

## Fine Needle Aspiration Cytological Study of Salivary Gland Lesions at Tertiary Care Centre

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### Abstract

**Introduction:** Salivary gland region mass usually presents a diagnostic challenge. The present study is conducted with a purpose to diagnose the non-neoplastic and neoplastic lesions of the enlarged salivary glands by FNAC and to study the spectrum of lesions with respect to age, sex and site of occurrence. FNAC is less invasive diagnostic modality with good range of sensitivity in all lesions.

**Materials and methods:** A prospective randomized study was conducted in the Department of Pathology, SMS Medical College & Hospital from February 2018 to June 2019. A total of 120 FNACs were done on salivary gland swellings during this period. FNAC was performed with informed consent of the patient using a 23-25 G needle. Alcohol fixed smears were stained with H&E. Air-dried smears were stained with MGG stain. PAS stain was done on methanol fixed smear, if required.

**Results:** Out of the 120 cases, 73 cases were diagnosed as non-neoplastic lesions and 47 cases as neoplastic lesions. The cytomorphological features of following lesions were studied: Sialadenitis (51), Non-neoplastic cysts (10), Benign tumors (40), Malignant tumors (11), Mesenchymal lesion (2) and Tumor-like lesions (6). The majority of the patients were in the age group of 21-30 years and were males. In the present study, the parotid gland was the commonest site involved.

Pleomorphic Adenoma and Mucoepidermoid carcinoma were the commonest benign and malignant tumors respectively.

**Conclusion:** FNAC of salivary gland lesions is an excellent method for investigating the nature of the lesions, as it is accurate, simple, rapid, inexpensive, well tolerated and harmless to the patient with high sensitivity, specificity and accuracy.

**Keywords:** Salivary gland lesions; FNAC; Accuracy; Sensitivity; Specificity

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## Introduction

Fine Needle Aspiration Cytology (FNAC) of suspected salivary gland lesions has an important role in preoperative diagnosis and management of patients. [1] The salivary glands are affected by developmental, inflammatory, immunopathic, degenerative and neoplastic diseases. Although salivary gland tumors account for 2-6.5% of all head and neck tumors, their superficial location and easy accessibility makes FNAC a famous method for diagnosing salivary gland tumors. [2,3]

Malignant tumors comprise 15-20% of all parotid tumors, 37-43% of submandibular gland tumors and over 80% of minor salivary gland tumors. [4]

Between 64-80% of all primary epithelial tumors occur in parotid glands, 7-11% occur in the submandibular glands, less than 1% occur in the sublingual glands and 9-23% occur in the minor glands. [6] The ratio of malignant to benign tumor is greatest (>2.3:1) in the sublingual gland, tongue, floor of the mouth and retro-molar area. [3] The mean age at presentation for malignant salivary neoplasms is 55 to 65 years while benign lesions typically develop atleast a decade earlier, at a mean age of 45 years. [4]

Pleomorphic Adenoma is the commonest benign neoplasm, accounting to 52.04% of the tumors, 80% of which is seen in the parotid gland. Mucoepidermoid Carcinoma is the commonest malignant neoplasm, accounting to 4.06% of the tumors and it mainly affects the major salivary glands, especially parotid gland (50% of Mucoepidermoid Carcinomas). Adenoid Cystic Carcinoma is the second commonest malignant neoplasm, accounting to 1.63% of salivary gland tumors and is seen commonly in the minor salivary glands (50-70% of Adenoid Cystic Carcinomas). [5]

Aim- To study the spectrum of salivary gland lesions with respect to age, sex and site of occurrence.

## Materials and Methods

Sources of data: A prospective randomized study from February 2018 to June 2019 was done on patients who presented with salivary gland mass and referred to the Department of Pathology SMS, Jaipur for fine needle aspiration cytology.

Methods of collection of data: All the patients were examined clinically, and the procedure of aspiration biopsy was explained to the patient including limitations and complications. Aspiration of salivary gland mass was performed using aseptic precautions. Smears were immediately fixed in 95% ethyl alcohol, and these smears were stained by haematoxylin and eosin stain. Air dried smears were also prepared and stained with MGG's stain. PAS stain was done on methanol fixed smear, if required. Smears were examined and cytological diagnosis offered.

All cases of salivary gland mass where fine needle aspiration cytology was done are included in the study. All cases where adequate salivary gland mass aspirate was not obtained even after repeated aspirations and uncooperative subjects were excluded from the study.

Data Analysis: Qualitative data will be expressed in percentage, graphs, tables and analysed by appropriate statistical test. Quantitative data will be expressed in mean, standard deviation and analysed by appropriate statistical test. P value <0.05 will be taken as significant.

## Results

During the period of study from February 2018 to June 2019, Fine Needle Aspiration was conducted on a total of 120 cases of salivary gland lesions.

**Table 1: Age distribution pattern in Salivary gland lesions**

Age (years)	Number of Cases	Percentage
0-10	8	6.66
11-20	11	9.16
21-30	33	27.50
31-40	13	10.83
41-50	21	17.50
51-60	15	12.50
61-70	15	12.50
71-80	2	1.66
81-90	2	1.66
<b>Total</b>	<b>120</b>	<b>100</b>

**Age distribution in salivary gland lesions**

Age of the patients ranged from 15 months to 84 years and the maximum number of lesions were seen in the age group 21-30 years (27.50%).

**Table 2: Gender distribution pattern in salivary gland lesions**

Sex	Number of Cases	Percentage
Male	83	69.16
Female	37	30.83
<b>Total</b>	<b>120</b>	<b>100</b>

**Gender distribution in salivary gland lesions**

In the present study, a male predilection was seen. Among the 120 cases, 83 cases (69.16%) were males and 37 cases (30.83%) were females. The male to female ratio was 2.24:1.

**Table 3: Cytological categories of salivary gland lesions**

Cytological category	Number of Cases	Percentage
Sialadenitis	51	42.50
Non-neoplastic cyst	10	8.33
Benign tumor	40	33.33
Malignant tumor	11	9.16
Mesenchymal lesion	2	1.66
Tumor-like lesion	6	5
<b>Total</b>	<b>120</b>	<b>100</b>

**Diagnosis of salivary gland lesions on FNAC**

Among the total number of 120 cases, 51 cases were sialadenitis, 40 were benign tumors, 10 were non-neoplastic cysts, 11 were malignant tumors, 6 were tumor-like lesions and 2 were of mesenchymal lesion.

**Table 4: Distribution of salivary gland tumors and their incidence**

FNAC Diagnosis	Number of Cases	Percentage
Pleomorphic adenoma	30	58.82
Warthin's tumor	7	13.72
Basal cell adenoma	3	5.88
Mucoepidermoid carcinoma	6	11.76
Adenoid cystic carcinoma	3	5.88
Carcinoma ex pleomorphic adenoma	2	3.92
<b>Total</b>	<b>51</b>	<b>100</b>

### **Pleomorphic Adenoma**

In the present study of 51 cases of salivary gland tumors, 30 cases were Pleomorphic Adenoma, accounting for 58.82% of all tumors and 75% of all benign tumors.

The peak incidence of Pleomorphic Adenoma was seen in the 3<sup>rd</sup> decade. A male predominance was observed.

### **Warthin's tumor**

In the present study of 51 cases of salivary gland tumors, 7 cases were Warthin's tumor, accounting for 13.72% of all tumors. All of them were found in parotid gland and in males. The peak incidence was seen in 6<sup>th</sup> decade.

### **Basal Cell Adenoma**

3 cases of Basal cell adenoma were encountered in the present study, accounting for 5.88% of all tumors and all were in males.

### **Mucoepidermoid carcinoma**

Six cases (11.76%) were diagnosed as Mucoepidermoid carcinoma out of 51 salivary gland tumors and all the cases

were present in parotid gland in the present study. The peak incidence was seen in 7<sup>th</sup> decade. The youngest patient was 31 years old and the eldest patient was 68 years old. The male to female ratio was 2:1.

### **Adenoid Cystic Carcinoma**

Adenoid Cystic Carcinoma constituted about 5.88% of all salivary gland tumors. All 3 the cases were reported in the parotid gland. Two case was reported in 6<sup>th</sup> decade and one in 5<sup>th</sup> decade. Male to female ratio was 2:1.

### **Carcinoma ex pleomorphic adenoma**

Two case of Carcinoma ex pleomorphic adenoma was encountered in the present study, accounting for 3.92% of all salivary gland tumors studied. Both tumors were located in parotid gland and the patient was 45 years and 55 years old. Male to female ratio was 1:1.

### **Discussion**

During the period of study from February 2018 to June 2019, Fine Needle Aspiration was conducted on a total of 120 cases of salivary gland lesions.

**Table 5: Age incidence of salivary gland lesions in various studies**

S.No.	Studies	Decade
1	Jayaram G, Dashini M <sup>6</sup> (1993-2000)	6 <sup>th</sup> decade
2	Das DK et al. <sup>7</sup> (1994-1999)	4 <sup>th</sup> decade
3	Present study (2018-2019)	3 <sup>rd</sup> decade

In the present study, salivary gland lesions were common in the 3<sup>rd</sup> decade, thus involving younger age group as compared to the earlier studies

**Table 6: Sex incidence of salivary gland lesions in various studies**

S.No.	Studies	M:F
1	Roland NJ et al. <sup>8</sup> (1989-1992)	1:1.14
2	Das DK et al. <sup>7</sup> (1994-1999)	1.28:1
3	Present study (2018-2019)	2.24:1

In our study, the occurrence of the salivary gland lesions were common in male patients as in the study conducted by Das DK et al. [7] (1994-1999), but unlike the study conducted by Roland NJ et al. [8] (1989-1992) in which the lesions were common in female patients

**Table 7: Frequency of salivary gland lesions in various studies**

S.No	Cytological category	Candel A et al. [9] (1988-1992)	Stewart CJ et al. [10] (2000)	Akhter J et al. [11] (2004-2006)	Present study (2018-2019)
1	Normal salivary gland	21	100	-	-
2	Inflammatory lesion	77	74	16	51
3	Non-neoplastic cyst	-	34	3	10
4	Benign tumor	50	91	16	40
5	Malignant tumor	15	27	5	11
6	Mesenchymal lesion	-	5	-	2
7	Tumor-like lesion	-	-	-	6
8	Unsatisfactory	-	10	-	-

In the present study, inflammatory lesions and benign tumors were the commonest non-neoplastic and neoplastic lesions respectively. These findings were similar to other studies.

**Table 8: Frequency of salivary gland tumors in various studies**

<b>FNAC Diagnosis</b>	<b>Jesus Souza et al. [12] (1987-97)</b>	<b>Stewart CJR et al. [10] (2000)</b>	<b>Present study (2018-2019)</b>
Pleomorphic Adenoma	34	55	30
Basal Cell Adenoma	-	-	3
Warthin's Tumor	8	36	7
Mucoepidermoid Carcinoma	11	1	6
Adenoid Cystic Carcinoma	-	2	3
Undifferentiated Ca	1	1	-
Carcinoma Ex Pleomorphic Adenoma	3	1	2
Lymphoma	-	4	-
Adenocarcinoma	-	3	-
Squamous Cell Carcinoma	-	2	-
Metastasis	-	13	-

In the present study, Pleomorphic Adenoma and Mucoepidermoid Carcinoma were the most common benign and malignant tumors respectively. These findings were similar to the study conducted by Jesus Souza et al. [12] (1987-97). Whereas in a study conducted by Stewart CJ et al. [10] (2000), Adenocarcinoma was the common primary malignant salivary gland tumor. [13]

#### **Pleomorphic Adenoma (PA)**

In the present study, PA was the most common tumor accounting for 58.82% of all tumors and 75% of benign tumors. In the present study, peak age incidence was seen in the 3<sup>rd</sup> decade with a male predominance.

#### **Warthin's Tumor (WT)**

Among 51 cases of salivary gland tumors in the present study, 7 cases were diagnosed as Warthin's tumor on FNAC accounting for 13.72% of all the tumors. All of them were found in the parotid gland and in males. The peak incidence was seen in 6<sup>th</sup> decade

#### **Basal Cell Adenoma**

Three cases of Basal cell adenoma were encountered in the present study, accounting for 5.88% of all the tumors and all were present in minor salivary gland.

#### **Mucoepidermoid Carcinoma (MEC)**

In our study, out of 51 cases of salivary gland tumors, there were 6 cases of MEC, which were diagnosed by FNAC. The peak incidence was seen in 7<sup>th</sup> decade. The youngest patient was 31 years old and the eldest patient was 68 years old. The male to female ratio was 2:1.

#### **Adenoid Cystic Carcinoma**

In the present study, Adenoid cystic carcinoma constituted 5.88% of all salivary gland tumors. All the cases were seen in the parotid gland. Two case was reported in 6<sup>th</sup> decade and one in 5<sup>th</sup> decade. Male to female ratio was 2:1.

#### **Conclusion**

Salivary gland tumor FNAC is beneficial to both the patient and the clinician because of its fast results, accuracy and lack of complications. FNAC helps in proper therapeutic management, whether it is local excision for a

benign neoplasm, radical surgery for a malignant neoplasm.

The main advantage of FNAC is that it can be repeated easily. It can be used as a first-line method for investigating the nature of lesion.

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