



## Histopathological spectrum and outcome of surgery for salivary gland tumors presented in tertiary care hospital of Pakistan.

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**ABSTRACT... Objective:** This study is aimed to know the histopathological spectrum and outcome of surgery for salivary gland tumors presented in a tertiary care hospital of Pakistan. **Study Design:** Retrospective study. **Setting:** Tertiary Care Hospital of Pakistan. **Period:** July 2018 to June 2020. **Material & Methods:** After approval from Institutional Review Board. Total 73 patients were selected with preoperative diagnosis of salivary gland tumors with consecutive non probability sampling. All surgical procedures were done by specialist general surgeons who had experience of more than 10 years of head and neck surgery. **Results:** Male to female ratio was 2:1 with mean age of patients was 46 years. Among males 29 (59.1%) were benign salivary gland tumors while 20 (40.81%) were malignant salivary gland tumors. Among females 13 (54.16%) were benign and 11 (45.83%) were malignant salivary gland tumors. Most common benign tumor was pleomorphic adenoma 32 (43.8%) while mucoepidermoid carcinoma was most common malignant tumor 17 (23.28%). Only 9 (12.32%) patients experienced nerve paresis. **Conclusion:** Male preponderance, a relatively younger age at presentation and single predominant benign tumor (pleomorphic adenoma) were the significant findings. Majority of them were found in parotid gland and found to be benign in nature. Majority of them were found in parotid gland and found to be benign in nature. Although fine needle aspiration cytology and magnetic resonance imaging provide some useful information about the nature of tumor but most of them will acquire a surgical excision in order to find the definitive diagnosis.

**Key words:** Facial Nerve Palsy, Mucoepidermoid Tumor, Malignancy, Pleomorphic Adenoma, Salivary Gland.

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## INTRODUCTION

Parotid Submandibular and Sublingual salivary glands are considered as major salivary glands while there are numerous minor salivary glands which are located throughout the submucosa of upper aero digestive tract.<sup>1</sup> Both types of malignancy either benign or malignant can occur in these salivary glands. The tumors of salivary glands are less than 1% of all the tumors of the body and 2% to 4 % of all the head and neck tumors.<sup>2</sup> Worldwide the incidence of salivary gland tumors is reported from 0.4 to 14 cases per 100,000 person and the incidence of malignant salivary gland tumors ranges from 0.4 to 2.6 per 100,000 people.<sup>3</sup>

The etiology of salivary gland tumors is

multivariant. Use of tobacco, vitamin A deficiency, ionizing radiation, chemotherapy and prolonged exposure to the sunlight contribute to the development of the salivary gland tumors. Pleomorphic adenoma is the most common benign while mucoepidermoid carcinoma is the most common malignant tumor of salivary gland reported in the literature.<sup>4,5</sup> Parotid gland is the most commonly involved by the malignancy in 80% of the cases while 10% to 20% of malignancy occurs in submandibular and sublingual glands.<sup>6</sup> It has been reported that about one third of malignant parotid tumors involve the facial nerve while hypoglossal nerve and trigeminal nerves are most commonly involved in the tumors of submandibular and sublingual gland.<sup>7</sup>

The most common presenting feature of salivary gland tumors is a long-standing lump while there is rapid growth of lump in malignant conditions along with nerve involvement.<sup>8</sup> First classification of salivary gland tumors was established by World Health Organization (WHO) in 1972 and after that many amendments has been done. Diagnosis of salivary gland tumors include combination of clinical features along with ultrasonography, sialography, computed tomography (CT), magnetic resonance imaging (MRI) and fine needle aspiration cytology (FNAC).<sup>9</sup> However, differentiation between benign and malignant is difficult on the basis of FNAC. Benign tumors need excision with follow-up for recurrence while malignant tumors need excision along with removal of surrounding involved tissue, neck dissection followed by chemotherapy.<sup>10</sup>

The purpose of this study is to report the demographic details, Histological pattern of the disease and treatment outcome of salivary gland disorders in the patient population presenting in one of the biggest hospital of Pakistan.

## **MATERIAL & METHODS**

It was a retrospective study conducted in East Surgery Ward of Mayo Hospital Lahore Pakistan, King Edward Medical University (KEMU) Lahore Pakistan. The duration of study was 2 years, from 1<sup>st</sup> July 2018 to 30<sup>th</sup> June 2020. This study was approved by the Institutional review board of King Edward Medical University. A total of 73 patients were selected for this study by consecutive non probability sampling technique. All those patients selected in this study were admitted patients in the surgical department through outdoor department with pre-operative diagnosis of salivary gland tumor of any type and were operated for these tumors. All surgeries were done by specialist general surgeons who had experience of more than 10 years of head and neck surgery. Patients with recurrent salivary gland tumors were excluded from the study.

All patients had detailed evaluation by complete history and physical examination followed by relevant investigations including Fine Needle Aspiration Cytology (FNAC) of all

cases, Ultrasonography (USG) and computed tomography (CT) in selective cases where all other investigations were either inconclusive with the clinical diagnosis.

Prophylactic broad-spectrum antibiotics including three doses of injection amoxiclav were given intravenous at induction and continued for two more doses in all patients. Superficial conservative parotidectomy was employed for tumors of superficial lobe of the parotid gland while the tumors of deep lobe total conservative parotidectomy was done. No specific nerve detection technology was used. Pathologies of submandibular and sublingual gland were treated with appropriate excision biopsies and the relevant nerves were saved by employing the standard techniques recommended for the flaps and dissection during resection. A low vacuum suction drain was kept in all cases after excision surgery and was removed on second or third post-operative day when discharge was reduced to less than 5 ml per day in 24 hours. Skin sutures were removed on 5<sup>th</sup> post-operative day. For the purpose of study facial nerve paresis was defined as temporary loss of nerve function gaining substantial or complete recovery in six months' time.

Facial nerve damage was defined as documented or inadvertent damage to the nerve resulting in permanent loss of nerve function. Surgical site infection was defined as the presence or absence of seroma or hematoma beneath the skin. Flap necrosis was defined as necrosis of flap which was treated with surgical debridement and repair. All excised specimen was sent to the histopathology department of King Edward Medical University to report the nature of the disease. All those patients with confirmed tumors on histopathology report were followed initially every month for first six months and then every six months. No specific measure was taken apart from physiotherapy was adopted for transient nerve paresis. The quantitative data was analyzed using SPSS version 26.

## **RESULTS**

Out of total 73 patients operated for salivary gland

tumors 49 (67.12%) were male and 24 (32.8%) were female. Among males 29 (59.1%) were benign salivary gland tumors while 20 (40.81%) were malignant salivary gland tumors. Among females 13 (54.16%) were benign and 11 (45.83%) were malignant salivary gland tumors (Table-I). The male to female ratio was 2:1. The mean age of patients was 46 years with minimum age of 28 years for benign Salivary gland tumors and 32 years for malignant salivary gland tumors. 52 patients had tumor of right parotid gland while 21 had tumor of left parotid gland. Among histology pleomorphic tumor was the most common benign tumor present in about 32 (43.8%) of cases while mucoepidermoid carcinoma was the most common malignant tumor observed in about 17 (23.28%) of cases (Table-II). Regarding tumor size most of the patients had tumor size of more than 4cm. Regarding post-operative complications,

only 9 (12.32%) patients experienced nerve paresis (Table-III).

Age Group	Male	Female
20 – 30 Years	3 (6.12%) B = 3 M = 0	1 (4.16%) B = 1 M = 0
31 – 40 Years	8 (16.3%) B = 6 M = 2	5 (20.83%) B = 4 M = 1
41 – 50 Years	13 (26.5%) B = 9 M = 4	9 (37.5%) B = 4 M = 5
51 – 60 Years	18 (36.73%) B = 7 M = 11	6 (25%) B = 2 M = 4
61 – 70 Years	06 (12.24%) B = 3 M = 3	3 (12.5%) B = 2 M = 1
71 – 80 Years	01 (%) B = 1 M = 0	0 (%) B = 0 M = 0
Total	49 (67.12%) B = 29 (59.1%) M = 20 (40.81%)	24 (32.8%) B = 13 (54.16%) M = 11 (45.83%)

**Table-I. Age and sex distribution of benign and malignant tumors (b= benign, m= malignant).**

	Type of Tumor	Parotid Gland	Submandibular Gland	Sublingual Gland	No of Patients
Benign	Myoepithelioma	1	0	0	1 (1.36%)
	Pleomorphic Adenoma	25	7	0	32 (43.8%)
	Warthin Tumor	2	2	0	4 (5.47%)
	Oncocytoma	1	1	0	2 (2.73%)
	Lymphadenoma	2	0	1	3 (4.10%)
	Total Benign	31 (73.8%)	10 (23.8%)	1 (2.28%)	42 (57.53%)
Malignant	Adenocarcinoma	2	0	0	2 (2.73%)
	Clear Cell Carcinoma	2	1	0	3 (4.10%)
	Acinic cell Carcinoma	4	2	1	7 (9.58%)
	Mucoepidermoid carcinoma	10	7		17 (23.28%)
	Salivary duct carcinoma		1	1	2 (2.73%)
	Total Malignant	18 (58.06%)	11 (35.4%)	2 (6.45%)	31 (42.4%)
	Total	49 (67.12%)	21 (28.76%)	3 (4.10%)	73

**Table-II. Histopathology of different types of salivary gland tumors.**

Post-Operative Complications	No of Cases and Percentage
None	54 (73.97%)
Nerve Paresis	9 (12.32%)
Surgical Site Infection	3 (4.10%)
Flap necrosis	7 (16.2%)
Nerve Damage	0 (0.00%)

**Table-III. Complications during salivary gland tumor surgery.**

## DISCUSSION

Salivary gland disorders are a distinct group of disorders which affect both major and minor glands. These disorders range from inflammatory changes, granulomatous disorders, autoimmune

diseases, obstructive, developmental, idiopathic and neoplastic disorders.<sup>11</sup> Salivary gland tumors are not a common presentation in any outdoor department of a tertiary care hospital. These tumors include both benign and malignant

types.<sup>12</sup> The epidemiology of salivary gland tumors in Pakistan is not well documented and only a limited number of research articles based on histological pattern of salivary gland tumors are present in literature.<sup>13</sup>

In this study, the minimum age for benign salivary gland tumor was found to be 28 years of age while for malignant salivary gland tumor it is 32 years of age. Another study done by Khan HU et al also showed that relatively younger patients with mean age of 34 were affected by the disorders of salivary gland.<sup>14</sup> Findings of salivary gland tumors in younger patients were also found in study done by Shrestha and associates (44.8 years) and by Ashkavandi and colleagues (41.8 years).<sup>15,16</sup> In our study there was male predominance of salivary gland tumors (2:1). This male predominance was in consistent with the findings observed by Seethala et al. On the other hand there are some studies done by Rewswan et al who showed female predominance of salivary gland tumors.<sup>17</sup> In this study it was found that females had salivary gland tumors in their 4<sup>th</sup> decade of life while males have these tumors in 5<sup>th</sup> decade of life. Razek et al found most of the salivary gland tumors in 3<sup>rd</sup> decade of life followed by 4<sup>th</sup> decade in his study.<sup>18</sup>

In our study the ratio between benign and malignant salivary gland tumors in males were found to be 1.45:1 while in females this ratio was 1.18:1. This ratio is almost same in both genders showing that both males and females can have benign and malignant salivary gland tumors and gender has no role in type of tumor. Bobati et al also showed that benign salivary gland tumors were more common in age group of 31 to 40 years and malignancy was reported was predominant in the 5<sup>th</sup> decade and the male to female ratio was found to be 1.7:1.<sup>19</sup>

In this study pleomorphic adenoma was the most common benign salivary gland tumor 32 (43.8%) followed by Warthin tumor 4 (5.47%). Most of the cases of pleomorphic adenoma were found in parotid gland (73.8%) while lingual salivary gland was least affected by all types of salivary gland tumors. This finding is endorsed in many case series available which showed that pleomorphic

adenoma is the most common salivary gland tumor and most cases of it are found in parotid gland.<sup>20,21</sup>

Mucoepidermoid carcinoma was the most commonly found malignant carcinoma in the salivary gland 17 (23.28%) and most of this carcinoma was found in parotid gland. Other studies also showed that the most common malignant tumor found in salivary gland is mucoepidermoid carcinoma and it is most commonly found in parotid gland.<sup>22</sup> It mostly affects women slightly higher as compared to men with peak age of 5<sup>th</sup> decade. Nerve involvement is not seen in low grade tumor while it is quite common in high grade tumor. In this study total 17 mucoepidermoid tumors were encountered out of which 10 were found in parotid gland while 7 were found in submandibular gland.

Transient facial nerve palsy (12.32%) following parotid gland surgery in this study is well within the reports of 1.6% to 33.3% reported by national and international studies.<sup>24,25</sup> Other complication like surgical site infection and flap necrosis are also consistent with the international studies.<sup>25</sup>

There exist some limitations to this study. Firstly, the sample size is small as compared to large multicenter studies to interpret the true load of disease in our setup. Secondly this was a single center study and more multicentric studies are required to evaluate the true burden of salivary gland tumors in Pakistan.

## CONCLUSION

This study highlights the spectrum of salivary gland pathologies in a large tertiary care hospital of Pakistan. Male preponderance, a relatively younger age at presentation and single predominant benign tumor (pleomorphic adenoma) were the significant findings. Most of the salivary gland tumors present as painless enlarging masses. Majority of them were found in parotid gland and found to be benign in nature. Although fine needle aspiration cytology and magnetic resonance imaging provide some useful information about the nature of tumor but most of them will acquire a surgical excision in








order to find the definitive diagnosis.

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### AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author(s) Full Name	Contribution to the paper	Author(s) Signature
1	Ahmed Siddique Ammar	Substantial contribution to the conception and design of the work. Drafting the work. Final approval of the version to be published and agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any parts of the work are appropriately investigated and resolved.	
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