



# Clinicopathological Profile of Salivary Gland Tumors: An Institutional Experience

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## Abstract

**Background:** Salivary gland tumors are relatively less common and they exhibit a wide variety of morphological and histological diversity. Thus, diagnosis and management of salivary gland tumors are still complex and challenging among the clinicians.

**Objectives:** To assess the clinical profile and to evaluate the histological profile of salivary gland tumors.

**Materials and Methods:** A cross-sectional observational study conducted in the department of otorhinolaryngology in collaboration with department of pathology, Regional Institute of Medical Sciences, Imphal, Manipur, India for a period of 2 years from October 2019 to September 2021. Thirty-two patients with salivary gland tumors were enrolled for the study. Clinical features, fine needle aspiration cytology findings and histopathological features were studied.

**Results:** Most of the patients were in the 5<sup>th</sup> decade of life with an overall female preponderance. Parotid gland was the most common affected followed by submandibular gland. Pleomorphic adenoma was the most common histological variant of benign tumor followed by Warthin tumor. Among the malignant tumors mucoepidermoid carcinoma was the most common histological variant followed by carcinoma ex pleomorphic adenoma. The sensitivity, specificity and diagnostic accuracy of fine needle aspiration cytology in diagnosing malignant tumors were 75%, 100% and 90.6% respectively. Clinically 78.1% and on fine needle aspiration cytology 90.6% tumors were correlated with final histopathological diagnosis.

**Conclusion:** Fine needle aspiration cytology and histopathological examination plays a crucial role in diagnosis and management of salivary gland tumors.

**Keywords:** Fine needle aspiration cytology; Histopathology; Mucoepidermoid carcinoma; Pleomorphic adenoma; Salivary gland

## Introduction

Salivary glands are the exocrine organs for the production and secretion of saliva. There are three pairs of major salivary glands, the parotid, submandibular and sublingual glands. There are hundreds of minor salivary glands situated in the mucosal lining of the upper aerodigestive tract [1].

Of all the tissues in the human body, perhaps the salivary glands have the most histologically heterogeneous group of tumors and the greatest diversity of morphologic features among their cells and tissues. Although the salivary, sweat, apocrine, and mammary glands all have similar phylogeny and cellular phenotypes, many lesions are unique to the salivary glands [2].

Salivary gland tumors are relatively uncommon lesions accounting for 3% to 6% of all head and neck neoplasms. World Health Organization (WHO) has given the global incidence of salivary gland tumors as 0.4 to 13.5 cases per 100,000 population annually. Studies discussing frequency and distribution of salivary gland tumors have been reported from India are very few. It is difficult to explain the epidemiological differences in their global distribution because the etiologic agent is not defined and most of the salivary gland tumors are idiopathic [3]. Their clinical importance however outweighs their relatively low frequency due to their confounding histological and behavioral

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diversity as well as their proximity to important head and neck structures that pose considerable management challenges [4].

Although researchers have learned much from the study of this diverse group of tumors over the years the diagnosis and treatment of salivary gland neoplasms remain complex and challenging for the head and neck surgeons. The present study was therefore, undertaken to study the clinical and pathological profile of salivary gland tumors.

**Materials and Methods**

A cross-sectional observational study was conducted in the department of otorhinolaryngology in collaboration with department of pathology, Regional Institute of Medical Sciences, Imphal, Manipur, India for a period of 2 years from October 2019 to September 2021 after obtaining approval from Institutional Ethics Committee.

A total of 32 patients of all age groups with salivary gland tumors who attended the department of otorhinolaryngology and willing to participate in the study were included. Salivary gland swelling which was congenital, as a result of inflammation and those associated with systemic diseases were excluded from the study. Detailed history, clinical examination, radiological imaging and FNAC were done. All the patients underwent surgery followed by histopathological examination of the specimen. Histopathological examination was considered as the gold standard for diagnosis. Tumors were classified according to the WHO classification of salivary gland tumors 2017. The data obtained were descriptively analyzed using SPSS software version 21.0 (IBM Corp., Armonk, NY, USA).

**Results**

In the present study, 32 patients with salivary gland tumors fulfilling the inclusion and exclusion criteria were studied.

The age group of the patients studied ranged from 22 to 70 years, with majority of the patients in the age range of 41 to 50 years (31.3%). Females (56%) were more affected than males with a male to female ratio of 1:1.28.

All the patients presented with swelling in the region of salivary gland. Features of rapid growth, fixity to the surrounding structures, nerve involvement, and enlargement of lymph node were considered as signs of malignancy. The swelling were associated with pain in 3 patients (9.4%), facial nerve paralysis in 2 patients (6.2%), skin involvement in 2 patients (6.2%) (Figure 1) and fixity to the surrounding structures in 3 patients (6.2%). Lymph node enlargement was seen in 2 patients (6.2%) with malignant tumor (Table 1). Majority of the patients (37.5%) presented between 5 to 10



Figure 1: Lymphoma of submandibular gland with skin involvement.

Table 1: Distribution of patients by clinical features (N=32).

| Clinical features      | Number | Percentage |
|------------------------|--------|------------|
| Swelling               | 32     | 100%       |
| Pain                   | 3      | 9.40%      |
| Facial nerve paralysis | 2      | 6.20%      |
| Skin involvement       | 2      | 6.20%      |
| Fixity                 | 3      | 9.40%      |
| Palpable lymph node    | 2      | 6.20%      |

Table 2: Distribution of patients by duration of disease (N=32).

| Duration of disease | Number | Percentage |
|---------------------|--------|------------|
| <1 year             | 9      | 28.10%     |
| 1-5 years           | 8      | 25%        |
| 5-10 years          | 12     | 37.50%     |
| >10 years           | 3      | 9.40%      |
| Total               | 32     | 100%       |

Table 3: Distribution of tumors by site and nature of disease (N=32).

| Site of tumor        | Nature of disease |           | Total (%) |
|----------------------|-------------------|-----------|-----------|
|                      | Benign            | Malignant |           |
| Parotid gland        | 14                | 7         | 21 (65.6) |
| Submandibular gland  | 4                 | 5         | 9 (28.1)  |
| Minor salivary gland | 2                 | 0         | 2 (6.3)   |
| Total                | 20                | 12        | 32 (100)  |

Table 4: Distribution of benign salivary gland tumors by histopathological diagnosis (N=32).

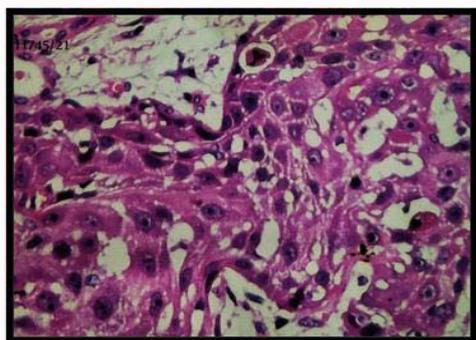
| Histological variant           | Number | Percentage |
|--------------------------------|--------|------------|
| Pleomorphic adenoma            | 15     | 75%        |
| Warthin tumor                  | 3      | 15%        |
| Myoepithelioma                 | 1      | 5%         |
| Benign lymphoepithelial lesion | 1      | 5%         |
| Total                          | 20     | 100%       |



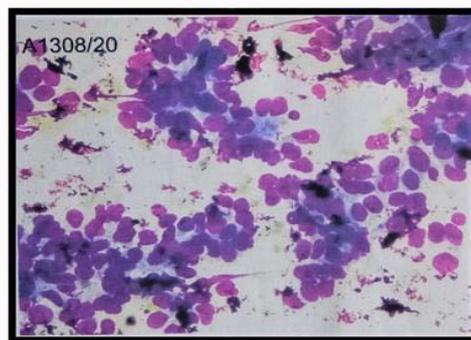
Figure 2: Pleomorphic adenoma of palate.

years after the onset of swelling (Table 2). Benign tumors (62%) were observed more common than malignant tumors (38%) among all the salivary gland tumors.

Parotid gland (65.6%) was the most common affected site followed by submandibular gland (28.1%) and minor salivary gland (6.3%). Most of the tumors in parotid gland (66.6%) and minor



**Figure 3:** Histopathological image showing carcinoma ex pleomorphic adenoma of parotid gland.



**Figure 4:** FNAC of salivary duct adenocarcinoma of parotid gland.

**Table 5:** Distribution of malignant salivary gland tumors by histopathological diagnosis (N=32).

| Histological variant             | Number | Percentage |
|----------------------------------|--------|------------|
| Mucoepidermoid carcinoma         | 4      | 33.50%     |
| Carcinoma ex pleomorphic adenoma | 3      | 25%        |
| Acinic cell carcinoma            | 1      | 8.30%      |
| Lymphoma                         | 1      | 8.30%      |
| Adenoid cystic carcinoma         | 1      | 8.30%      |
| Lymphoepithelial carcinoma       | 1      | 8.30%      |
| Salivary duct adenocarcinoma     | 1      | 8.30%      |
| Total                            | 12     | 100%       |

**Table 6:** Validity of FNAC with histopathological diagnosis.

| FNAC diagnosis | Histopathological diagnosis |        |
|----------------|-----------------------------|--------|
|                | Malignant                   | Benign |
| Malignant      | 9                           | 0      |
| Benign         | 3                           | 20     |

salivary gland (100%) were benign whereas in submandibular gland 55.6% of the tumors were malignant (Table 3).

After histopathological examination, pleomorphic adenoma (75%) (Figure 2) was the most common benign tumor followed by Warthin tumor (15%) among all the salivary gland tumors. One patient with myoepithelioma (5%) and one patient with benign lymphoepithelial lesion (5%) were found (Table 4). Mucoepidermoid carcinoma (33.3%) was the most common malignant salivary gland tumor followed by carcinoma ex pleomorphic adenoma (25%) (Figure 3). One patient each with acinic cell carcinoma, lymphoma, adenoid cystic carcinoma, lymphoepithelial carcinoma and salivary duct adenocarcinoma (Figure 4) were present (Table 5).

In Fine Needle Aspiration Cytology (FNAC), 23 cases reported as benign and 9 cases as malignant tumors (Figure 4). On histopathological examination, 20 cases reported as benign and 12 cases as malignant. Overall, in the present study, there are 3 cases

of false negative diagnosis from FNAC. All the cases of malignancy on FNAC were proven to be malignant on the final histopathology. So, the sensitivity and specificity of FNAC in diagnosis of malignant salivary gland tumors in the present study are 75% and 100% respectively. The diagnostic accuracy of FNAC in detecting benign and malignant tumors was found to be 90.6% (Table 6).

On clinical and histopathological correlation, clinically 90% of benign and 58.3% of malignant tumors were correctly diagnosed. On FNAC and histopathological correlation, 100% of benign and 75% of malignant tumors were correctly diagnosed on FNAC. Overall, clinically 78.1% and on FNAC 90.6% tumors were correlated with final histopathological diagnosis (Table 7).

### Discussion

In the present study maximum patients (31.3%) were in the age range from 41 to 50 years. Rajdeo et al. [5], in his study also observed maximum patients in the age range from 41 to 50 years. The male to female ratio was found to be 1:1.28. Female preponderance in the present study may be due to better awareness and cosmetic concerns which occur as part of the disease.

All the patients in our study presented with a swelling in the region of salivary glands. The swelling was also associated with facial nerve paralysis, skin involvement, fixity to the surrounding structures or lymph node enlargement in patients with clinically malignant tumors. Majority of the patients (37.5%) presented between 5 to 10 years after the onset of swelling. Increase in duration of presentation in this study may be due to the lack of concern and awareness among patients regarding the disease.

Benign tumors (62%) were observed more common than malignant tumors (38%) among all the salivary gland tumors. This finding in this study was consistent with studies of Subhashraj [6] and Ito et al [7]. However, in a study conducted by Ahmed et al. [8], the incidence of benign and malignant tumors was 86% and 14% respectively showing a high incidence of malignant tumors in this study?

Parotid gland (65.6%) was the most common affected site

**Table 7:** Correlation of clinical and FNAC diagnosis with histopathological diagnosis.

| Histopathological diagnosis | Clinical diagnosis |      |              |      | FNAC diagnosis |     |              |    |
|-----------------------------|--------------------|------|--------------|------|----------------|-----|--------------|----|
|                             | Consistent         |      | Inconsistent |      | Consistent     |     | Inconsistent |    |
|                             | Number             | %    | Number       | %    | Number         | %   | Number       | %  |
| Benign                      | 18                 | 90   | 2            | 10   | 20             | 100 | 0            | 0  |
| Malignant                   | 7                  | 58.3 | 5            | 41.7 | 9              | 75  | 3            | 25 |

followed by submandibular gland (28.1%) and minor salivary glands (6.3%). Devi et al. [4], and Shinde [9], also observed similar findings in their study. No tumor was encountered in the sublingual gland. This result demonstrates the low prevalence of sublingual tumors, as has been reported by Eveson et al. [10], who observed 1 sublingual tumor to 100 parotid tumors.

Among parotid tumors, 13 cases (66.6%) were benign and 8 cases (33.4%) were malignant. In a study conducted by Arumalla et al. [11], 79% and 21% of their patients had benign and malignant tumors in parotid gland respectively which shows that the incidence of malignant tumors in the parotid gland is higher in this study. Regarding submandibular tumors, 4 cases (44.4%) were benign and 5 cases (55.6%) were malignant. In this study, the incidence of malignancy is higher in submandibular gland that is comparable with the studies of Afify et al. [12], and De Vincentiis et al. [13].

FNAC was done in all the cases before surgery. A cytological smear representative of pleomorphic adenoma includes three component, extracellular matrix, myoepithelial and ductal cells in varying proportions and metachromatic chondromyxoid stroma [14]. 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 [15,16]. In this study 17 cases of pleomorphic adenoma diagnosed cytologically. 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 [4]. In this study one case of myoepithelioma was diagnosed cytologically.

The treatment of salivary gland neoplasms is challenging because of their infrequency, their unpredictable and varied biologic behavior and their prolonged risk of recurrence. The basic approach to a salivary gland neoplasm is operative [17]. In the case of parotid gland tumors, superficial parotidectomy with facial nerve dissection and preservation is the standard procedure for benign or small malignant tumors limited to the superficial lobe of the gland. If the tumor involves the deep lobe of the parotid gland, total parotidectomy is the procedure of choice to achieve adequate tumor clearance [18]. In the present study, 17 patients underwent superficial parotidectomy, 4 patients of parotid malignancy with deep lobe involvement underwent total parotidectomy.

Complete excision of the gland is the adequate treatment for submandibular gland tumors if the lesion is small, limited to the gland parenchyma and also of benign or low-grade malignant nature. More extensive tumors require excision of the gland bed and also adjacent soft tissues similar to a supraomohyoid neck dissection [18]. In the present study, all the patients with submandibular gland tumors underwent excision of the tumor. In two patients, selective neck dissection was also done along with excision of the tumor as there was lymph node metastasis. Minor salivary gland tumors were treated by a wide excision of the lesion with adequate margins.

After histopathological examination, pleomorphic adenoma (75%) was the most common benign tumor followed by Warthin tumor (15%). Mucoepidermoid carcinoma (33.5%) was the most common encountered malignant salivary gland tumor. Carcinoma ex pleomorphic adenoma (25%) was the 2<sup>nd</sup> most common malignant tumor observed in the present study. Carcinoma ex pleomorphic

adenoma is an infrequent aggressive malignancy that is believed to evolve from a pre-existing benign adenoma [19]. Higher incidence of carcinoma ex pleomorphic adenoma was observed in this study.

The sensitivity and specificity of FNAC in diagnosis of malignant salivary gland tumors in the present study are 75 % and 100% respectively. The diagnostic accuracy of FNAC in detecting benign and malignant tumors was found to be 90.6%. According to our study, FNAC is highly specific but less sensitive in detecting malignant salivary gland tumors.

On clinical and histopathological correlation of salivary gland tumors, clinically 90% of benign and 58.3% of malignant tumors were correctly diagnosed. On FNAC and histopathological correlation, 100% of benign and 75% of malignant tumors were correctly diagnosed on FNAC. Overall, clinically 78.1% and on FNAC 90.6% tumors were correlated with final histopathological diagnosis. Hence, FNAC is an important diagnostic tool with high accuracy which can aid in the preoperative planning and management.

## Conclusion

The present study concludes that clinical characteristics cannot make a definite diagnosis in salivary gland tumors. Preoperative evaluation with FNAC and histopathological examination after surgery is crucial for the diagnosis and management.

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