

## A cytological and histological comparative study of salivary gland lesions at tertiary health care centre

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### Abstract

**Aim/Objective:** The objective of this study was to evaluate the diagnostic accuracy of FNAC in various salivary gland lesions and its correlation with histopathology, which helps in the appropriate management of the patient.

**Materials and Methods:** A total of 120 FNA were performed on salivary gland lesion from September 2013 to October 2014 at department of pathology in tertiary health care centre. Surgically resected, formalin fixed specimen were received, they were processed and slides were prepared. The cytological and histopathological stained slides were studied, analysed and correlated clinically.

**Results:** The cytological features of 120 cases were studied and following lesions were observed in FNAC study of 120 cases: Pleomorphic adenoma were in 76, chronic sialadenitis in 16, Warthin's tumour in 4, Cystic lesion in 5, Mucoepidermoid carcinoma in 6, Acinic cell carcinoma in 3, Carcinoma EX pleomorphic adenoma in 3, metastatic deposits in 2, benign parotid tumour in 2 and malignant tumour (unspecified) in 2, Neuroblastoma in 1. Out of 120 cases histopathologies of 87 cases were available and out of which 75 cases were correlated in both cytology and histology. The sensitivity, specificity and diagnostic accuracy, positive predictive value, negative predictive value of present study is 89.29%, 91.67%, 86.21%, 96.15% and 78.57% respectively.

**Conclusion:** FNAC of the salivary gland is a safe and reliable technique in the primary diagnosis of salivary gland lesions. FNAC of the salivary gland tumours has a high diagnostic accuracy, though rate of characterization of specific type of tumor is lower, due to variable cytomorphology. In such cases, histopathological examination may prove to be accurate for diagnosis. This study documents that FNAC of the salivary gland tumours is accurate, simple, rapid and cost-effective for the patient.

**Keywords:** salivary gland lesion, FNAC, sensitivity, specificity, diagnostic accuracy

### 1. Introduction

Fine needle aspiration cytology (FNAC) is accurate, simple, and cost-effective for the patient. Salivary gland tumours are rare and they account for only 2-6.5% of all the head and neck tumours, their superficial location, easy accessibility and high diagnostic accuracy makes FNAC a popular method for evaluation. Among the entire salivary gland lesion, 64-80% occur in the parotid glands, 7-11% occur in the sub-mandibular, less than 1% occur in the sublingual and 9-23% occur in the minor salivary glands<sup>9</sup>. A review of the various recent studies shows that the diagnostic sensitivity of FNAC varied from 81-100%, that the specificity varied from 94-100% and that the diagnostic accuracy varied from 61-

80% [13-17]. Hence, FNAC proves to be simple and accurate method for diagnosis and thus appropriate therapeutic management could be planned earlier. Hence, the current study was done to know the diagnostic accuracy, sensitivity, specificity of FNAC in diagnosing salivary gland lesion which helps in appropriate therapeutic management.

### 2. Materials and Methods

Informed consent was taken from patient, then swelling was palpated and fixed, under aseptic precautions, a 10 cc syringe with a 23 gauge needle was introduced into the nodule. The material was aspirated and smeared onto clean glass slides. The

methanol fixed smears were stained with Pap (papanicolau), H&E (haematoxylin and eosin) and MGG (May Grunwald’s Giemsa) respectively. In histopathology, surgically resected and formalin fixed specimens were received, processed and stained with H&E (haematoxylin and eosin) for histopathological examination. The cytological and Histopathological stained slides were studied, analysed and were correlated clinically.

### 3. Result

FNA was performed on 120 patients with palpable swelling on salivary gland. Among these, histopathological correlations were available for 87 cases. All the cases occurred in the age group of 10-80 years. Most common age of presentation was 2<sup>nd</sup> to 3<sup>rd</sup> decade. Male to female ratio of lesion was 1.5:1, as shown in table 3.1. The number of cases which were seen in the parotid gland were 93 (77.5%), in sub-mandibular gland were 13(10.5%) and in minor salivary gland were 14(12%). There were 103(85.8%) benign lesions and 17(14.2%) malignant lesions. The most common gland involved was parotid gland. On FNA Out of the 120 cases, 76(63.33%) were pleomorphic adenomas, 16(13.3%) were of chronic sialadenitis, 4(3.33%) were Warthin’s tumours, 6(5.00%) were mucoepidermoid carcinomas, 3(2.5%) were acinic cell carcinomas, 3(2.50%) were carcinoma ex pleomorphic adenomas, 2(1.7%) were metastatic deposits, 2(1.7%) were benign parotid tumours, 5(4.16%) were cystic lesions and 2(1.70%) were malignant tumours (unclassified), 1(0.83%) was of neuroblastoma. pleomorphic adenoma was the most common benign lesion were as mucoepidermoid carcinoma was the most common malignant lesion, as shown in table 3.2. Out of 120 cases histological correlation was available for 87 cases; remaining 33 cases had only cytological diagnosis.

On histological examination out of 76 cases of pleomorphic adenoma, histology of 70 cases were available in which 58 cases were diagnosed pleomorphic adenoma, 3 were basal cell adenoma, 2 were myoepithelioma, 4 were warthim’s tumor, 1 was mucoepidermoid carcinoma and 2 were of sialadenosis, as shown in table 3.3. Out of 4 cases of warthim’s tumor 2 were coordinated histologically were as of other 2 cases histology was not available. 2 cases of benign parotid tumor were diagnosed as pleomorphic adenoma on histology. Out of 5 cases of cystic lesion histology of 3 were available out of which 2 was diagnosed as mucocele and 1 as benign lymphoepithelial cyst. Out of 3 cases of carcinoma Ex pleomorphic adenoma, histology of 2 cases was available that was diagnosed as mucoepidermoid

carcinoma. Amongst 6 cases of mucoepidermoid carcinoma 2 were coordinated histologically, whereas remaining 4 case of histology was not available. Amongst 3 cases of acinic cell carcinoma 2 were coordinated histologically remaining 1 case histology was not available. 2 cases of metastatic deposit were coordinated histologically. 1 case of neuroblastoma was coordinated histologically. Out of 2 cases of unclassified malignancy histology of 1 cases was available that was diagnosed as Infiltrating salivary duct carcinoma whereas histology of 1 case was not available, as shown in table 3.4-3.5. The sensitivity, specificity and diagnostic accuracy, positive predictive value, negative predictive value of present study is 89.29%, 91.67%, 86.21%, 96.15% and 78.57% respectively.

**Table 3.1: Correlation of Age and Sex of salivary gland lesion**

Age	Sex (No. of cases)		Total Cases
	Male	Female	
0-9	01	00	01
10-19	09	06	15
20-29	24	12	36
30-39	12	10	22
40-49	06	09	15
50-59	10	07	17
60-69	07	04	11
70-79	02	00	2
80-89	01	00	1
<b>Total</b>	<b>72</b>	<b>48</b>	<b>120</b>

**Table 3.2: Cases diagnosed on FNAC**

Lesion	No. of cases	Percentage
<b>BENIGN LESION</b>		
Pleomorphic adenoma	76	63.33%
Chronic sialadenitis	16	13.33%
Benign parotid tumor	2	1.70%
Warthim’s tumor	4	3.33%
Cystic lesion	5	4.16%
Total benign lesion	103	85.83%
<b>MALIGNANT LESION</b>		
Mucoepidermoid carcinoma	6	5.00%
Acinic cell carcinoma	3	2.50%
Carcinoma ex pleomorphic adenoma	3	2.50%
Metastatic deposit	2	1.70%
Malignant unclassified	2	1.70%
Neuroblastoma	1	0.83%
Total malignant lesion	17	14.16%
<b>Total</b>	<b>120</b>	<b>100%</b>

**Table 3.3:- Cases diagnosed on Histology**

Lesion	No. of cases	Percentage
<b>BENIGN LESION</b>		
Pleomorphic adenoma	60	68.18%
Sialadenosis	2	2.27%
Basal cell adenoma	3	3.41%
Warthim's tumor	6	6.81%
Benign lymphoepithelial cyst	1	1.13
Mucocele	2	2.27%
Total benign lesion	74	85.05%
<b>MALIGNANT LESION</b>		
Mucoepidermoid carcinoma	5	5.68%
Acinic cell carcinoma	2	2.27%
Myoepithelioma	2	2.27%
Infiltrating salivary duct carcinoma	1	1.13%
Metastatic deposit	2	2.27%
Neuroblastoma	1	1.13%
Total malignant lesion	13	14.94%
<b>Total</b>	<b>87</b>	<b>100%</b>

**Table 3.4: Cytohistological correlation of benign salivary gland lesion**

Cytology	No. of cases	Histology		
		Histology correlated	Histology not correlated	Histology not available
Pleomorphic adenoma	76	58	12	6
Chronic sialadenitis	16	-	-	16
Benign parotid tumor	2	2	-	-
Warthim's tumor	4	2	-	2
Cystic lesion	5	3	-	2
<b>Total</b>	<b>103</b>	<b>65</b>	<b>12</b>	<b>26</b>

**Table 3.5:- Cytohistological correlation of malignant salivary gland lesion**

Cytology	No. of cases	Histology		
		Histology correlated	Histology not correlated	Histology not available
Mucoepidermoid carcinoma	6	2	-	4
Acinic cell carcinoma	3	2	-	1
Metastatic deposit	2	2	-	-
Carcinoma ex-pleomorphic adenoma	3	2	-	1
Neuroblastoma	1	1	-	-
Malignant (unclassified)	2	1	-	1
<b>Total</b>	<b>17</b>	<b>10</b>	<b>-</b>	<b>7</b>

#### 4. Discussion

FNAC has been proved as an important diagnostic tool in the diagnosis of salivary gland lesions, due to its safe procedure, cost-effectiveness,

lower rate of complication to the patient and aid to clinician in therapeutic management[1].

Majority of the lesion occurred during the age interval of 09-89 years, with M: F ratio is 1.5:1, with most common age of presentation being 2<sup>nd</sup> to 3<sup>rd</sup> decade of life[2]. The most common presenting complain was painless, progressive swelling. In present study among all the salivary gland lesion, 77.5% occur in parotid gland, 10.5% occur in sub-mandibular gland, and 12% occur in minor salivary gland<sup>9</sup>. Parotid gland is the most common salivary gland involved[9].

The rate of benign lesion in this study is 85%, in concordance with other studies ranging from 43% to 89%[3-5]. The rate of occurrence of malignant lesion in this study is 14%, in relation with other studies that reported the occurrence of malignant lesion between 14% - 35%[6]. The most common benign lesion reported in present study is pleomorphic adenoma that was correlated with various other previously reported studies[3-5]. 78.94% of the cases of pleomorphic adenoma were correlated histologically and cytologically. One of the common non-neoplastic lesion was chronic sialadenitis followed by benign cystic lesion and warthims tumor, most of the non-neoplastic lesions involves submandibular gland[8]. Whereas mucoepidermoid carcinoma is the most common malignant lesion reported in this study that is correlated with Nguansangiam *et al*[5]. Diagnosis of low grade mucoepidermoid carcinoma requires histology for confirmation as it may be misdiagnosed as chronic sialadenitis, Warthin's tumor and pleomorphic adenoma as observed in the present study<sup>7</sup>. In present study benign lesion were relatively more common than malignant lesion as correlated with various other studies[10-12].

The sensitivity, specificity and diagnostic accuracy, positive predictive value, negative predictive value of present study is 89.29%, 91.67%, 86.21%, 96.15% and 78.57% respectively that is correlated with various other previously reported studies[13-17]. It is shown in table 4.1

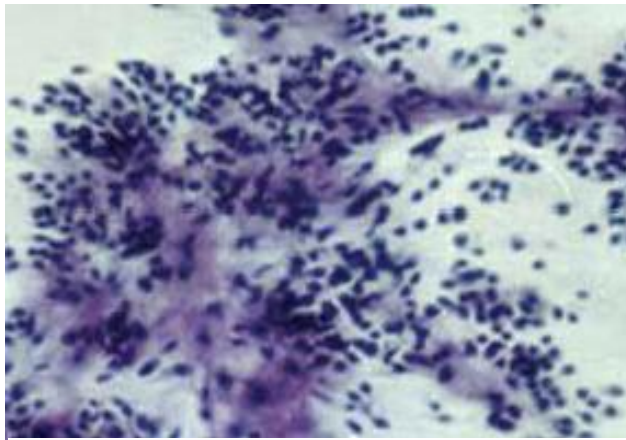
**Table 4.1: Cytohistological correlation of present study with other studies**

	No. of cases	Sensitivity	Specificity	Diagnostic accuracy
Jayaram [13]	53	90%	95%	73.6%
Piccioni [17]	176	81%	99%	97%
Stow [14]	104	86.95%	92.3%	92.3%
Lukas [16]	107	89.2%	85%	97.2%
Rehman [15]	50	78%	53.28%	88.57%
Present study	120	89.29%	91.67%	86.21%

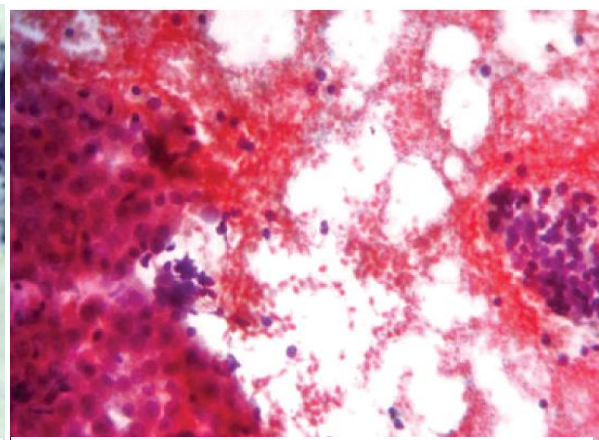
## 5. Conclusion

FNAC continues to be a reliable diagnostic technique. FNAC of the salivary gland tumours is advantageous both for the patients and the clinicians because of its quick results, accuracy, cost-effectiveness, and lack of complications to the

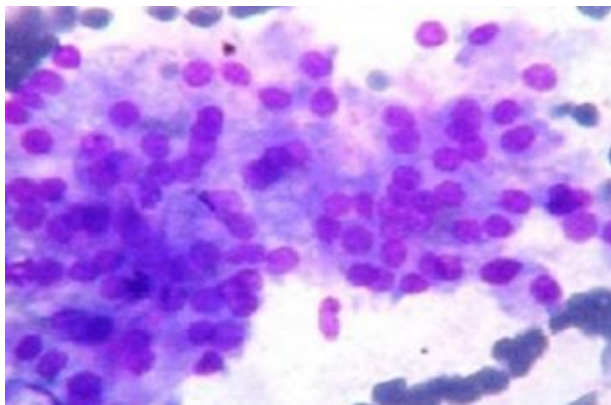
patient. FNAC of the salivary gland lesions is highly accurate, sensitive and specific though the rate of characterization of specific type of tumor is lower, due to variable cytomorphology. In such cases, histopathological examination may be used for accurate diagnosis.



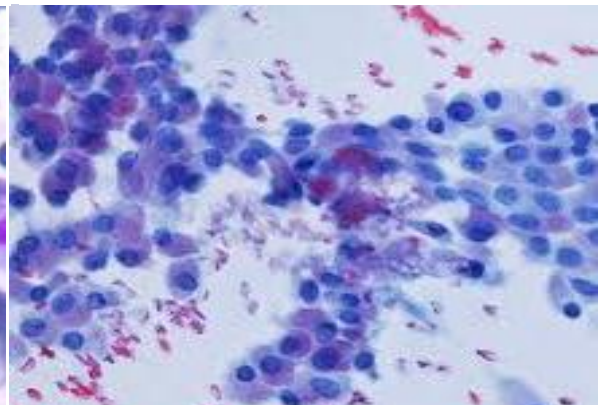
**Figure 1: Myxoid stromal tissue with admixed epithelial cells in pleomorphic adenoma (Pap stain 40X)**



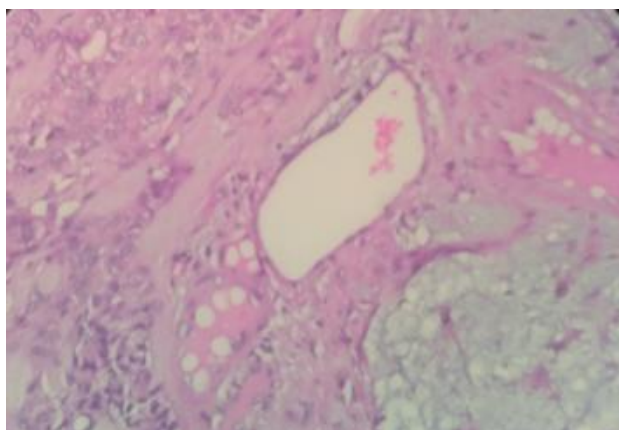
**Figure 2: Cytomorphology of Warthin's tumour showing cluster of oxyphilic cells and scattered lymphocytes. (Pap stain 40X)**



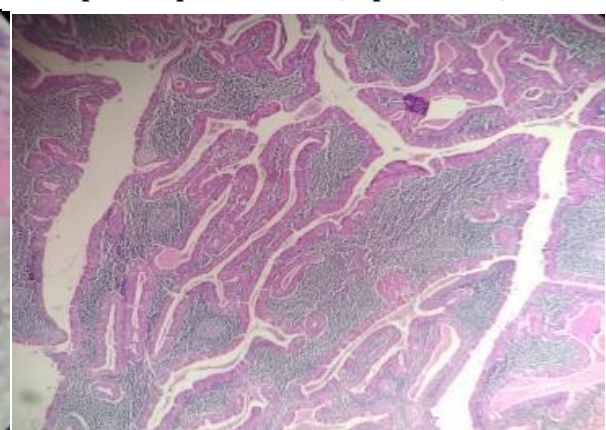
**Figure 3: Cytomorphology of mucoepidermoid Carcinoma showing intermediate cells with Abundant vacuolated cytoplasm. (Pap stain 40X)**



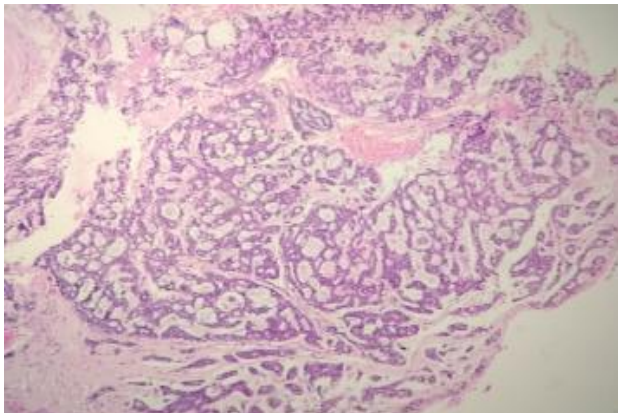
**Figure 4: Cytomorphology of salivary gland carcinoma showing loosely cohesive cluster of malignant cells with abundant cytoplasm and pleomorphic nucleoli. (Pap stain 40X)**



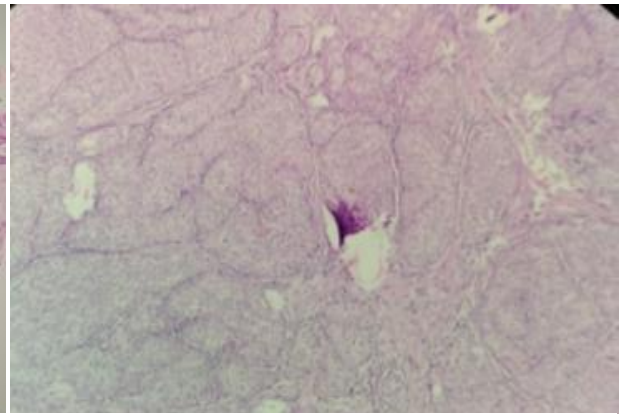
**Figure 5: Histology of Pleomorphic Adenoma Regional variation in cellularity chondromyxoid matrix. (H&E stain 40X)**



**Figure 6: Histology of Warthin's Tumour, the epithelium is tall and oxyphilic. The stroma beneath contains monotonous dense Inflammatory infiltrate. (H&E stain 10X)**



**Figure 7: Histology Adenoid cystic Carcinoma The figure typically shows cribriform pattern and sclerotic stroma (H&E stain 10X)**



**Figure 8: Histology Mucoepidermoid carcinoma the figure shows mucin filled cystic structure with significant tumour component and abundant mucous cells. (H&E stain 10X)**

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