



# Salivary gland neoplasms: A clinicopathological study of 84 cases

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## Abstract

**Background:** Accounting for less than 2% of all human neoplasms, salivary gland tumors are relatively uncommon and it comprises a morphologically diverse group of rare tumors. FNAC has been employed in pre-operative diagnosis of salivary gland tumor as essential diagnostic tool to diagnose swelling in major and some minor salivary glands. Superficial locations of salivary glands make them suitable for FNAC.

**Objectives:** To find out the frequency of different types of salivary gland tumors in a hospital based samples and make clinicopathological correlation.

**Material and methods:** FNAC of all 84 patients was done using 22 gauge needle and 10 ml syringe applying negative pressure, smears were either wet fixed or air dried and stained by Papanicolau and Giemsa stains respectively. Histopathological examination was done whenever available and was compared with FNAC diagnosis.

**Results:** In this study, overall male predominance with male to female ratio was 1.4: 1. Maximum number of cases of salivary gland neoplasms occurs in 3<sup>rd</sup> decade of life. Incidence of malignant and benign parotid neoplasms was 32.14% and 67.86% respectively. Parotid was the most commonly affected salivary gland. Benign tumors were more common in parotid gland however, malignant tumor were more common in submandibular gland. Pleomorphic adenoma (60.71%) was most common benign tumor and mucoepidermoid carcinoma (22.02%) was the most common malignant tumor.

**Conclusion:** FNAC is a simple quick inexpensive and minimally invasive technique to diagnose different types of salivary gland tumor. It could easily differentiate benign from malignant neoplasms and can be helpful for management of patient. Thus, FNAC can be recommended as first line of investigation in the diagnosis of salivary gland tumors.



## Key words

Clinicopathological, FNAC, Salivary gland.

## Introduction

The Salivary gland system comprises three pairs of major glands-parotid, submandibular and sublingual and many minor glands dispersed in the submucosa of oral cavity, lips, gingiva, floor of the mouth, cheek, hard and soft palates, tongue, tonsillar areas and oropharynx [1]. Salivary gland tumors are rare, and they account for 2-6.5% of all head and neck tumors [2]. Their clinical importance however outweighs their relatively low frequency due to their confounding histological and behavioral diversity as well as their proximity to important head and neck structures that pose considerable clinical management challenges [3].

Among the primary epithelial tumors 64-80% occurs in the parotid gland, 7-11% occurs in the submandibular gland, less than 1% occurs in the sublingual gland and 9-23% occurs in the minor salivary glands [4, 5, 6]. Majority of these neoplasms are benign and only 20% are malignant.

In the parotid gland, 20-25% of the tumors are malignant. This rises to 40% for the submandibular gland and more than 90% for sublingual gland [7, 8]. Among benign salivary gland neoplasms 80% contributes pleomorphic adenoma, 10% Warthin's tumor and 10% others. On the other hand, malignant neoplasm of salivary gland comprises mucoepidermoid carcinoma (35%), malignant pleomorphic adenoma (20%), and acinic cell carcinoma (10-25%) [9].

Fine needle aspiration cytology (FNAC) is a popular method for diagnostic evaluation of salivary gland masses due to their superficial nature and easy accessibility for the procedure

[10]. It is a major diagnostic tool and is of great relevance in head and neck lesions, including salivary glands. In this region, FNAC is easy to perform and achieve excellent patient compliance, being minimally invasive OPD procedure [1].

The published data regarding salivary gland tumors in North Eastern region (Assam) had poorly documented. The aim of this study was to describe the frequency of salivary gland tumors, in hospital-based samples and to make clinicopathological correlation of salivary gland tumors.

## Material and methods

This cross sectional study included 84 cases of various salivary gland neoplasms that underwent FNAC over a period of two years from September 2012 to August 2014. Relevant clinical details were elicited in all the cases and findings of local examination were noted. All the patients underwent FNAC which was performed using 23 G needle with 20 ml syringe. The character of aspirates was noted and routine smears were prepared. The air dried and ethanol fixed smears were stained with May-Grunwald-Giemsa stain and Papanicolaou's (Pap) stain. FNAC diagnosis was correlated with details of relevant clinical findings. Histopathological correlation was done whenever possible.

## Results

The study included 84 cases of salivary gland neoplasms ranged from 1-70 years, of these 50 (59.52%) male and 34 (40.48%) female with an overall male predominance, the male to female ratio being 1.4: 1. The maximum incidences

observed in the 3<sup>rd</sup> decade of life in both male and female patients as per **Table – 1**.

On FNA, variety of cytological diagnosis was observed. Out of 84 neoplastic lesions, 57 (67.86%) were benign and 27 (32.14%) were malignant. Benign neoplasms outnumbered the malignant. In general parotid was the commonest affected site.

In this series 52 (61.90%) patient had parotid, 27 (32.14%) had submandibular, 1 (1.19%) had sublingual and 4 (4.76%) patients had minor salivary gland tumors, parotid was the most commonly affected gland in this study as per **Table – 2**.

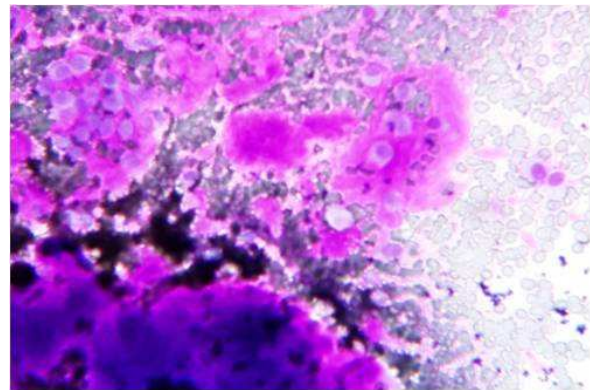
Pleomorphic adenoma (**Photo - 1**) and mucoepidermoid carcinoma (**Photo - 2**) were the commonest benign and malignant tumors respectively. Out of 57 benign neoplasms, pleomorphic adenoma (60.71%) was the commonest followed by myoepithelioma (5.95%) (**Photo - 3**) and Warthin's tumor (1.19%). Out of 51 cases of pleomorphic adenoma, 35(68.63%) (**Photo – 4**) occurred in parotid gland and 12 (23.53%) in submandibular gland, one (1.96%) in sublingual gland and 3 (5.88%) in minor salivary glands. Out of 5 cases of myoepithelioma, 2 (40%) occurred in parotid gland and 3 (60%) in submandibular gland. One case of Warthin's tumor occurred in parotid gland.

Out of 27 malignant neoplasms, 19 cases (70.37%) were mucoepidermoid carcinoma, 4 cases (14.81%) adenoid cystic carcinoma (**Photo – 5**), 3 cases (11.11%) acinic cell carcinoma and one case of (3.70%) ca ex pleomorphic adenoma.

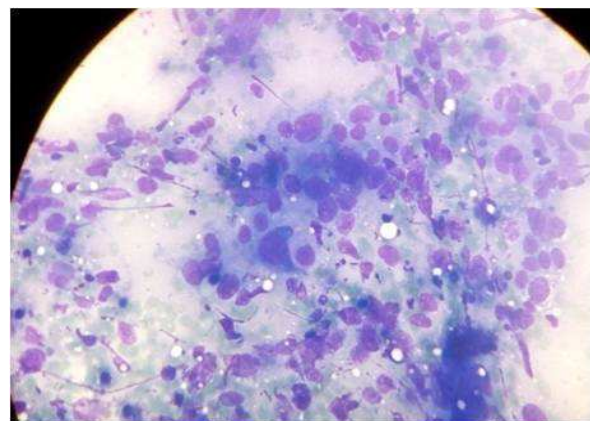
Out of 19 cases of mucoepidermoid carcinoma, 9 (47.37%) cases occurred in parotid gland, 10 (52.63%) in submandibular salivary gland. Out of

4 cases of adenoid cystic carcinoma, 3 (75%) cases occurred in parotid, one (25%) in minor salivary gland. Out of 3 cases of acinic cell carcinoma one (33.33%) case occurred in parotid gland and 2 (66.66%) cases in submandibular gland. One case of carcinoma ex pleomorphic adenoma occurred in parotid gland.

**Photo – 1:** Cytology of Pleomorphic adenoma. (MGG stain, 400X)



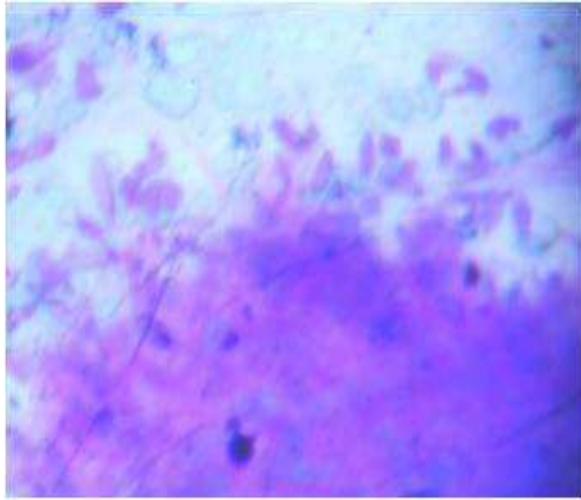
**Photo – 2:** Cytology of Mucoepidermoid carcinoma on FNAC. (MGG stain, 400X)



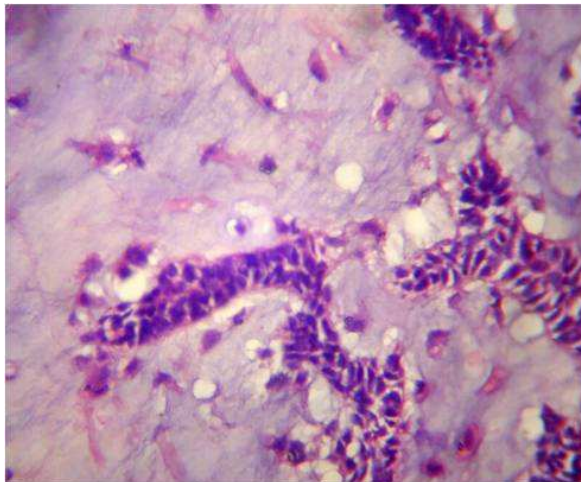
All total 52 tumors (benign and malignant) occurred in the parotid glands. Out of these, 38 (73.08%) were benign and 14 (26.92%) were malignant. In submandibular glands, total 27 tumors occurred. Among these, 15 (55.56%) were benign and 12 (44.44%) were malignant. Therefore, frequency of incidence of malignant tumors is more in submandibular glands in comparison to parotid and other salivary glands.



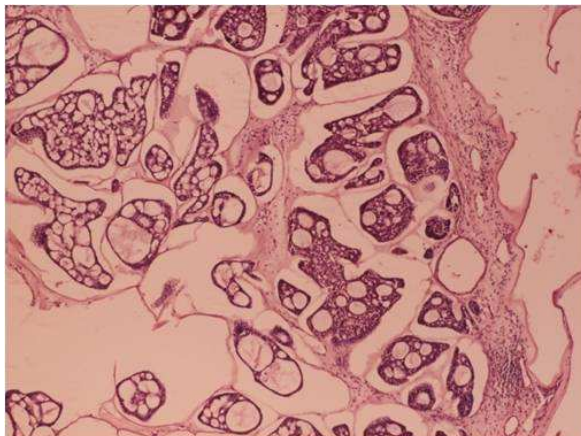
**Photo – 3:** Cytology of Myoepithelioma. (MGG stain, 400X)



**Photo – 4:** Histopathology of Pleomorphic adenoma. (H and E stain, 400X)



**Photo – 5:** Histopathology of Adenoid cystic carcinoma. (H and E stain, 400X)



## Discussion

Salivary gland tumors are relatively uncommon but their multifaceted clinical presentation; varied morphologic configuration and relatively unpredictable prognosis continue to attract significant medical interest [11]. Salivary gland neoplasms were rare and they account for 2-6.5% of all neoplasms of the head and neck [4]. It can occur at any age. In the present study, most common age group affected was 21-40 years among all lesions which is comparable to the findings of Chetan Jain [12]. Nanda, et al. [13] and Oliveira, et al. [14] found maximum incidence in 4<sup>th</sup> decade in case of woman but in 5<sup>th</sup> decade in man. Early presentation in our study can be due to increase awareness among people and improvement of health care system. In the present study, the tumors of the salivary glands were more common in male than female. M: F was 1.4: 1. The male predominate observed in the present study is similar to that reported by Nanda, et al. [13], Cajulies, et al. [15] and Young, et al. [16] GC Fernandage, et al. [4].

In the present study, commonest benign tumor pleomorphic adenoma occurred in 21-40 years age group, which correlates well with John A Pinkstno [17] and Chetan Jain [12]. In the studies done by John A Pinkstno [17], and Radha Pai [18] peak incidence of malignancy was reported during 65-70 years which is similar to the present study.

Considering all neoplasms parotid gland is most frequently involved gland in the present study followed by submandibular and minor salivary glands which is consistent with Nanda, et al. [13] and Kamal, et al. [19].

In this study, 52 (61.90%) patients had parotid neoplasms and 27 (32.14%) had submandibular neoplasms. Among parotid neoplasms, 38 cases (73.08%) were benign and 14 cases (26.92%)

were malignant. Fiorella, et al. [23] showed 79.8% and 13.8% of their patients had benign and malignant neoplasms in parotid gland respectively which is almost similar to our study. Regarding submandibular neoplasms, 15 cases (55.55%) were benign and 12 cases (44.44%) were malignant. This finding is comparable with the findings of Afify, et al. [20] who found 40% benign 50% malignant, Wahiduzzaman M, et al. [21] who also found 50% benign and 50% malignant. In our study, 44.44% of submandibular glands neoplasms were malignant but in case of parotid gland it is 26.92%. Incidence of malignancy is higher in submandibular gland that is consistent with the study of Vincentis, et al. [22], Fiorella, et al. [23], and Wahiduzzaman, et al. [21].

Among salivary gland neoplasms, pleomorphic adenoma is the most commonly encountered benign tumor that corresponds with other studies done by Nanda, et al. [13], Shilpa H Gandhi, et al. [1], Young, et al. [16]. Pleomorphic adenoma shows higher incidence of occurrence in the parotid glands followed by submandibular glands.

A cytological smear representative of pleomorphic adenoma include three component, extra cellular matrix, myoepithelial and ductal cells in varying proportions and metachromatic chondromyxoid stroma [24]. However, considerable variation of cellular composition of pleomorphic adenoma raises diagnostic difficulty especially in FNAC. A cellular pleomorphic adenoma on FNAC needs to be differentiated from monomorphic adenoma, myoepithelioma and adenoid cystic carcinoma [25, 26]. Cases with prominence of plasmacytoid myoepithelial cells may be mistaken for malignant lymphoma or plasmacytoma. Rare cases may display nuclear atypia and need to be differentiated from carcinoma ex pleomorphic adenoma. In this study, five cases of

myoepithelioma were diagnosed cytologically, two occurred in the parotid gland and three in the submandibular gland. Only one case of Warthin's tumor in the parotid gland was diagnosed cytologically.

In the present study, out of 57 cases of benign salivary gland tumors, 31 cases were available for histopathological correlation. All cases correlated correctly.

Mucoepidermoid carcinoma is the most commonly encountered malignant neoplastic lesions (19 cases) followed by adenoid cystic carcinoma (4 cases). Mucoepidermoid carcinoma shows mucous producing and intermediate cells in a dirty mucoid background with varying degrees of atypia depending on the grade of the tumor [27]. In case of adenoid cystic carcinoma confusion raises with that of basal cell adenoma but here malignant nuclear characteristics and necrosis differentiates the malignant lesions from benign one. Out of 19 mucoepidermoid carcinoma, 9 occurred in the parotid gland and 10 occurred in the submandibular gland. Out of total 4 cases of adenoid cystic carcinoma, 3 occurred in the parotid gland and one in the minor salivary gland. We got three cases of acinic cell carcinoma, one in the parotid gland 2 in the submandibular gland. One case of carcinoma Ex pleomorphic adenoma (parotid) was encountered in this study.

Findings of malignant neoplastic lesions are compared with Nanda, et al. (15) and Michael Cohen's [28], Jayaram, et al. [29] who found mucoepidermoid carcinoma as commonest malignant lesion which is similar to our study.

Out of 27 malignant neoplasms, 11 cases were available for histopathological correlation all are correlated well except one case which was cytologically diagnose as mucoepidermoid

carcinoma. In histopathology, it was come out as sialoadenitis.

## Conclusion

Nowadays with increasing cost of medical facilities, any technique which speed up the process of diagnosis, limits the physical and psychological trauma to the patient, and save the expenditure of hospitalization will be of tremendous value. Therefore, FNAC, which simple quick inexpensive and minimally invasive technique, can be recommended as a first line of investigation in the diagnosis of salivary gland neoplasms. It can easily diagnose various types of salivary gland neoplasms, can differentiate benign and malignant neoplasm and offer valuable information for planning and subsequent management. However, histopathology is the gold standard for final diagnosis.

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**Table - 1:** Age and sex distribution of various salivary gland neoplasms.

Age (in years)	Sex		Total
	Male	Female	
0-20	05 (5.95%)	05 (5.95%)	10 (11.90%)
21-40	17 (20.24%)	14 (16.67%)	31 (36.90%)
41-60	16 (19.05%)	12 (14.26%)	28 (33.33%)
>60	12 (14.29%)	03 (3.57%)	15 (17.86%)
<b>Total</b>	50 (59.53%)	34 (40.45%)	84 (100%)

**Table – 2:** Frequency of cases diagnosed on FNAC in various sites.

Neoplasms	Parotid	Sub mandibular	Sub lingual	Minor salivary gland	Total (%)
Pleomorphic adenoma	35	12	1	3	51 (60.71%)
Myoepithelioma	2	3	0	0	05 (5.95%)
Warthin's tumor	1	0	0	0	01 (1.19%)
Mucoepidermoid carcinoma	9	10	0	0	19 (22.62%)
Adenoid cystic carcinoma	3	0	0	1	04 (4.76%)
Acinic cell carcinoma	1	2	0	0	03 (3.57%)
Carcinoma ex pleomorphic adenoma	1	0	0	0	01 (1.19%)
Total	52 (61.90%)	27 (32.14%)	1 (1.19%)	4 (4.76%)	84 (100%)