Government Dental College and Hospital, Nagpur.

Results: The overall annual frequency of all SGTs was found to be 2.64 cases per year. Minor salivary glands (74.4%) were found to be more commonly involved as compared to major salivary gland (25.6%).

Conclusion: Benign tumors were found in a relatively younger age group than the malignant tumors. In case of benign and malignant tumors, there was a slightly male predilection. Submandibular gland was commonly involved followed by parotid gland in major SGTs. Palate was the most common site in case of minor SGTs.

Key Words: Salivary glands, salivary gland neoplasms, tumors

Introduction

Salivary gland tumors (SGTs) are reported to represent between 1% and 5% of all head and neck tumors and are either benign or malignant. The annual incidence of SGT varies around the world from approximately 0.4 to 13.5 cases/100,000 people. Children account for 4.5% of all patients. Among major salivary glands, benign tumors occur more commonly in females and malignant tumors are frequent in males, whereas in minor salivary glands, these differences are not evident. Age distribution of patients with benign tumors demonstrates a peak in the third decade, and malignant tumors show steady rise until the sixth decade of life. About three-fourth of all epithelial tumors occurred in major salivary glands, parotid gland (PG) being the most common site (parotid 63.9%, submandibular 9.6%, and sublingual 0.3%), and one-fourth of all tumors arise from minor salivary glands and most of the tumors arise in palate.^{1,2} Among benign SGTs, pleomorphic adenoma is the most common tumor, and in malignant tumors, mucoepidermoid carcinoma (MEC) is the most frequent tumor.²

Literature from various parts of the world points out that there are differences in the frequency of particular histologic type and in frequency with which major and minor salivary glands are involved.

The aim of the present study was to analyze the relative frequency of individual SGT and to correlate the various SGTs according to age, sex, and anatomical site of the lesion by retrieving SGTs from the registry of Department of Oral Pathology and Microbiology, Government Dental College and Hospital Nagpur, from 1977 to July 2008 (31 years).

Materials and Methods

Nearly 9264 surgical specimens were reported from 1977 to July 2008 (31 years) in the Department of Oral Pathology and Microbiology, Government Dental College and Hospital, Nagpur. Out of these, a total of 82 cases were diagnosed as SGTs. Paraffin-embedded sections each of 4 µm thick were cut on rotary microtome and stained using Hematoxylin and Eosin (H & E) stain. The clinicopathological analysis was done on 82 cases of histologically confirmed SGTs considering the parameters such as age, sex, and anatomical site of SGTs.

Results

Incidence

When analyzed they constituted about 0.9% (number of SGTs per total no. of cases) of all surgical specimens. The overall annual frequency of all SGTs was found to be 2.64 cases per year.

Out of these 82 cases, 38 cases (46.3%) were benign and 44 cases (53.7%) were malignant SGTs as summarized in Table 1; the difference of the frequency between benign and malignant tumors was statistically nonsignificant by proportion test ($P > 0.05$).

Frequency

The individual frequencies of benign and malignant SGTs are tabulated in Table 2 which reveals that among the benign tumors, pleomorphic adenoma (34.14%) was the most common benign tumor of salivary glands followed by basal cell adenoma, and the difference was statistically significant ($P = 0.000$).

Among malignant tumors, MEC (20.73%) was the most common malignant tumor followed by adenoid cystic carcinoma as illustrated in Table 2.

Table 1: Incidence of benign and malignant tumors of salivary glands.

SGTs	Number of cases <i>n</i> (%)		Total (%)
	Benign tumors	Malignant tumors	
Major SGTs	3 (14.3)	18 (85.7)	21 (25.6)
Minor SGTs	35 (57.4)	26 (42.6)	61 (74.4)
Total (→)	<i>n</i> =38 (46.3)	<i>n</i> =44 (53.7)	Total number of cases=82

SGTs: Salivary gland tumors, $p=0.000$ statistically significant

Table 2: Relative frequency of SGTs.*

Name of SGTs	Number of cases (<i>n</i>)	Relative frequency (%)
Benign tumors	<i>n</i> =38	46.34
PA	28	34.14
ME	2	2.43
BCA	7	8.53
CA	1	1.22
Malignant tumors	<i>n</i> =44	53.66
MEC	17	20.73
AdCC	9	10.98
AcCC	6	7.31
AdCa	5	6.09
PLGA	2	2.43
MC	1	1.22
SDC	1	1.22
Ca-ex-PA	1	1.22
BCAdCa	1	1.22
EMC	1	1.22

SGTs: Salivary gland tumors, PA: Pleomorphic adenoma, ME: Myoepithelioma, BCA: Basal cell adenoma, CA: Cystadenoma, MEC: Mucoepidermoid carcinoma, AdCC: Adenoid cystic carcinoma, AcCC: Acinic cell carcinoma, AdCa: Adenocarcinoma, PLGA: Polymorphous low-grade adenocarcinoma, MC: Myoepithelial carcinoma, SDC: Salivary duct carcinoma, Ca-ex-PA: Carcinoma ex pleomorphic adenoma, BCAdCa: Basal cell adenocarcinoma, EMC: Epithelial-myoepithelial carcinoma, SDC: Salivary duct carcinoma

Age distribution

As shown in Table 3a, benign tumors were found in a relatively younger age group than the malignant tumors. Analysis was done using two-tailed, unpaired Student's *t*-test ($P = 0.0081$) using software Strata version-8. The difference in mean age of benign and malignant tumors was statistically significant as value of $P < 0.05$. As shown in Table 3b and c, benign tumors were seen with a peak in the fourth decade, and malignant tumors were seen with a peak in the seventh decade.

Sex distribution

As shown in Table 4a, among total 82 SGTs, 47 cases (57.31%) were males and 35 cases (42.68%) were females; thus, overall male-female ratio was 1.34:1. Among 38 benign SGTs, 24 (63.15%) were males and 14 (36.84%) were female patients, and the male-female ratio was 1.7:1. Among 44 malignant SGTs, 23 (52.27%) were males and 21 (47.72%) were females and male-female ratio was 1.09:1. There was a slight male predilection for benign and malignant tumors.

As shown in Table 4b, analysis was done separately for males and females in benign and malignant tumors using Chi-square test of goodness of fit, and value of P was found ($P = 0.320$) using software Strata version-8. Remarks: As value of $P > 0.05$, difference is statistically nonsignificant.

Site distribution

The site-wise distribution of tumors in major and minor salivary glands is given in Table 5a-d.

Analysis of benign and malignant tumors in major salivary glands

As shown in Table 5a and b, frequency of malignant tumors, i.e., 18 cases (85.7%) of major salivary glands were more frequent than benign tumors 3 cases (14.3%). Chi-square test of goodness of fit was applied, and value of P was found ($P = 0.0078$) using software Strata version - 8. Remarks: As value of $P < 0.05$, the difference was statistically significant.

PG was the most common site for benign tumors, whereas other two major salivary glands were found to be free of any neoplastic involvement. Submandibular gland (SMG) was the most common site among malignant tumors.

Analysis of benign and malignant tumors in minor salivary glands

Table 5c and d show that benign tumors, i.e., 35 cases (57.4%) of minor salivary glands were more frequent than those of malignant tumors, i.e., 26 cases (42.6%). Chi-square test of goodness of fit was applied, value of P was calculated ($P = 0.001$) using software Strata version - 8. Remarks: As value of $P < 0.05$, differences are statistically significant.

Palate was the most common site for benign (82.85%) and malignant tumors (50%).

Table 3a: Summary of age distribution of SGTs.

SGTs (total number of cases=82)		Age range (years)	Mean±SD (years)	P value	Remarks
Group of SGTs	Number of cases				
Benign tumors	38	16-74	40.60±16.66	0.0081	Significant
Malignant tumors	44	16-75	49.79±13.98		

SGTs: Salivary gland tumors, SD: Standard deviation

Table 3b: Detailed age distribution of benign SGTs.

Benign tumors* (number of cases=38)		Age range (years)						Age mean±SD (years)
Type	Number of cases	15-25	26-35	36-45	46-55	56-65	66-75	
PA	28	8	9	6	4	1	0	34.64±12.18
ME	2	0	1	0	0	1	0	45±21.21
BCA	7	1	0	0	0	2	4	60.43±16.60
CA	1	0	0	0	0	1	0	60
Total number of cases per age range (→)		9	10	6	4	5	4	Total no. of cases=38

SGTs: Salivary gland tumors, PA: Pleomorphic adenoma, ME: Myoepithelioma, BCA: Basal cell adenoma, CA: Cystadenoma, p=0.0081 statistically significant

Table 3c: Detailed age distribution of malignant SGTs.

Malignant tumors* (number of cases=44)		Age range (years)						Age mean±SD (years)
Type	Number of cases	15-25	26-35	36-45	46-55	56-65	66-75	
MEC	17	3	2	4	3	4	1	45±16.73
AdCC	9	0	2	4	1	1	1	46.1±12.3
AcCC	6	0	0	0	2	3	1	59.5±6.97
AdCa	5	0	0	1	2	2	0	53.4±7.57
PLGA	2	0	0	0	0	1	1	63.2±4.95
MC	1	0	0	0	0	1	0	60
SDC	1	0	0	1	0	0	0	30
Ca-ex-PA	1	0	0	0	0	1	0	60
BCA-dCa	1	0	0	0	0	1	0	60
EMC	1	0	0	0	1	0	0	50
Total (→)		9	10	6	4	5	4	Total number cases=44

SGTs: Salivary gland tumors, PA: Pleomorphic adenoma, ME: Myoepithelioma, BCA: Basal cell adenoma, CA: Cystadenoma, MEC: Mucoepidermoid carcinoma, AdCC: Adenoid cystic carcinoma, AcCC: Acinic cell carcinoma, AdCa: Adenocarcinoma, PLGA: Polymorphous low grade adenocarcinoma, MC: Myoepithelial carcinoma, SDC: Salivary duct carcinoma, Ca-ex-PA: Carcinoma ex pleomorphic adenoma, BCAdCa: Basal cell adenocarcinoma, EMC: Epithelial-myoepithelial carcinoma, SDC: Salivary duct carcinoma, p=0.0081 statistically significant

Discussion

In the present study, the relative frequency of SGTs is 0.9% (number of SGTs per total number of cases), which is less compared to the previous studies by Ledesma-Montes and Garcés-Ortiz (2000)³ who found 6% of SGTs in the Mexican population. Thus, value of our findings is less compared to Ledesma-Montes and Garcés-Ortiz (2000).³

These findings suggest that the differences can be related to the genetic or ethnic factor, as well as the geographic location of population has some influence on relative frequency in different populations.

In the present study, as given in Table 2, the frequency of malignant tumors (44 cases, [53.7%]) was more as compared to those of benign tumors (38 cases [46.3%]), but the difference was not statistically significant ($P = 0.5039$).

Thus, our findings were not in accordance to the studies by Chaudhry *et al.* (1984),⁴ Waldron *et al.* (1988),⁵ Shafkat *et al.* (2002),⁶ and Vuhahula (2004).⁷ This disparity may be due to

differences in the total number of cases that were analyzed, geographical location of population, genetic and ethnic factors.

In the present study, as given in Table 1, we found that benign tumors of minor salivary glands (57.4%) are more frequent than those of malignant tumors (42.6%) and the difference was statistically significant ($P = 0.001$).

Thus, findings in our study are in accordance to those of Isacson and Shear (1983),⁸ Waldron *et al.* (1988),⁵ and Ellis *et al.* (1991).¹

In our series as illustrated in Table 1, minor salivary glands, i.e., 61 cases (74.4%) were found to be more commonly involved by neoplasms as compared to major salivary glands, i.e., 21 cases (25.6%).

Our findings are not in agreement to almost all the previous studies by Spiro *et al.* (1977),⁹ Eveson and Cawson (1985),¹⁰ Ellis *et al.* (1991),¹ and Vuhahula (2004),⁷ that found definitely higher percentage of major SGTs as compared to minor SGTs.

The variation in these findings could be attributed to the paucity of cases in our study and possibly because parotid and submandibular swellings are not referred to dental department so frequently. There is disparity with other studies, which may be due to differences in the total number of cases that were analyzed.

Frequency

In the present study as shown in Table 2, pleomorphic adenoma (28 cases, [73.68%]) is the most common benign tumor in major and minor salivary glands.

Thus, our findings are in accordance with the findings, by Eveson and Cawson (1985),¹⁰ Waldron *et al.* (1988),⁵ Ellis *et al.* (1991),¹ Shafkat *et al.* (2002),⁶ and Vuhahula (2004).⁷

In the present study, MEC is the most common malignant tumor, accounting for 20.73% of all malignant tumors as shown in Table 2.

Thus, our findings are in accordance with the studies by Waldron *et al.* (1988)⁵ and Hashemi *et al.* (2007)¹¹ but was in contrast to Vuhahula, (2004).⁷

Age distribution

In the present study as given in Table 3b and c, benign tumors are seen with a peak in the fourth decade of life, whereas malignant tumors occur with a peak in the seventh decade.

Thus, our findings are in accordance with the study by Isacson and Shear (1983),⁸ Ledesma-Montes and Garcés-Ortiz (2000),³ and Shafkat *et al.* (2002)⁶ and Chaudhry *et al.* (1984)⁴ who reported that benign tumors occur at a younger age than malignant tumors.

In our series as shown in Table 3a, the mean age of patients with malignant tumors (49.79 years ± 13.98, standard deviation [SD]) was greater than for patients with benign tumors (40.60 years ± 16.66, SD); these findings are in accordance with higher value to the study by Waldron *et al.* (1988)⁵ who suggested the mean ± SD age of patients with malignant tumors (55.2 years ± 17.59, SD) was greater than for patients with benign tumors (49.8 years ± 19.92, SD), which was statistically significant.

Sex distribution

In the present study as shown in Table 4b, among total 82 SGTs males account to 47 cases (57.31%) and females 35 cases (42.68%) accounting for overall male to female ratio 1.34:1, and for malignant tumors, male to female ratio was 1.09:1, whereas for benign tumors, male to female ratio 1.7:1 showing a male predilection but was not statistically significant as shown in Table 4a. Our findings are in accordance with Hashemi *et al.* (2007),¹¹ but in contrast to Vuhahula (2004)⁷ and Waldron *et al.* (1988)⁵ who noted a female predominance in overall tumors in the United States, with female to male ratio of 1.59:1.

No literature studies pertaining to male-female ratio for benign tumors have been found to our knowledge.

Site distribution

In the present study as shown in Table 5c and d, among minor salivary glands, palate has been found to be the most common site accounting for 29 cases (82.85%) for benign tumors and 13 cases (50%) in malignant tumors. Thus, overall contributes to 42 cases (51.21%) of all tumors as given in Table 5e.

Our findings were in accordance to almost all the previous studies such as Frable and Elzay (1970),¹² Isacson and Shear

Table 4a: Detailed sex distribution of SGTs.

SGTs*	Total number of cases	Males	Females	Male:female ratio
Benign tumors	38	24	14	1.7:1
PA	28	15	13	1.15:1
ME	2	1	1	1:1
BCA	7	7	1	7:1
CA	1	1	0	NA
Malignant tumors	44	23	21	1.09:1
MEC	17	6	11	0.54:1
AdCC	9	4	5	4:5
AcCC	6	3	3	1:1
AdCa	5	4	1	4:1
PLGA	2	2	0	NA
MC	1	1	0	NA
SDC	1	1	0	NA
Ca-ex-PA	1	0	1	NA
BCAdCa	1	1	0	NA
EMC	1	1	0	NA
Total number of SGTs	82	47	35	1.34:1

NA: Not applicable, SGTs: Salivary gland tumors, PA: Pleomorphic adenoma, ME: Myoepithelioma, BCA: Basal cell adenoma, CA: Cystadenoma, MEC: Mucoepidermoid carcinoma, AdCC: Adenoid cystic carcinoma, AcCC: Acinic cell carcinoma, AdCa: Adenocarcinoma, PLGA: Polymorphous low grade adenocarcinoma, MC: Myoepithelial carcinoma, SDC: Salivary duct carcinoma, Ca-ex-PA: Carcinoma ex pleomorphic adenoma, BCAdCa: Basal cell adenocarcinoma, EMC: Epithelial-myoepithelial carcinoma, SDC: Salivary duct carcinoma, P=0.320 statistically non-significant

Table 4b: Summary of sex distribution of SGTs.

SGTs	Number of cases	Males	Females	χ ²	P value	Remarks
Group of SGTs						
Benign tumor	38	24	14	1.3390	0.247	NS*
Malignant tumor	44	23	21	0.0455	0.831	NS*
Total number of cases of SGTs	82	47	35	0.9875	0.320	NS*

*Non significant. SGTs: Salivary gland tumors

(1983),⁸ Eveson and Cawson (1985),¹⁰ Waldron *et al.* (1988),⁵ and Ledesma-Montes and Garces-Ortiz *et al.* (2000).³

Thus, suggesting that palate was the most common site for benign and malignant tumors of minor salivary gland which is consistent with our study.

In the present study as illustrated in Table 5a among the major SGTs, PG was the most common site for benign tumors; this finding is in accordance to Eveson and Cawson (1985).¹⁰ In the present study, as illustrated in Table 5b, for malignant

tumors, SMA was the most common site, our findings were in accordance with Alves FA (2004)¹³ but Vuhahula(2004)⁷ and Hashemi *et al.* (2007)¹¹ found that PG was the most common site for malignant tumors.

This disparity in the findings can be attributed to the limited number of cases studied in the present study.

Duration of the lesion

In the present study as shown in Table 6a and b, 16 cases (42.1%) of benign tumors are reported in <1 year, whereas among malignant tumors, thirty cases (68.2%) were reported in <1 year. This suggests that the malignant tumors being symptomatic are early detected by patients.

No reports have been documented to our knowledge in literature to compare with these findings.

Conclusion

Salivary glands because of their unique position, complex histogenesis, diverse histopathology, and clinical significance can link the dental profession with the medical profession. However, neoplasms of salivary glands are neglected by ear-nose-throat surgeons and ignored by dentists.

Keeping this objective in mind, the present study was carried out to determine the relative frequency of various SGTs.

82 cases of SGTs reported in the registry of Department of Oral Pathology and Microbiology, Government Dental College and Hospital, Nagpur, were selected for retrospective analysis with parameters such as age, sex site, and biological behavior of the tumors.

The findings were compiled and evaluated. The observations in the present study can be summarized as follows.

1. A total of 82 cases of SGTs were studied, out of a total of 9000 cases reported in the registry of Oral Pathology. Thus, the overall annual frequency of all SGTs was found to be 2.64 cases per year with a relative frequency of 0.9%.
2. Of the 82 tumors studied, benign and malignant tumors were found with almost equal frequency. Benign tumors constituted 46.34% and malignant tumors 53.66%.
3. Minor salivary glands (74.4%) were found to be more

Table 5a: Site distribution analysis of benign tumors in major salivary glands.

Type of benign tumors	Total number of cases	Type of major salivary gland (site)			Total
		PG	SMG	SLG	
PA	28	3	0	0	3
ME	2	0	0	0	0
BCA	7	0	0	0	0
CA	1	0	0	0	0
Total (→)	38	3	0	0	3 (14.3%)

PA: Pleomorphic adenoma, ME: Myoepithelioma, BCA: Basal cell adenoma, CA: Cystadenoma, PG: Parotid gland, SMG: Submandibular gland, SLG: Sublingual gland

Table 5b: Site distribution analysis of malignant tumors in major salivary glands.

Type of malignant tumors	Total number of cases	Type of major salivary gland (site)*			Total
		PG	SMG	SLG	
MEC	17	5	4	0	9
AdCC	9	0	3	0	3
AcCC	6	1	0	0	1
AdCa	5	0	2	0	2
PLGA	2	0	2	0	2
MC	1	0	-	0	0
SDC	1	0	1	0	1
Ca-ex-PA	1	0	0	0	0
BCAdCa	1	0	0	0	0
EMC	1	0	0	0	0
Total (→)	44	6	12	0	18 (85.7%)

SGTs: Salivary gland tumors, PA: Pleomorphic adenoma, ME: Myoepithelioma, BCA: Basal cell adenoma, CA: Cystadenoma, MEC: Mucoepidermoid carcinoma, AdCC: Adenoid cystic carcinoma, AcCC: Acinic cell carcinoma, AdCa: Adenocarcinoma, PLGA: Polymorphous low grade adenocarcinoma, MC: Myoepithelial carcinoma, SDC: Salivary duct carcinoma, Ca-ex-PA: Carcinoma ex pleomorphic adenoma, BCAdCa: Basal cell adenocarcinoma, EMC: Epithelial-myoepithelial carcinoma, PG: Parotid gland, SMG: Submandibular gland, SLG: Sublingual gland,

Table 5c: Site distribution analysis of benign tumors in minor salivary glands.

Type of benign tumors	Total number of cases	Anatomic site*					Total	
		Palate	Labial mucosa	Buccal mucosa	Retromolar mucosa	Floor of mouth		Others
PA	28	22	1	1	-	-	1	25
ME	2	2	-	-	-	-	-	2
BCA	7	4	-	3	-	-	-	7
CA	1	1	-	-	-	-	-	1
Total	38	29	1	4	-	-	1	35 (57.4%)

PA: Pleomorphic adenoma, ME: Myoepithelioma, BCA: Basal cell adenoma, CA: Cystadenoma

Table 5d: Site distribution analysis of malignant tumors in minor salivary glands.

Type of malignant tumors*	Total number of cases	Anatomic site*						Total
		Palate	LM	BM	RM	Floor of mouth	others	
MEC	17	4	0	1	1	0	2	8
AdCC	9	4	1	1	0	0	0	6
AcCC	6	1	0	2	1	0	1	5
AdCa	5	1	0	0	2	0	0	3
PLGA	2	0	0	0	0	0	0	0
MC	1	1	0	0	0	0	0	1
SDC	1	0	0	0	0	0	0	0
Ca-ex-PA	1	1	0	0	0	0	0	1
BCAdCa	1	0	0	0	0	0	1	1
EMC	1	1	0	0	0	0	0	1
Total	44	13 (50%)	1	4	4	0	4	26 (42.6%)

SGTs: Salivary gland tumors, PA: Pleomorphic adenoma, ME: Myoepithelioma, BCA: Basal cell adenoma, CA: Cystadenoma, MEC: Mucoepidermoid carcinoma, AdCC: Adenoid cystic carcinoma, AcCC: Acinic cell carcinoma, AdCa: Adenocarcinoma, PLGA: Polymorphous low grade adenocarcinoma, MC: Myoepithelial carcinoma, SDC: Salivary duct carcinoma, Ca-ex-PA: Carcinoma ex pleomorphic adenoma, BCAdCa: Basal cell adenocarcinoma, EMC: Epithelial-myoepithelial carcinoma, SDC: Salivary duct carcinoma, LM: Labial mucosa, BM: Buccal mucosa, RM: Retromolar mucosa

Table 5e: Summary of site distribution of SGTs.

Type of SGTs*	Total number of cases	Anatomical site*								
		PG	SMG	SLG	Palate	LM	BM	RM	Floor of mouth	Others
Benign tumors*	38	3	0	0	29	1	4	0	0	1
PA	28	3	0	0	22	1	1	0	0	1
ME	2	0	0	0	2	0	0	0	0	0
BCA	7	0	0	0	4	0	3	0	0	0
CA	1	0	0	0	1	0	0	0	0	0
Malignant tumors*	44	6	12	0	13	1	4	4	0	4
MEC	17	5	4	0	4	0	1	1	0	2
AdCC	9	0	3	0	4	1	1	0	0	0
AcCC	6	1	0	0	1	0	2	1	0	1
AdCa	5	0	2	0	1	0	0	2	0	0
PLGA	2	0	2	0	0	0	0	0	0	0
MC	1	0	0	0	1	0	0	0	0	0
SDC	1	0	1	0	0	0	0	0	0	0
Ca-ex-PA	1	0	0	0	1	0	0	0	0	0
BCAdCa	1	0	0	0	0	0	0	0	0	1
EMC	1	0	0	0	1	0	0	0	0	0
Total (→)	82	9	12	0	42	2	8	4	0	5

SGTs: Salivary gland tumors, PA: Pleomorphic adenoma, ME: Myoepithelioma, BCA: Basal cell adenoma, CA: Cystadenoma, MEC: Mucoepidermoid carcinoma, AdCC: Adenoid cystic carcinoma, AcCC: Acinic cell carcinoma, AdCa: Adenocarcinoma, PLGA: Polymorphous low grade adenocarcinoma, MC: Myoepithelial carcinoma, SDC: Salivary duct carcinoma, Ca-ex-PA: Carcinoma ex pleomorphic adenoma, BCAdCa: Basal cell adenocarcinoma, EMC: Epithelial-myoepithelial carcinoma, PG: Parotid gland, SMG: Submandibular gland, SLG: Sublingual gland, LM: Labial mucosa, BM: Buccal mucosa, RM: Retromolar mucosa

Table 6a: Duration of the lesion in benign tumors.

Type of benign tumors	Duration of the lesion (years)			Total number of cases	P value	Remarks
	<1	1-5	More than 5			
PA	12	10	6	28	0.527	Non-significant
ME	1	1	0	2		
BCA	2	3	2	7		
CA	1	0	0	1		
Total	16	14	8	38		

PA: Pleomorphic adenoma, ME: Myoepithelioma, BCA: Basal cell adenoma, CA: Cystadenoma

- commonly involved as compared to major salivary gland (25.6%).
- In major SGTs, SMG was commonly involved followed by PG. Palate was the most common site in case of minor SGTs.
 - In both major and minor SGTs, pleomorphic adenoma and MEC were the most common benign and malignant tumors, respectively.
 - Benign tumors were found in a relatively younger age group than the malignant tumors. The age range for benign tumors was 16-70 years with a peak in the third and fourth decade, whereas that for malignant tumors was 11-65 years with a peak in the sixth decade.
 - In case of benign and malignant tumors, there was a slightly male predilection.

Table 6b: Duration of the lesion in malignant tumors.

Type of malignant tumors*	Duration of the lesion (years)			Total number of cases	P value	Remarks
	<1	1-5	More than 5			
MEC	11	5	1	17	0.003	Significant
AdCC	7	1	1	9		
AcCC	5	1	0	6		
AdCa	4	1	0	5		
PLGA	1	1	0	2		
MC	0	0	1	1		
SDC	1	0	0	1		
Ca-ex-PA	0	0	1	1		
BCAdCa	1	0	0	1		
EMC	0	0	1	1		
Total	30	9	5	44		

SGTs: Salivary gland tumors, PA: Pleomorphic adenoma, ME: Myoepithelioma, BCA: Basal cell adenoma, CA: Cystadenoma, MEC: Mucoepidermoid carcinoma, AdCC: Adenoid cystic carcinoma, AcCC: Acinic cell carcinoma, AdCa: Adenocarcinoma, PLGA: Polymorphous low grade adenocarcinoma, MC: Myoepithelial carcinoma, SDC: Salivary duct carcinoma, Ca-ex-PA: Carcinoma ex pleomorphic adenoma, BCAdCa: Basal cell adenocarcinoma, EMC: Epithelial-myoepithelial carcinoma, P=0.003, statistically significant

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