



## Original Research Article

# A study of cytology and histopathology correlation of salivary gland neoplasms in a tertiary care hospital

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## ABSTRACT

**Introduction:** FNAC is a minimally invasive technique which is additionally also safe and reliable. It plays a significant role in salivary gland cytology in view of the nonuniformity of salivary gland neoplasms and therefore the limitations of incisional or core needle biopsy in salivary gland.<sup>1</sup> This study aims at the important role of FNAC in the preoperative diagnosis of salivary gland neoplasm.

**Materials and Methods:** This study was done in Saveetha Medical College, Thandalam in 40 patients. The period of study was from January 2016 to December 2017. A total of forty cases of salivary gland tumors for which both FNAC and Biopsy were accessible were solely included during this study.

**Results:** Out of forty patients slight male predominance was noted with male: female ratio of 1.5:1. Most of the tumour were found to be in the parotid gland (31 cases) followed by submandibular gland (6 cases). Out of forty cases, twenty eight were benign and twelve were malignant. Out of twelve malignant cases, nine cases (75%) reported in cytology correlated well with histopathology.

**Conclusion:** FNAC are often a great tool in reducing the rate of salivary gland surgery by one third of cases and in patients undergoing radical surgery. FNAC helps in coming up with an ideal surgical approach.

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## 1. Introduction

Salivary gland is an organ of nonuniformity in cytopathology making marked limitations in cytological diagnosis. Among the head and neck lesions, the incidence of salivary gland lesion is 2 to 6.5%.<sup>2,3</sup> Salivary gland tumours are not so common and majority of them occur in parotid followed by minor salivary glands.

FNAC is a minimally invasive method which is also safe and reliable.<sup>4</sup> As the major salivary glands are superficially located it is easy to do the FNAC technique.<sup>2,5</sup> The main aspect of FNA of salivary gland lesions is to assist the clinician in patient management. Cytology helps in assessing whether the process is salivary or non salivary and if neoplastic whether it is benign or malignant.<sup>6,7</sup>

Clinicopathological correlation is mandatory for a preoperative assessment for patient management to utilize

the utmost benefits of cytological diagnosis. The histological complexity and morphological variability is reflected in cytological material.<sup>8,9</sup> FNA reduces the rate of salivary gland surgery by more than 50%. It aids in counseling of patients before surgery.<sup>1</sup>

## 2. Materials and Methods

This study was done in Saveetha Medical College, Thandalam, in the department of pathology in 40 cases during a period of two years from January 2016 to December 2017. For all the cases both FNAC and Biopsy were available. In every case sex, site of lesion, and clinical diagnosis were noted down. FNAC slides were routinely stained with Hematoxylin and eosin stain and Papanicolaou stain. For histopathological examination we used Hematoxylin and eosin Stain. The cytological diagnosis was then correlated with the histological diagnosis.

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### 3. Results

In our study out of 40 patients, the male: female ratio was 1.5:1 and the mean age was 46.8 yrs. The mean age for benign lesion was 34.3 years while for malignant neoplasms, it was 51.2 years.

P arotid gland was the commonest site of involvement seen in 31 cases followed by submandibular gland (6 cases). In the parotid gland out of 31 cases, 22 cases were benign lesions and 9 cases were malignant lesions. Two cases were located in the minor salivary gland with one case being pleomorphic adenoma in the parapharyngeal region and the other one was mucoepidermoid carcinoma in the left hard palate. Common site of salivary gland tumour presentation are depicted in Table 1.

#### 3.1. Cytological diagnosis of salivary gland lesions:

Out of 40 cases, 30 cases (75%) were reported as benign and 10 cases (25%) as malignant lesions in the cytology. Among the 30 benign cases, pleomorphic adenoma was the most common lesion seen in 26 cases accounting for 65% (Figure 1) followed by 2 cases each of basal cell adenoma (Figure 2) and Warthins tumour (Figure 3). The common malignant neoplasm was mucoepidermoid carcinoma seen in 5 cases accounting for 12.5% (Figure 4) followed by 3 cases (7.5%) of adenoid cystic carcinoma (Figure 5) and two cases were reported as positive for malignancy which were reported as Salivary duct carcinoma and Carcinoma Ex Pleomorphic adenoma in histopathology. The cytological diagnosis of 40 cases is depicted in Table 2.

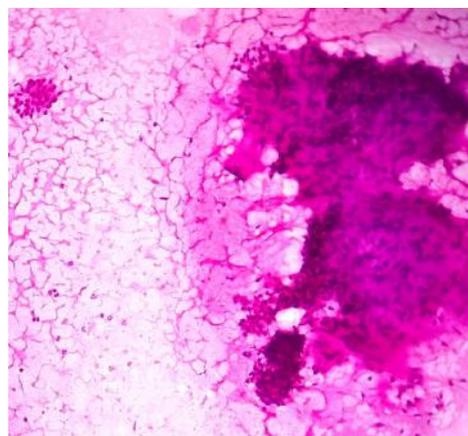
#### 3.2. Histopathological diagnosis of salivary gland lesions:

For all the 40 cases, histopathological examination was done and out of 40 cases, 28 cases (70%) were benign lesions and 12 cases (30%) were malignant lesions. Among the benign cases, the most common benign tumour was pleomorphic adenoma reported in 22 cases, of which 16 cases were seen in parotid region, 5 cases seen in submandibular region and one case in parapharyngeal region. Other benign neoplasms reported were three cases each of basal cell adenoma (Figure 2) and Warthins tumour (Figure 3); both were seen in parotid region. Among the malignant neoplasms, mucoepidermoid carcinoma was the commonly reported tumour seen in 6 cases accounting for 15%. Other malignant lesions were Adenoid cystic carcinoma (4 cases), Salivary duct carcinoma (1 case) and Carcinoma ex Pleomorphic adenoma (1 case). One case of mucoepidermoid carcinoma was reported in the left hard palate.

#### 3.3. Cytohistological correlation of Salivary gland neoplasms

With histopathological examination as gold standard, the cytological diagnosis was correlated with histological diagnosis. Out of 28 benign cases, cytology diagnosis of 23 cases was consistent with the histological diagnosis. In the present study out of 22 cases of Pleomorphic adenoma, 20 cases correlated well in the histopathology, whereas 1 case of cellular pleomorphic adenoma was reported in cytology as basal cell adenoma due to absence of chondromyxoid stroma and another one cytologically misdiagnosed as Mucoepidermoid carcinoma due to extensive areas of chondromyxoid stroma. Out of 12 malignant cases, the cytological diagnosis of 9 cases was consistent with histopathological diagnosis.

The overall cytohistocorrelation was found to be 80%. For benign tumours the correlation was 82% and for malignant tumours 75%. The maximum correlation was for Pleomorphic adenoma accounting for 90.9%. Cytohistological correlation of Salivary gland neoplasms was shown in Table 3.



**Fig. 1:** FNAC of Pleomorphic adenoma (400X, H & E Stain). Smear shows clusters of benign salivary ductal epithelial cells and chondromyxoid stroma

### 4. Discussion

FNAC is an easy and less invasive method which helps in determining the nature of the salivary gland lesions, still histopathological examination is the gold standard.<sup>10</sup> The cytology diagnosis also helps in planning for the surgery.<sup>11–13</sup>

In our study salivary gland neoplasms were found to be common among 18 to 65 years with a mean age of 46.8 yrs. According to a study done by Jain et al<sup>13</sup> & Arjun Singh et al<sup>14</sup> the mean age was 35.3 and 34.6 years. The male: female ratio in the present study was found to be 1.5:1 which is comparable to the study of Sneha et al,<sup>12</sup> Anitha et

**Table 1:** Common sites of salivary gland tumour presentation

Site	List of Tumours	Frequency	Percentage
Parotid	Pleomorphic adenoma	16	77.5
	Monomorphic adenoma	3	
	Warthins tumour	3	
	Mucoepidermoid carcinoma	4	
	Adenoid cystic carcinoma	3	
	Salivary duct carcinoma	1	
	Carcinoma ex pleomorphic adenoma	1	
Submandibular	Pleomorphic adenoma	5	17.5
	Adenoid cystic carcinoma	2	
Parapharyngeal	Pleomorphic adenoma	1	2.5
Left hard palate	Mucoepidermoid carcinoma	1	2.5

**Table 2:** Cytological diagnosis in 40 cases

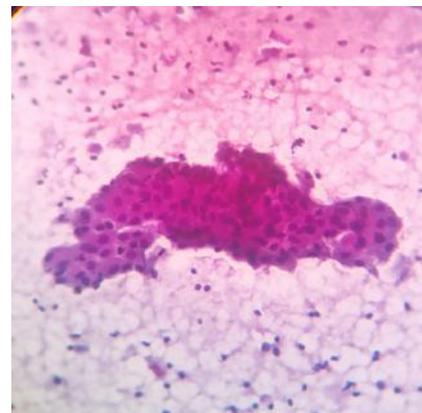
Cytological Diagnosis	No. of cases	Pertentage
Benign	30	75
Pleomorphic Adenoma	26	65
Basal cell adenoma	2	5
Warthin's tumour	2	5
Malignant	10	25
Mucoepidermoid carcinoma	5	12.5
Adenoid cystic carcinoma	3	7.5
Positive for malignancy	2	5
Total	40	100

**Table 3:** Histological diagnosis in 40 cases

S. No	Lesions	Histopathology	Percentage
1	Pleomorphic Adenoma	22	55
2	Basal cell adenoma	3	7.5
3	Warthin's tumour	3	7.5
4	Mucoepidermoid carcinoma	6	15
5	Adenoid cystic carcinoma	4	10
6	Salivary duct carcinoma	1	2.5
7	Carcinoma ex pleomorphic adenoma	1	2.5
	Total	40	100



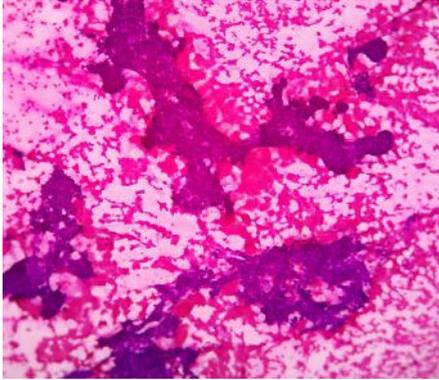
**Fig. 2:** FNAC of Basal cell adenoma (40X, H & E Stain). Smear shows basoloid cells arranged in clusters and monolayered sheets with back ground showing basement membrane like material.



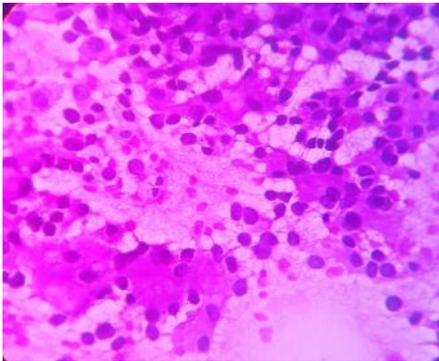
**Fig. 3:** FNAC of Warthins tumour (400X, PAP Stain). Smear shows monolayered sheets of oncocytic cells in a background of scattered lymphocytes

**Table 4:** Cytohistological correlation of Salivary gland neoplasms

HPE Diagnosis	No of cases	Cytological diagnosis					No of cases	% Correlation
		Pleomorphic adenoma	Monomorphic adenoma	Warthins tumour	Mucoepidermoid carcinoma	Adenoid cystic carcinoma		
Pleomorphic adenoma	22	20	1	-	1	-	20	90.9
Monomorphic adenoma	3	2	1	-	-	-	1	33.3
Warthins tumour	3	1	-	2	-	-	2	66.6
Mucoepidermoid carcinoma	6	2	-	-	4	-	4	80
Adenoid cystic carcinoma	4	2	-	-	-	3	3	60
Salivary duct carcinoma	1	-	-	-	-	-	1	100
Carcinoma ex pleomorphic adenoma	1	-	-	-	-	-	1	100
Total cases	40	26	2	2	5	3	32	80



**Fig. 4:** FNAC of Mucoepidermoid carcinoma (100X, H & E Stain). Smear shows monolayered sheets of pleomorphic hyperchromatic cells seen in a background of mucous and hemorrhagic material



**Fig. 5:** FNAC of Adenoid cystic carcinoma (400X, H & E Stain). Smear shows hyaline globules surrounded by tumour cells with uniform round to oval nuclei

al<sup>15</sup> and Arjun Singh et al.<sup>14</sup>

The present study has observed Mucoepidermoid carcinoma as the most common malignant tumour which is comparable with the previous studies done by Jain et al<sup>13</sup> and Anitha Omhare et al.<sup>15</sup> Whereas, Arjun Singh et al<sup>14</sup> has found the Adenoid cystic carcinoma as the most common malignant tumour. In the present study the malignant tumours constitutes 30% whereas according to the study done by Arjun Singh et al it was 21.66%.

According to study done by Aruna et al<sup>2</sup> Pleomorphic adenoma was the common benign tumour like the present study and Adenoid cystic carcinoma was the most common malignant tumour unlike the present study where Mucoepidermoid carcinoma was the most common malignant tumour.

The diagnostic accuracy in the present study was observed to be 80%, whereas according to Sneha et al<sup>12</sup> it was 94.87% and Anitha Omhare et al<sup>15</sup> has observed 93.3% for benign and 88.2 % for malignant tumours.

In the present study out of 22 cases of Pleomorphic adenoma, 1 case of cellular pleomorphic adenoma was

reported in cytology as basal cell adenoma due to absence of chondromyxoid stroma and another one cytologically misdiagnosed as Mucoepidermoid carcinoma due to extensive areas of chondromyxoid stroma. Similarly one case of Mucoepidermoid carcinoma and 1 case of adenoid cystic carcinoma, were reported as pleomorphic adenoma in cytology since the mucinous and hyaline material were misinterpreted as chondromyxoid stroma.

## 5. Conclusion

FNAC can be a useful tool in reducing the rate of salivary gland surgery by one third of cases and in patients undergoing radical surgery. FNAC helps in planning a perfect surgical approach. To conclude the accuracy of FNA in neoplasm is almost 80% and much better for benign than for malignant neoplasms.

## 6. Source of funding

None.

## 7. Conflicts of interest

No potential conflict of interest, relevant to this article has been reported.

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