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Research Article

Histopathological Spectrum of Salivary Gland Tumors: A 10 Year Experience

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Abstract: This study was carried out to study the histopathological spectrum of salivary gland tumors and to know their pattern of distribution. A combination study was done with retrospective data of eight years from june 2001 to may 2009 and prospective data of two years from June 2009 to June 2011 in the department of pathology of our hospital. The study was duly approved by Hospital Ethical Committee. Out of total 80 cases, 49(61.25%) were benign and 31(38.75%) were malignant. Predominance of males was observed with M: F ratio of 2.3:1. The mean age observed was 44.76 years with age range of 12 to 75 years. Benign tumors outnumbered the malignant ones. Parotid was the most common site for the location of tumors (65%) followed by submandibular (25%) and minor salivary glands (10%). Pleomorphic adenoma was the commonest salivary gland tumor observed in both sexes. Mucoepidermoid carcinoma was the most common among the malignant salivary gland tumors followed by adenoid cystic carcinoma. In conclusion, the mean age of all salivary gland tumors was 44.76 years and age range was 12-75 years with male predominance. Benign tumors outnumbered the malignant ones with parotid gland being the most common site and pleomorphic adenoma being the commonest subtype.
Keywords: histopathology, salivary gland, tumors, distribution

INTRODUCTION

Salivary gland neoplasms are rare lesions and represent less than 1% of all tumors and 3-6.5% of all head and neck tumors [1, 2].

Approximately 80% of the salivary gland tumors are found in the Parotid gland and10 to 15% in the submandibular gland3. Around 80% Parotid tumors and 50% of submandibular tumors are benign [4]. In the pediatric population, 35% of salivary gland tumors are regarded to be malignant [3].

Minor salivary gland tumors are infrequent, accounting for 10 to 15% of all salivary neoplasms and are fundamentally located in the palate (50%), lips (15%), buccal mucosa (12%), tongue (5%) and floor of mouth (5%), among other regions [5, 6].

Salivary gland tumors are observed in all ages but the highest incidence is observed in the 3rd and 4th decade for benign tumors and 4^{th} and 5^{th} decades for the malignant tumors [7]. There are no fewer than 30 histologic subtypes of benign and malignant primary salivary gland tumors [8, 9].

The aim of this study was to analyse various salivary gland tumors, regarding age, gender, tumor location, tumor size, and histological type of these lesions in our hospital and to study the histopathological spectrum of various salivary gland tumors, their age and sex distribution, and pathological characteristics of various salivary gland tumors.

MATERIALS AND METHODS

The data for the present study was collected from the record section of the department of Pathology of our hospital. The period from June 2001 to June 2011 was chosen for present study. It was a combination study with retrospective data of eight years from June 2001 to May 2009 and prospective data of two years from June 2009 to June 2011. Information aboout age, gender, tumor location and tumor size were determined for each salivary tumor type. The frequencies of different benign and malignant salivary tumors in both major and minor glands were identified. The histology of all tumors was reviewed and classified according to the world health organization (WHO) Histological Typing of Salivary Gland Tumors. The study was duly approved by Hospital Ethical Committee.

RESULTS

Total of 80 cases were observed during the course of 10 year study out of which 49 (61.25%) were benign and 31 (38.75%) were malignant. The mean age observed for all salivary gland tumors was 44.76 years with age range of 12 to 75 years. However mean age for benign and malignant tumors was 43.63 and 51.54 respectively (table 1).

Of all salivary gland tumors, pleomorphic adenoma was the most common histologic type (55%) (Fig. 1) (table 3)followed by mucoepidermoid carcinoma (17.5%) (Fig. 2) and adenoid cystic carcinoma (10%) .

Table 1: Age distribution of salivary gland tumors

Age group	Total no. of patients	Benign tumors	Malignant tumors
<20	5	4	1
21-30	13	11	2
31-40	10	8	2
41-50	18	8	10
51-60	22	12	10
>60	12	6	6

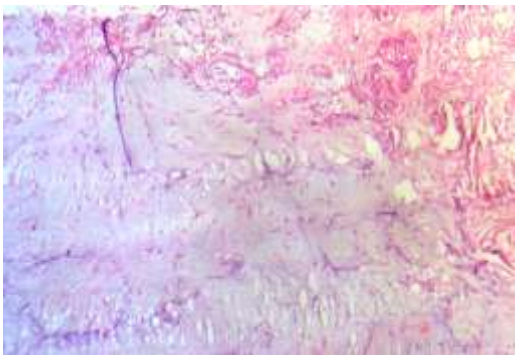

Fig. 1: Microscopic appearance of Pleomorphic adenoma showing both epithelial and mesenchymal components

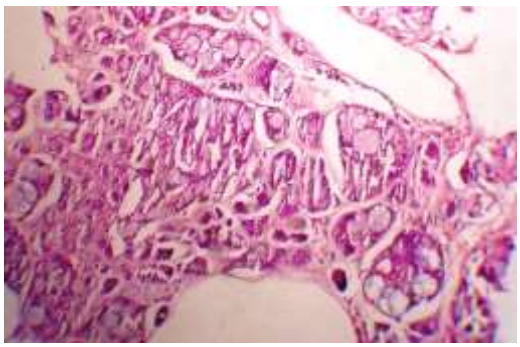

Fig. 2: Microscopic appearance of Adenoid cystic carcinoma showing small cells arranged around gland like spaces

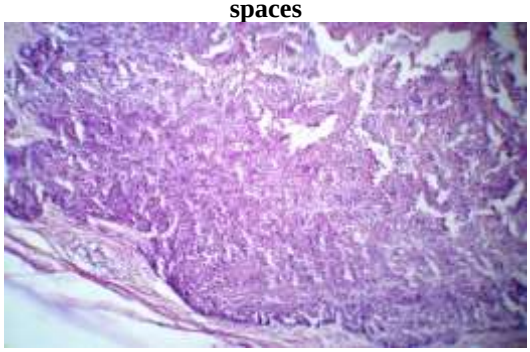

Figure 3: Microscopic appearance of Spindle cell myoepithelioma of palate

Table 2: Distribution of tumors according to sex and site

		Parotid gland		Submandibular gland		Minor salivary glands	
Sex	**Total**	**Benign**	**Malignant**	**Benign**	**Malignant**	**Benign**	**Malignant**
Males	56(70%)	24(49%)	13(42%)	8(16%)	4(13%)	3(6%)	4(13%)
Females	24(30%)	10(20%)	5(16%)	4(8%)	4(13%)	0	1(3%)

Pleomorphic adenoma was the most common histologic type observed in both sexes. The mean age for pleomorphic adenoma was 43.90 years with age range of 13 to 75 years. Male to female ratio of 2.6:1

was observed (table2). The most common site of occurrence for pleomorphic adenoma was parotid gland (65.30%), followed by submandibular (20.40%) and minor salivary glands (4.08%) (table 3, table 4).

Table 3: Distribution of benign tumors in salivary glands

Tumor type	Parotid	Submandibular	Minor salivary glands	Total% out of 80
Pleomorphic adenoma	32(65.30%)	10 (20.40%)	2 (4.08%)	55%
Warthinstumor	1(2.04%)	-	-	2.04%
Basal cell adenoma	-	1(2.04%)	-	2.04%
Oncocytoma	1(2.04%)	-	-	2.04%
Myoepithelioma	-	-	1(2.04%)	2.04%
Hemangioma	-	1(2.04%)	-	2.04%

Table 4: Distribution of malignant tumors of salivary glands

Tumor type	Parotid	Submandibular	Minor salivary glands
Mucoepidermoid carcinoma	10 (32.25%)	1(3.22%)	3 (9.67%)
Adenoid cystic carcinoma	2(6.45%)	4 (12.90%)	2 (6.45%)
Acinic cell carcinoma	1(3.22%)	-	-
Adenocarcinoma	1(3.22%)	-	-
Polymorphous low grade adenocarcinoma	1(3.22%)	1(3.22%)	-
Lymphoepithelial carcinoma	1(3.22%)	-	-
Epithelial myoepithelial carcinoma	1(3.22%)	-	-
Undifferentiated carcinoma	-	1(3.22%)	-
Squamous cell carcinoma	1(3.22%)	1(3.22%)	-

Mucoepidermoid carcinoma was most common among the malignant salivary gland tumors (45.16%). It was more common in males than in females with a male to female ratio of 6:1. Parotid was the most common site of occurrence for mucoepidermoid carcinoma, (71.42%) followed by minor salivary glands (21.42%) and submandibular gland (7.14%). Of all mucoepidermoid carcinomas 42.85% were high grade, 28.57% were intermediate grade and 28.57%were low grade.

Adenoid cystic carcinoma was the second most common malignant salivary gland tumor (25.80%). It was more common in females than in males (M: F=1.6:1). Submandibular gland was the most common site of occurrence (50%) followed by parotid (25%) and minor salivary glands (25%).

Among females 50% had pleomorphic adenoma, 20.83% had adenoid cystic carcinoma, 8.33% had mucoepidermoid carcinoma, 4.16% had warthin's tumor, 4.16% had hemangioma, 4.16% had acinic cell carcinoma, 4.16% had polymorphous low grade adenocarcinoma and 4.16% had epithelial myoepithelial carcinoma.

Among males 57.14% had pleomorphic adenoma, 21.42% had mucoepidermoid carcinoma, 5.35% had adenoid cystic carcinoma, 3.57% had squamous cell carcinoma, 1.78% had basal cell adenoma, 1.78% had oncocytoma, 1.78% had myoepithelioma (fig. 3), 1.78% had adenocarcinoma, 1.78% had polymorphous low grade adenocarcinoma, 1.78% had lymphoepithelial carcinoma and 1.78% had undifferentiated carcinoma.

The commonest malignant tumor of parotid (32.25%) and the minor salivary glands (9.67%) was mucoepidermoid carcinoma. In the submandibular gland the most common malignant salivary gland tumor was adenoid cystic carcinoma (12.90%).

In the present study four recurrent salivary gland tumors were identified, 3 among these tumors were pleomorphic adenomas and no histopathological variation was identified in these 3 tumors. The fourth recurrent tumor was previously diagnosed as basal cell adenocarcinoma and the present histopathological diagnosis was undifferentiated carcinoma.

DISCUSSION

In the present study of 80 cases of salivary gland tumors, 49 (61.25%) were benign and 31 (38.75%) were malignant. This observation was comparable to most of the studies including case series by Nepal A *et al.* [10], Ali NS *et al.* [11], and Moghadam SA *et al.* [12] where they noted a predominance of benign tumors over the malignant ones.

In the present series mean age observed was 46.7 years with an age range of 12 to 75 years. Benign salivary gland tumors were more common in age group of 51 to 60 years with a mean age of 43.63 years and the peak age incidence observed for malignant salivary gland tumors was 41 to 50 years and 51 to 60 years with a mean of 51.54 years.

Chatterjee *et al.* [13] observed large number of benign cases in third decade followed by fourth decade. Malignancy reported in his study was maximum in fifth decade. Potdar and Paymaster [14] reported an age range of 9 to 81 years with average age for benign tumors as 40.1 years and for malignant tumors as 46.3 years.

In the present study a male preponderance was noted with a male: female ratio of 2.3:1.This is in agreement with series reported by Potdar and Paymaster [14], and Spiro *et al.* [15]. However this was in contrast to the series reported by Dandapat *et al.* [16] and Rewsuwan *et al*. [17] who reported a female preponderance in their series.

Parotid was the commonest site of neoplasia (65%) in this series followed by submandibular gland (25%) and minor salivary glands (10%).This is in conformity with other workers, viz., Gore *et al.* [18], Richardson *et al.* [19], Spiro *et al.* [15], and Dandapat *et al.* [16]. There was no case of salivary gland tumor arising from major sublingual salivary gland in the present series.

Literature also reveals that primary tumors of sublingual salivary glands are extremely uncommon. In the series reported by Potdar and Paymaster [14], Richardson *et al.* [19], Chatterjee and Panda [13], Vargas *et al.* [20], and Nagarkar *et al.* [21], Pleomorphic adenoma was the most common benign salivary gland tumor encountered in parotid, submandibular and minor salivary glands. Similar findings were observed in the present study where pleomorphic adenoma was the most common benign salivary gland tumor at all locations.

In the present study, mean age for pleomorphic adenoma was 43.53 years with age range of 13 to 75 years. Out of all reported cases of pleomorphic adenoma, 32 were males and 12 were females with a male to female ratio of 2.6:1.

Vergas *et al.* [20] reported male to female ratio for pleomorphic adenoma to be 2:1, a mean age of 39 years for both males and females, and age range of 13 to 84 years.

Out of total 43 pleomorphic adenomas in our study, majority occurred in the parotid gland 31(72.09%) followed by submandibular gland 10 (23.25%) and minor salivary glands (4.65%).

Potdar and Paymaster [14] reported 183 cases of pleomorphic adenomas, out of which 101 were involving parotid gland.

Mucoepidermoid carcinoma was the most common malignant salivary gland tumor of parotid constituting 10 (32.25%) of all malignant salivary gland tumors in the present series. Mucoepidermoid carcinoma was reported to be the most common malignant salivary gland tumor of parotid by Richardson *et al*. [19], Spiro *et al*. [15] and Ali *et al.* [11].

In the present series mucoepidermoid carcinoma was also found to be the most common malignant salivary gland tumor of minor salivary glands constituting 3(9.67%) of all malignant salivary gland tumors. Vargas *et al.* [20] also reported similar observation in his study. In contrast to the above finding, Adenoid cystic carcinoma was the most common malignant salivary gland tumor of the minor salivary glands in most of the reported series, viz., Potdar and Paymaster [14], Chatterjee and Panda [13], Rewsuwan *et al.* [17].

The average age for mucoepidermoid carcinoma in our study was 53.92 years with age range of 25 to 70 years. Out of total 14 cases 12 were males and 2 were females giving a male to female ratio of 6:1.

Mean age of 37.92 years in case of mucoepidermoid carcinoma was reported by Vergas *et al*. [20] for both males and females with an age range of 17 to 76 years. In their series 8 cases were seen in females and 5 cases in males.

In our study mucoepidermoid carcinoma was more common in parotid gland-10 (71.42%), followed by minor salivary glands-3 (21.42%) and submandibular gland-1 (7.14%).

Richardson *et al.* [19] reported 61 cases of mucoepidermoid carcinoma and parotid (52) was reported to be the most common site of occurrence followed by minor salivary glands (6) and submandibular gland (3).

The most common malignant salivary gland tumor observed in submandibular salivary gland was adenoid cystic carcinoma accounting for 4(12.90%) of all malignant salivary gland tumors. Similarly, Potdar and Paymaster [14], Richardson *et al.* [19], and Rewsuwan *et al.* [17] also found adenoid cystic carcinoma to be the most common malignant tumor of submandibular glands.

Out of total 8 cases, 3 were males and 5 were females. Age range observed was 34-65 years with a mean of 53.37 years.

The average size in the present study was 3.52 cms. Spiro *et al.* [22], reported that 40% of his lesions were less than 3 cms in size and 34% were between 3-6 cms in size.

Vergas *et al.* [20], reported five cases of adenoid cystic carcinoma in their series accounting for 4% of all cases or 20% of malignant tumors. It was also reported to be the second most common malignant salivary gland tumor in their series.

In contrast to the present study, Lima *et al.* [23] and Rewsuwan *et al.* [17] reported adenoid cystic carcinoma to be the most common malignant salivary gland tumor in their series.

CONCLUSION

It was shown that mean age of all salivary gland tumors was 44.76 years and age range was 12-75 years with male predominance. Benign tumors outnumbered the malignant ones with parotid gland being the most common site and pleomorphic adenoma being the most common tumor observed.

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