

# FNAC of Salivary Gland Lesions with Histopathological and Clinical Correlation

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## ABSTRACT

**Introduction-** There are three pairs of major salivary glands namely Parotid, Submandibular and Sublingual gland and hundreds of minor salivary glands. Salivary gland tumours comprise less than 3% of all tumours of head and neck. The lesions involving salivary gland are divided into two groups; non-neoplastic and neoplastic. Though the most accurate method of diagnosis is histopathology yet the role of Fine Needle Aspiration Cytology (FNAC) for the diagnosis of salivary gland masses is well documented and is significantly accurate. The most common source of diagnostic error is inadequate sampling since FNAC samples derive cells from only a small area. Keeping into consideration the importance of clinical features in forming the impression about diagnosis, role of FNAC in diagnosis of lesion and its accuracy vis a vis Histopathology (HPE), the present study is undertaken. **Material and methods-** This study was conducted for a period of 1 year in the Department of ENT, Head & Neck Surgery, Government Medical College, Jammu. Patients attending the OPD with salivary gland lesions were assessed thoroughly and 32 patients were admitted for further evaluation and management. After complete history, patients underwent complete ENT examination and all the routine investigations were done. After explaining the procedure and with due written consent, all the 32 patients were subjected to FNAC and as per the FNAC reports, surgical management was planned. All the 32 patients underwent surgery under general anaesthesia. The surgical specimen were obtained and sent for histopathological examination. The FNAC and the histopathological examination of the same lesion were compared by the cytopathologists. **Results-** Majority of benign lesions were seen in the age group of 31-45 years and that of malignant tumours was in the age group of 16-30 years. There was a male predominance over the female. Site most frequently involved was parotid gland (87.5%) followed by submandibular gland (9.3%). On FNAC, 23 cases (71.8%) were diagnosed as benign and 5 cases (15.6%) as malignant tumours. Out of 23 cases diagnosed as benign on FNAC, only 20 cases were confirmed as benign on HPE and 3 cases turned out to be malignant. In case of malignant tumours, all the 5 (15.6%) cases diagnosed on FNAC as malignant were confirmed on HPE. 3 cases which were misdiagnosed on FNAC as benign came out to be malignant on HPE. Chronic sialadenitis was the most common non-neoplastic lesion whereas amongst benign tumours, pleomorphic adenoma was frequently encountered. Amongst the malignant group, mucoepidermoid carcinoma was the commonest lesion accounting for 50% of the total malignant lesions. **Conclusion-** Importance of careful clinical examination should not be ignored in salivary gland tumours as it is seen in our study that thorough clinical evaluation can aid in correct diagnosis in 84% cases. FNAC is an important diagnostic tool to clinch the correct diagnosis of salivary gland tumours with high accuracy rate. Though it has some limitations and pitfalls in differentiating certain lesions like pleomorphic adenoma from mucoepidermoid carcinoma and adenoid cystic carcinoma probably due to resemblance of histological patterns.

**KEYWORDS:** Benign, Malignant, Sialadenitis

## INTRODUCTION

There are three pairs of major salivary glands namely Parotid, Submandibular and Sublingual gland. In addition, there are hundreds of minor salivary glands situated in the mucosal lining of the upper aerodigestive tract. Salivary gland tumours had remained a matter of interest between medical profession, oral surgeons, pathologists and ENT specialists in particular because of a number of peculiarities like diverse histological forms and unpredictable clinical behaviour. Benign tumours of the salivary glands occur usually in the age group of 30 to 70 yrs and are 12 times more frequent in parotid than in

submandibular gland. Malignant tumours are more frequent in women than men. The lesions involving salivary gland are divided into two groups; non-neoplastic and neoplastic. The non-neoplastic lesions include acute sialadenitis, chronic sialadenitis, retention cyst, granulomatous sialadenitis and non specific reactive changes. The neoplastic lesions vary in behavior from totally benign to high grade malignancies. The benign lesions seen mostly are the pleomorphic adenoma, oncogenic adenoma, warthin's tumour, myoepithelioma and monomorphic adenoma. The commonest among them is the pleomorphic adenoma. The malignant cases

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most commonly seen are an adenoidcystic carcinoma, mucoepidermoid carcinoma, acinic cell tumour, carcinoma expleomorphic adenoma, adenocarcinoma and squamous cell carcinoma.

The most common submandibular gland pathologies include sialadenitis, sialolithiasis, pleomorphic adenoma, lymphoma and carcinomas. The prevalence of malignancy in submandibular gland varies from 33.3% to 78.2% in the western population which is higher than in the Asian population.<sup>1</sup> Minor salivary gland tumours are infrequent accounting for 10-15% of all salivary neoplasms.

Though the most accurate method of diagnosis is histopathology yet the importance of FNAC in the diagnosis of salivary gland masses is well documented and is significantly accurate. The most common source of diagnostic error is inadequate sampling since FNAC samples derive cells from only a small area. However, this can be minimized by experience and improved technique like resorting to multiple aspirates from different sites of the tumour and aspirating the residual swelling in cystic lesions after its collapse following initial aspiration.

Keeping into consideration the importance of clinical features in forming the impression about diagnosis, the role of FNAC in the diagnosis of the lesion and its accuracy vis a vis HPE, the present study is undertaken.

## MATERIAL AND METHODS

This study was conducted for a period of 1 year in the Department of ENT, Head & Neck Surgery, Government Medical College, Jammu. Patients attending the OPD with salivary gland lesions were assessed thoroughly clinically and 32 patients were admitted for further evaluation and management.

All the 32 patients included in the study were subjected to detailed history regarding the present pathology, including age, sex, personal history, past history of any salivary gland swelling, family history, socio-economic status, surgical history and drug history.

All the patients underwent complete ENT examination (including indirect laryngoscopy and posterior rhinoscopy), general physical examination and examination of salivary gland which included examination of the swelling regarding its size, shape, consistency, tenderness, fixity to underlying structures, overlying skin, involvement of the facial nerve and associated lymphadenopathy. All the routine investigations including complete haemogram, RFT's, LFT's, blood grouping were done. Some special investigations like CT scan, MRI and USG were done in relevant cases.

**FNAC-** After explaining the procedure and with due written consent, all the 32 patients were subjected to FNAC under the supervision of cytopathologists in the Department of Pathology, Government Medical College,

Jammu. As per the FNAC, surgical management was planned in all the 32 patients.

**Histopathological examination-** All the 32 patients underwent surgery under general anaesthesia. The surgical specimen obtained was fixed in 10% neutral buffered formalin and subjected to gross examination, processing, paraffin embedding, section cutting, staining by haematoxylin and eosin and mounting by DPX. The HPE of the stained sections was done by the cytopathologists. The FNAC and the histopathological examination of the same lesion were compared by the cytopathologists.

## OBSERVATIONS

The maximum no. of cases were seen in the age group of 31-45 yrs (46.8%). The youngest patient was of 13 yrs age and the eldest was of 70 yrs age. 22 (68.75%) cases were males while 10 (31.25%) cases were females with M:F ratio of 2.2:1. [Table 1]

Age in years	No. of cases	Percentage
0 - 15	2	6.25
16 - 30	7	21.8
31 - 45	15	46.87
46 - 60	5	15.6
61 - 75	3	9.37
<b>Total</b>	<b>32</b>	<b>100</b>

Table 1. Age wise distribution

Parotid gland was the most frequently involved salivary gland accounting for 87.5% (28 out of 32) of lesions followed by submandibular gland comprising 9.3% (3 out of 32). There was only one case involving minor salivary gland of the palate while no case of sublingual gland involvement was seen. [Table 2]

S.no	Site	No. of cases	Percentage
1	Parotid	28	87.5
2	Submandibular	3	9.31
3	Sublingual	-	-
4	Minor salivary gland	1	3.12
<b>Total</b>		<b>32</b>	<b>100</b>

Table 2. Percentage of location of different salivary gland lesions

Swelling was the chief complaint noticed in all 32 cases (100%). 5 (15.6%) patients gave the history of pain. In 1 (3.1%) case there was facial nerve involvement. 2 (6.2%) cases were having associated regional lymphadenopathy. In 4 (12.5%) cases, swelling was fixed to the underlying structures. [Table 3]

Clinical diagnosis was based on the clinical features. Presences of facial nerve palsy, fixity to skin/underlying structures, associated lymphadenopathy were taken as indicative of malignancy. 4 (12.5%) cases were diagnosed as non-neoplastic and rest of the cases was diagnosed as benign (78.1%). [Table 4]

Symptoms	No. of cases	Percentage
Swelling	32	100
Pain	5	15.6
Fever	0	0
Facial nerve involvement	1	3.1
Lymphadenopathy	2	6.2
Discharging Sinus/ fistula	0	0
Fixicity to skin/underlying structures	4	12.5

Table 3. Presenting symptoms

Clinical diagnosis	No. of cases	Percentage
Non neoplastic	4	12.5
Benign	25	78.1
Malignant	3	9.3
<b>Total</b>	<b>32</b>	<b>100</b>

Table 4. Clinical diagnosis of salivary gland lesions

On clinical examination, 4 cases were labelled as non-neoplastic, which were confirmed on FNAC but on HPE one case turned out to be Warthin's tumour. 25 cases were labeled as benign clinically, out of which 23 cases were confirmed on FNAC but on HPE 2 cases turned out to be malignant. 2 cases of mucoepidermoid carcinoma and 1 case of adenoid cystic carcinoma was misdiagnosed on FNAC as pleomorphic adenoma. One case of adenocarcinoma diagnosed on FNAC turned out to be mucoepidermoid carcinoma on HPE. [Table 5]

	Non neoplastic		Benign		Malignant	
	(n)	%age	(n)	%age	(n)	%age
<b>Clinical</b>	4	12.5%	25	78.1%	3	9.3%
<b>FNAC</b>	4	12.5%	23	71.8%	5	15.6%
<b>HPE</b>	3	9.3%	21	65.6%	8	25%

Table 5. Correlation of clinical, FNAC and histopathological diagnosis

On FNAC, out of 32 cases, 4 (12.5%) cases were diagnosed as chronic sialadenitis. In case of benign tumours, 22 (68.7%) cases were diagnosed as Pleomorphic adenoma and 1 (3.12%) case was diagnosed as Warthin's tumour. In case of malignant tumours 1 (3.12%) was each of Mucoepidermoid carcinoma, Acinic cell carcinoma, Adenoma carcinoma was diagnosed. 2 cases were diagnosed as Carcinoma expleomorphic adenoma. In 2 cases of chronic sialadenitis, the submandibular gland was involved and rest 2 cases were having the involvement of parotid gland. In 20 cases of Pleomorphic adenoma, the parotid gland was involved and in the rest of the 2 cases involvement of submandibular gland and minor salivary gland was seen. In the majority of other cases, the parotid gland was the site of involvement. On HPE, 3 (9.3%) cases were diagnosed as chronic sialadenitis (Non-Neoplastic Lesion). In case of benign tumours, 18 (56.25%) cases were diagnosed as Pleomorphic adenoma, 2 (6.25%) cases were diagnosed as Warthin's Tumour and 1

(3.12%) case was diagnosed as Hamartoma. In case of malignant tumours, 4 (12.5%) cases of Mucoepidermoid carcinoma, 1 (3.12%) case each of Acinic Cell Carcinoma and Adenoid cystic carcinoma was diagnosed and 2 cases were diagnosed as Carcinoma Expleomorphic Adenoma.

## DISCUSSION

The present study involves 32 cases of primary salivary gland tumours which reported in the Department of ENT, SMGS Hospital, Jammu during one year period.

**Age:** In the present study, salivary gland tumours were observed in all ages but the peak incidence was seen in all age group of 16-45 years which is consistent with findings of a study done earlier.<sup>2</sup> In the present study, the peak incidence of benign tumours was in the age group of 31-45 years and that of malignant tumours was in the age group of 16-30 years.

**Sex:** There was a male predominance 22(68.7%) over female 10(31.3%) patients with M:F ratio of 2.2:1. The results of our study are comparable with other studies.<sup>3-5</sup>

**Site:** The frequency of salivary gland tumours in parotid, submandibular and minor salivary gland in the present study was 87.5%, 9.3% and 3.12% respectively. The result of our study is more or less in agreement with the majority of studies. Parotid gland is the most common site involved in our study also.<sup>6,7</sup>

**Clinical Presentation:** In all cases, the history of gradually enlarging palpable masses of variable duration was noted with the majority of cases showing a duration of 6 months to 5 years. Mass was firm in most cases (84%). In the present study, facial nerve involvement was seen in only 1(3.12%) case. Fixity to the underlying structures or skin was appreciated in 4(12.5%) cases. Lymphadenopathy was seen in 2(6.2%) cases. Our findings are consistent with a study in which they noticed a history of a long standing mass in patient with parotid tumours. He mentioned facial nerve paralysis as an ominous sign and pain to be suggestive of a serious type of lesion.<sup>8</sup> As noticed in our study, pain, cervical lymph node metastasis, facial nerve palsy and fixity to underlying structures were noticed in a few cases of adenoid cystic carcinoma and adenocarcinoma.<sup>9,10</sup>

**Clinical diagnosis:** Based on clinical findings, clinical diagnosis was made in all 32 cases and impression recorder was that incidence of non-neoplastic and benign lesions were higher (99.7%) than malignant ones (9.3%). The ratio of benign to malignant lesions was 9.6:1 and when compared with histopathological examination afterwards following surgery.

**Comparison of FNAC with Histopathology:** In the present study all 32 cases who underwent FNAC of the swelling, 4 (12.5%) cases were diagnosed as non-neoplastic, 23 (71.8%) as benign and 5 (15.6%) were malignant. All the cases were subjected to HPE of the specimens after surgery. Hence, correlation of FNAC and HPE was available in all the 32 cases. 29 cases were

correctly diagnosed by FNAC out of which 24 cases were benign and 5 cases were malignant.

In case of benign & non-neoplastic cases, 27 (84.3%) cases were diagnosed on FNAC and 24 of these were correctly diagnosed. Our findings are consistent with a study in which they reported 122 cases as benign out of total 146 cases. Out of 122 cases, 199 cases were correctly diagnosed giving an accuracy of 98%.<sup>11</sup> Among the Non-neoplastic lesions, chronic sialadenitis noted in 4 cases (12.5%) on FNAC. Out of the 4 cases, 3 cases were confirmed on HPE (75%) one case turned out to be Warthin's tumour on HPE of the specimen. Pleomorphic adenoma comprised the most frequent benign tumour in 22 cases (68.7%) on FNAC, mostly encountered in parotid gland and out of these 22 cases, only 18 cases were confirmed on HPE (81.8%) and 3 cases turned out to be malignant. These findings are consistent with other studies.<sup>12,7,2</sup>

One case of Warthin's tumour was diagnosed on FNAC and was confirmed on HPE. However, a study reported 33 cases of Warthin's tumour on FNAC out of which only 19 cases were confirmed on HPE showing a low accuracy rate FNAC for diagnoses of Warthin's tumour.<sup>12</sup>

2 cases diagnosed as pleomorphic adenoma on FNAC in a 20yr old female and a 30yrs old male turned out to be mucoepidermoid carcinoma on HPE. Similar finding was reported earlier in which 3 out of 4 lesions were misdiagnosed as pleomorphic adenoma.<sup>13</sup> Reason attributed was that the mucoepidermoid carcinoma is probably the most difficult to diagnose accurately by FNAC.

One case diagnosed as pleomorphic adenoma in a 25yrs old female patient turned out to be Adenoid cystic carcinoma on HPE. Reason being the distinction between pleomorphic adenoma and adenoid cystic carcinoma on FNAC may be difficult on account of several features-myxoid acellular material may be found in both and hyaline globules characteristic of adenoid cystic carcinoma may also be seen in pleomorphic adenoma.<sup>2</sup>

In case of malignant tumours, 5 (15.6%) cases were diagnosed on FNAC and all the 5 cases were confirmed to be malignant giving an accuracy rate of 100% which is exactly consistent with a study in which they diagnosed 24 cases of malignant tumours and all were confirmed on HPE giving an accuracy rate of 100%.<sup>11</sup> A single case of mucoepidermoid carcinoma was diagnosed on FNAC and was confirmed on HPE. In our study, acinic cell carcinoma accounted for 1 case (out of 32) on FNAC, which was confirmed with histopathological examination.

## CONCLUSION

The peak incidence of salivary gland tumours was seen in the age group of 16-45 years. Majority of benign lesions were seen in the age group of 31-45 years and that of malignant tumours was in the age group of 16-30 years. There was a male predominance over the female with

M:F ratio of 2.2:1. Site most frequently involved was parotid gland (87.5%) followed by submandibular gland (9.3%). All these cases presented with a palpable mass. Pain was experienced by 5 (15.6%) patients, facial nerve involvement was seen in 1 (3.1%) case, lymphadenopathy was seen in 2 (6.2%) cases and fixity to skin/underlying structures was seen in 4 (12.5%) cases. Based on these clinical features, clinical diagnosis was made according to which 4 cases (12.5%) were labelled as non-neoplastic, 25 (78.1%) cases as benign and 3 cases (9.3%) as malignant lesions. On FNAC, 23 cases (71.8%) were diagnosed as benign and 5 cases (15.6%) as malignant tumours. Out of 23 cases diagnosed as benign on FNAC, only 20 cases were confirmed as benign on HPE and 3 cases turned out to be malignant. In case of malignant tumours, all the 5 (15.6%) cases diagnosed on FNAC as malignant were confirmed on HPE. 3 cases which were misdiagnosed on FNAC as benign came out to be malignant on HPE. Chronic sialadenitis was the most common non-neoplastic lesion whereas, amongst benign tumours, pleomorphic adenoma was frequently encountered. Amongst the malignant group, mucoepidermoid carcinoma was the commonest lesion accounting for 50% of the total malignant lesions.

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