

# Fine Needle Aspiration Cytology of Salivary Gland Lesions: A Study in A Tertiary Care Hospital

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## ABSTRACT

**Introduction:** Fine needle aspiration cytology (FNAC) of suspected salivary gland lesions has an established role in preoperative diagnosis and management of patients. It has acquired an edge over incisional biopsy and frozen section. The present study was conducted to evaluate the spectrum of salivary gland lesions in our setting and to compare cytology with histopathological findings.

**Material and methods:** This retrospective study was carried out for 4 years from January 2016 to December 2020 on salivary gland swelling reporting in the Department of Pathology, RIMS Raichur. A total of 100 cases of salivary gland swelling were included. All patients were clinically evaluated. The cases were retrieved from register of cytology division. FNAC was performed. Histopathological correlation was done wherever available and possible. The data collected was analysed statistically using descriptive statistics.

**Results:** In the present series total 126 cases were studied out of which 67 were males and 59 were females. The maximum number of cases were in the age group 21 to 50 years. with overall male to female ratio was 1.3:1. The most common site of involvement was the parotid gland with a frequency of 76.66%-(92/120) followed by submandibular gland 20%(24/120) and minor salivary gland 3.33%(4/120) where as no case of sublingual salivary gland lesion was observed in the present study. Benign tumours accounted for 53.26%(64/120), followed by non neoplastic lesions 33.32% (40/120) and 13.32%(16/120) malignant tumours. Acute sialadenitis was the most common non neoplastic lesion (50%, 20/40) followed by chronic sialadenitis (35% 14/40) and benign cystic lesion 15% (16/40). Among benign tumors pleomorphic adenoma was the most common neoplasm (62, 96.87 %) followed by warthin's tumor.mucoepidermoid carcinoma was the most common malignant lesion (50%, 8/16) followed by adenoid cystic carcinoma (4/16, 31.25%) and acinic cell carcinoma.

**Conclusion:** The present study concluded that Fine-needle aspiration is useful for clinical management of patients with salivary gland lesions. FNAC can be used preoperatively to avoid unnecessary surgery and discomfort associated with open biopsy.

**Keywords:** FNAC Samples, Benign, Malignant, Non-Neoplastic Lesion, Inflammatory, Histopathology.

## INTRODUCTION

Salivary glands are exocrine organs responsible for production and secretion of saliva and consist of the parotid, submandibular, sublingual, and the minor glands that are numerous and widely distributed throughout the mouth and oropharynx. Salivary glands neoplasms account for 6% of all head and neck tumors.<sup>1</sup> Fine needle aspiration cytology

(FNAC) of suspected salivary gland lesions has now been accepted as an excellent, though challenging, primary method in preoperative diagnosis and management of patients. It has acquired an edge over incisional biopsy and frozen section.<sup>2</sup> A stepwise approach has been recommended to the cytological diagnosis of salivary gland lesions. Firstly, one has to decide whether the lesion is of salivary gland origin or from adjacent tissues. The next step is to identify cells and their morphology to classify them into non-neoplastic or neoplastic. This essentially eliminates unnecessary surgery in about one third of cases.<sup>3</sup> Fine needle aspiration cytology (FNAC) is a useful method for evaluating suspicious salivary glands lesions due to its low cost, minimum morbidity, rapid turnaround time, high specificity, and sensitivity.<sup>4</sup> By cytological examination, lesions can be divided into inflammatory, reactive, benign, or malignant and, if possible, specific diagnosis is given which helps the clinicians in planning the management of the lesion.<sup>5</sup> In today's era it has become an essential diagnostic investigation. Around the world, the annual incidence of all salivary gland tumour is 0.4-13.5 cases per 100,000 and 0.4-2.6 per 100000 for malignant tumour.<sup>6</sup> Salivary gland tumours usually occur in adults with a slight female predominance, but for unknown reasons Warthin's tumour occurs more in males. Benign tumours appear in the 5th to 7th decade of life and malignant tumours appear somewhat later.<sup>7,8</sup> These tumours represent less than 2% of tumours in humans and about 65% to 80% arises in parotid, 10% in submandibular, and the remaining in sublingual gland. Pleomorphic adenoma, being the most common neoplasm, represents 60% in parotid.<sup>8</sup> The present study was conducted to evaluate the spectrum of salivary gland lesions and to compare cytology with histopathological findings.

## MATERIAL AND METHODS

This retrospective study was carried out for 4 years from January 2016 to December 2020 on salivary gland swelling

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reporting in the Department of Pathology, RIMS Raichur. A total of 126 cases of salivary gland swelling were included in which cytological and histological studies were done.

All patients were clinically evaluated by detailed history, clinical examination, and hematological and radiological investigations. The study includes all salivary gland FNACs diagnosed and performed during defined period. All cases of salivary gland swellings where adequate material was not obtained even after repeated aspiration, were excluded from the study. The cases were retrieved from register of cytology division.

FNAC was performed from different sites of the salivary gland swelling using a 10 ml disposable syringe and 23/24 gauge needle without local anesthesia. FNA air dried smears

were stained with Giemsa stain and wet smears fixed in 95% ethyl alcohol were stained with haematoxylin and eosin stain. paraffin embedded tissue sections were stained with haematoxylin and eosin stain (H &E).

Salivary gland lesions were studied under the three groups- non-neoplastic lesions, benign and malignant tumors.

Histopathological correlation was done wherever available and possible. The collected data was entered in Microsoft excel spread sheet. The SPSS version 16 for windows used for analysis. The data collected was analysed statistically using descriptive statistics. The results were depicted in the form of percentages, bar diagrams, histograms and graphs wherever required.

## RESULTS

In the present series total 126 cases were studied out of which 67 were males and 59 were females. The maximum number of cases were in the age group 21 to 50 years. with overall male to female ratio was 1.3:1.

The most common site of involvement was the parotid gland with a frequency of 76.66%-(92/120) followed by submandibular gland 20%(24/120) and minor salivary gland 3.33%(4/120) where as no case of sublingual salivary gland lesion was observed in the present study. Benign tumours accounted for 53.26%(64/120), followed by non- neoplastic lesions 33.32% (40/120)and 13.32%(16/120) malignant tumours.

On FNAC, Acute sialadenitis was the most common non- neoplastic lesion (50%, 20/40) followed by chronic sialadentis (35% 14/40) and benign cystic lesion 15% (16/40). Among benign tumors pleomorphic adenoma was the most common neoplasm (62/64, 96.87 %) followed by warthin's tumor. Mucoepidermoid carcinoma was the most common malignant lesion (50%, 8/16) followed by adenoid cystic carcinoma (4/16, 31.25%) and acinic cell carcinoma. (18.75%)

Out of 126 patients who underwent FNAC, 6 cases were non diagnostic due to lack of adequate material. A histopathological correlation was available in 67 cases. The acute sialadenitis lesions did not undergo histological examination. The remaining cases could not be correlated as few were referred to higher centers for excision or

Age group	No. of cases	Percentage
0-10	0	0
11-20	14	11.66 %
21-30	30	25 %
31-40	35	29.16 %
41-50	24	20 %
51-60	14	11.66%
61-70	3	2.5%
Total	120	100%

**Table-1:** Age distribution of cases

Gland involved	Number of cases	Percentage
Parotid gland	92	76.66 %
Submandibular gland	24	20 %
Sublingual minor salivary gland	0	0 %
Minor salivary gland	4	3.33%
Total	120	100%

**Table-2:** Distribution of type of gland involved.

Fnac diagnosis	Frequency	Percentage
Non neoplastic	40	33.32%
Benign	64	53.26%
Malignant	16	13.32%
Total	120	100%

**Table-3:** Distribution of salivary gland lesions

Type of lesion	Parotid	SM	MSG	Total cases	Percentage
Non-neoplastic lesion (40)					
Acute sialadenitis	16	4	0	20	16.66%
Chronic sialadnitis	11	3	0	14	11.66%
Benign cystic lesion.	4	2	0	06	5%
Benign Tumours(64)					
Pleomorphic adenoma	48	10	4	62	51.66%
Warthins tumor	02	0	0	02	1.6%
Malignant tumours(16)					
Mucoepidermoid carcinoma	5	3	0	8	6.66%
Acinic cell carcinoma	2	1	0	3	2.5 %
Adenoid cystic carcinoma	4	1	0	5	4.16%
Total	92	24	4	120	100%

**Table-4:** Distribution and type of lesions by FNAC.

radiotherapy and was difficult to follow up.

Out of 120 cases on FNAC in this study only 67 cases underwent biopsy for histopathological evaluation (HPE correlation). There was concordance in 63 of the cases between FNAC and their HPE. 4 cases showed discordance. Out of 67 cases 63 were correctly diagnosed by FNAC out of which 8 cases were non-neoplastic, 45 benign and 10 malignant cases. On HPE, 8 cases were diagnosed as chronic sialadenitis, (non neoplastic lesion). In case of benign tumours 43 cases were diagnosed as pleomorphic adenoma and 2 cases as Warthin's tumour. In case of malignant tumours 6 cases of mucoepidermoid carcinoma, 2 cases of adenoid cystic carcinoma and 2 cases of acinic cell carcinoma were diagnosed.

## DISCUSSION

The present study involves 126 cases of primary salivary gland lesions which reported in the department of pathology, Rims raichur during 4 year period.

In the diagnosis of salivary gland lesions, FNAC has gained the popularity as diagnostic tool due to its low cost and safe procedure with minimal risk to the patient and aid to the clinicians in the management planning.<sup>9</sup>

The rate of non-neoplastic lesion in this study was 33.32%. it is in concordance with those of other studies, ranging from 20 % to 72.9%.

In the present study, benign neoplasms accounted for 64 cases (54.26%). The rate of benign neoplasm was in concordance with those of other studies which ranged from 49-83%. We observed pleomorphic adenoma as the commonest benign neoplasm similar to those previously reported number of studies. Various authors have reported that the incidence of malignant tumors ranged from 15% to 32%. We found total 16 cases of malignant tumours accounting to 13.32% similar to Nguansangian et al.<sup>10</sup>, which have found a lower rate of malignant neoplasms. In our study most common malignant salivary gland tumour was Mucoepidermoid carcinoma which accounted for 50 % of all malignant neoplasma which is in accordance with the studies done by sonal verma et al.<sup>20</sup> parotid gland was observed as the commonest site of salivary gland lesions. 76.66% (92/ 120) of all salivary gland lesions involved the parotid gland followed by submandibular salivary gland in this study. Almost similar distribution of salivary gland neoplasms in the parotid gland has also been described by choudhury et al.<sup>14</sup> lesions involving the sublingual gland were not observed in this study, which was in accordance with the study done by Vuhahula et al<sup>15</sup>

**Comparison of FNAC with Histopathology:** In the present study total 126 cases were studied. 6 cases were non diagnostic due to lack of adequate material. On FNAC, 40 were non neoplastic, 64 benign cases and total 16 cases were malignant. Correlation of FNAC and HPE was available in 67 cases. Out of 67 cases 63 were correctly diagnosed by FNAC out of which 8 cases were non neoplastic, 45 benign(pleomorphic adenoma and Warthin's tumour) and 10 malignant cases.

In, case of benign and non neoplastic cases, 104(86.58) cases were diagnosed on FNAC, 56 cases were available for HPE, and 52 were in concordance with HPE. our findings are consistent with a study in which they reported 122 cases as benign out of 146 cases. out of 122 cases 199 cases were correctly diagnosed giving an accuracy of 98%.<sup>9</sup>

Total of 40 cases were of non-neoplastic on FNAC (16 acute sialadenitis, 11 chronic sialadenitis, 4 benign cystic lesion). The acute sialadenitis lesions did not undergo histological examination. out of 11 chronic sialadenitis cases HPE correlation was present in 9 cases. out of the 9 cases 8 cases were confirmed on HPE (88.88%) and one case turned out to be Warthin's tumour on HPE of the specimen.

Total 64 cases of benign neoplastic lesions were encountered on FNAC, and HPE correlation was available in 48 cases (cases 46 pleomorphic adenoma and 2 Warthin's tumour). Out of the 46 cases of pleomorphic adenoma on FNAC, mostly encountered in parotid gland only 43 cases were confirmed on HPE(93.47%) and 3 cases turned out to be malignant. These findings are consistent with other studies.<sup>16</sup>

Two cases of Warthin's tumor were diagnosed on FNAC and were confirmed on HPE giving an accuracy rate of 100%. However, a study reported 33 cases of Warthin's tumor on FNAC out of which only 19 cases were confirmed on HPE showing a low accuracy rate FNAC for diagnosis of Warthin's tumour.<sup>2</sup>

Two cases diagnosed as pleomorphic adenoma on FNAC 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>2</sup>

One case diagnosed as pleomorphic adenoma in 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 cellular material may be found in both and hyaline globules characteristic of adenoid cystic carcinoma may also be seen pleomorphic adenoma.<sup>17</sup> In case of malignant tumours total 16 cases were diagnosed on FNAC and 10 cases were available for HPE correlation. All the 10 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 of 100%.<sup>9</sup> In our study 8 cases of Mucoepidermoid carcinoma were cytologically diagnosed, out of which cytohistopathological correlation was present in six cases. all these cases were histologically confirmed as low grade and intermediate MEC. this correlation of MEC is similar to the findings of the study done by Tessa et al.<sup>18</sup> the main diagnostic criteria used for cytological diagnosis of MEC are variations in cell type predominantly intermediate cells, mucin secreting cells, infrequently squamous epithelial cells with relatively bland nuclei and some prominent nucleoli in a dirty background of mucus and debris.<sup>19</sup>

## CONCLUSION

The present study concluded that Fine-needle aspiration

is useful for clinical management of patients with salivary gland lesions. FNAC can be used preoperatively to avoid unnecessary surgery and discomfort associated with open biopsy.

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