

## A STUDY ON CYTOHISTOPATHOLOGIC CORRELATION IN DIAGNOSIS OF SALIVARY GLAND LESIONS

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### ABSTRACT

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#### BACKGROUND

Fine Needle Aspiration Cytology (FNAC) has been employed in preoperative diagnosis of salivary gland lesions for many years. Various studies in the existing literature have shown a wide range of sensitivity and diagnostic accuracy of cytological diagnosis. This study was aimed at evaluating FNAC of salivary gland lesions in order to assess its sensitivity, specificity and diagnostic accuracy at a tertiary care centre.

#### MATERIALS AND METHODS

Patients with suspected salivary gland enlargements who were referred for FNAC were included in this study, which was done over a 4-year period from 2013 to 2016 in MKCG Medical College Hospital. Cytological diagnosis was compared with histopathology diagnosis wherever it was available.

#### RESULTS

In the present study, we obtained 117 cases of salivary gland lesions on which FNAC was done in the cytology department of our institute. Biopsy confirmation of diagnosis was available in 69 cases. Inflammatory lesions constituted the largest category followed by benign tumours and malignant tumours.

#### KEYWORDS

Diagnostic Accuracy, FNAC, Salivary Gland Lesions.

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#### BACKGROUND

Salivary gland swellings can result from tumours, an inflammatory process or cysts. It can sometimes be difficult to establish whether pathology arises from the salivary gland itself or from adjacent structures such as lymph nodes, soft tissues or skin. Fine Needle Aspiration Cytology (FNAC) is a reliable diagnostic method for the evaluation of these lesions because of the rather superficial location and easy accessibility of the salivary glands. The technique is simple, cost effective, safe and relatively nontraumatic procedure that can quickly provide important information.

The main goal of doing FNAC of salivary gland lesions is to assist clinicians in the management of patients who present with mass lesions. The characteristic cytological features of common salivary gland lesions have been well-delineated in literature.<sup>(1)</sup> However, there also exist cytological pitfalls and overlapping features that make an accurate diagnosis difficult in few cases. This has led to a wide range of sensitivities (62-97.6%) and specificities (94.3-100%) of cytological diagnosis<sup>(2-5)</sup> seen in this region.

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The present study is based on cytomorphological features of various salivary gland lesions and explores the diagnostic accuracy by comparing with subsequent histopathology. The diagnostic pitfalls in FNAC were also discussed.

#### MATERIALS AND METHODS

117 patients with various salivary gland lesions who were referred to the cytology section of pathology department at MKCG Medical College and Hospital over a period of four years were taken up for the study irrespective of the age group and sex. FNAC was done under aseptic precautions with prior consent after recording the relevant clinical details. Only 69 patients who underwent surgery ultimately were included in the study. The technique involved aspiration of material from the salivary gland lesions using a 10 mL disposable syringe and 23G needle.

The characteristics of aspirates were noted, routine smears were prepared and they were stained with Diff-Quik, May-Grunwald Giemsa and Papanicolaou's stains. Diagnosis of non-neoplastic salivary gland lesions were made according to conventional criteria. Histopathological typing of tumours was done according to the WHO classification of salivary gland tumours. The cytological diagnosis was compared to the histopathological diagnosis. When an error was found, every attempt was made to trace its source. Sensitivity, specificity and diagnostic accuracy were calculated.

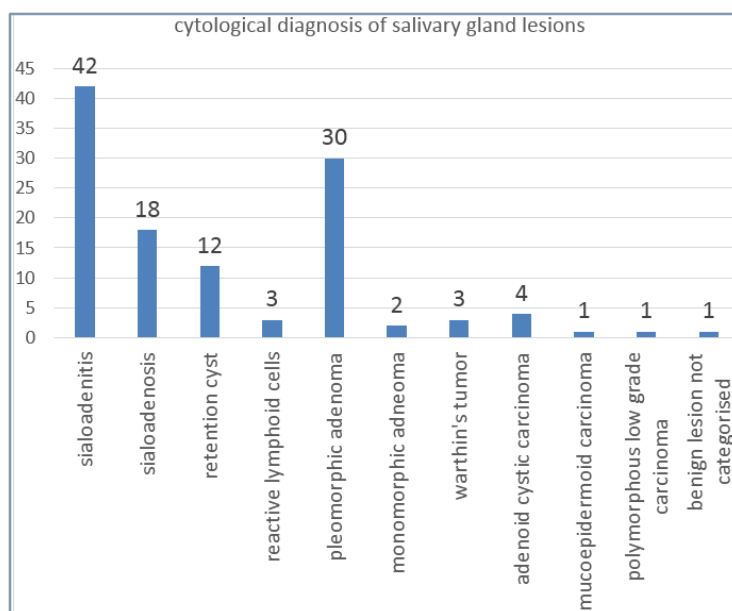
**RESULTS**

Total of 117 fine needle aspirations of salivary gland lesions were done in the cytology department of our institute during the period of January 2013 to August 2016. Out of this, 75 patients were males and 42 were females. So, in the present study, salivary gland lesions were more common in males. The age range of the group varied from 4 years to 88 years with a mean age of 46 years. Majority of the salivary gland tumours occurred in 5th decade. Of the 117 cases studied, histopathological confirmation of diagnosis was available in 69 cases. The various lesions were classified as non-neoplastic lesions (sialadenitis and sialadenosis), benign, malignant tumours and others. Non-plastic lesions (sialadenitis and sialadenosis) constituted the largest category followed by benign tumours and malignant tumours (Table 1).

Regarding FNA diagnosis in the present study, out of the 42 cases reported as sialadenitis in cytology, 16 cases were confirmed on histopathology. Out of 18 cases of sialadenosis reported in cytology, 8 cases were histopathologically confirmed. Five cases of retention cyst were confirmed on histopathology out of 12 cases. One case turned out to be pleomorphic adenoma on histopathology. One case was diagnosed as Warthin’s tumour histopathologically, which was reported as reactive lymphoid cells on cytology. Cytohistologic correlation was done. Out of 29 cases of pleomorphic adenoma, one case misdiagnosed as mucous retention cyst in cytology. Two cases of monomorphic adenoma and 2 cases of Warthin’s tumour were confirmed on histopathology. One case of Warthin’s tumour was misinterpreted as reactive lymphoid cells in cytology. All malignant lesions were correlated correctly on cytohistology. Four cases of adenoid cystic carcinoma, one case of mucoepidermoid carcinoma and one case of polymorphous low-grade carcinoma were confirmed on histopathology.

Type of Lesion		No. of Cases	
Non-Neoplastic Lesions			
1.	Sialadenitis	42	
2.	Sialadenosis	18	
3.	Retention Cyst	12	
4.	Reactive Lymphoid Cells	03	
Neoplastic Lesions			
Benign:	1.	Pleomorphic Adenoma	30
	2.	Monomorphic Adenoma	02
	3.	Warthin’s Tumour	03
Malignant	1.	Adenoid Cystic Carcinoma	04
	2.	Mucoepidermoid Carcinoma	01
	3.	Polymorphous Low-Grade Carcinoma	01
Benign Lesion Not Categorized		01	
<b>Total</b>		<b>117</b>	

**Table 1. Frequency of Salivary Gland Lesions (Cytology)**

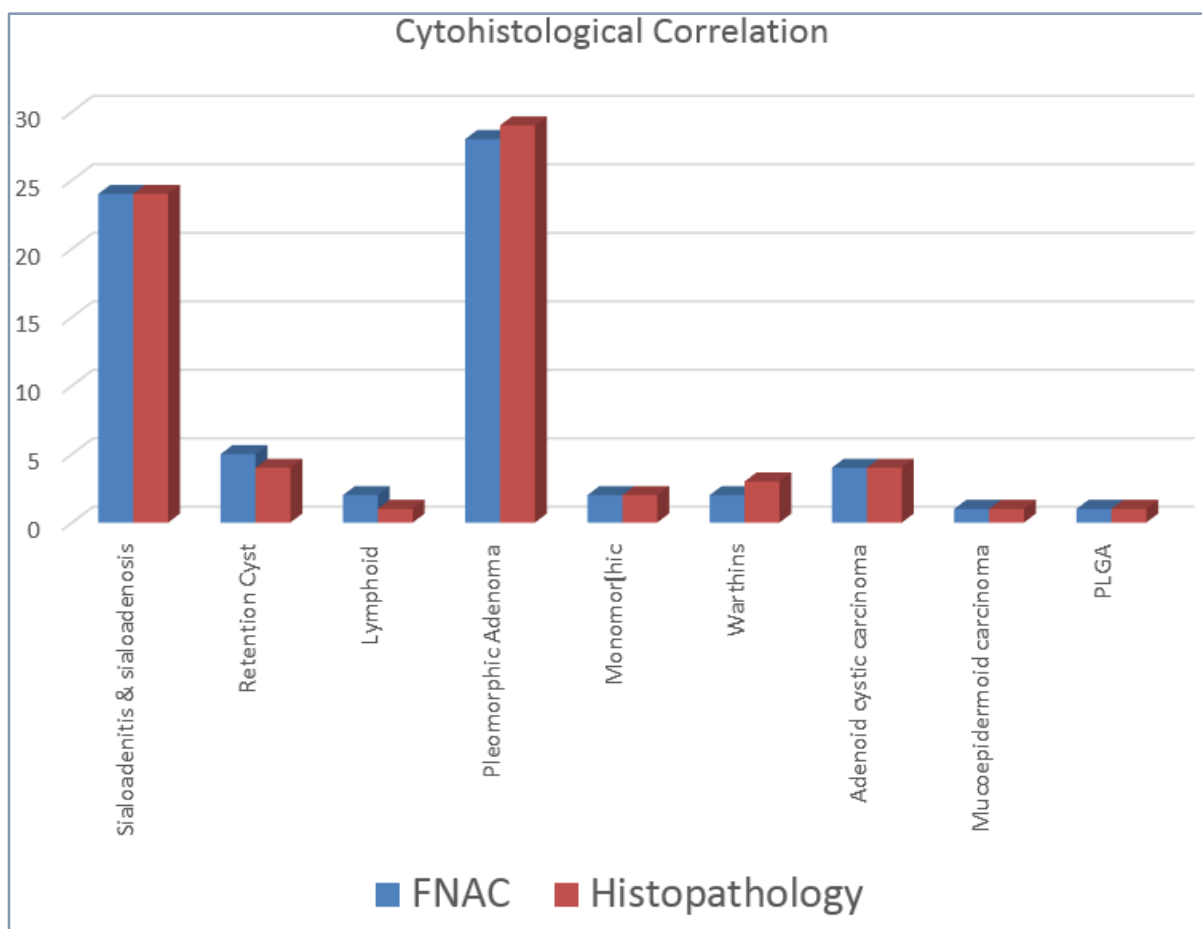


Lesion	Exact Diagnosis	Incorrect Diagnosis
Sialadenitis	16	Nil
Sialadenosis	08	Nil
Retention Cyst	05	01
Reactive Lymphoid Cells	02	01
Pleomorphic Adenoma	28	01
Monomorphic Adenoma	02	Nil
Warthin's Tumour	03	01
Adenoid Cystic Carcinoma	04	Nil
Mucoepidermoid Carcinoma	01	Nil
Polymorphous Low-Grade Adenocarcinoma	01	Nil

**Table 2. Cytohistopathological Correlation of Different Lesions**

**DISCUSSION**

FNAC is a widely used, safe and less traumatic diagnostic procedure capable of providing important information to the treating physician. In salivary gland lesions, FNAC serves to determine the nature of the lesion (non-neoplastic/neoplastic - benign or malignant) and in some cases, the specific diagnosis. Though the management of almost all neoplastic salivary gland lesions is surgical excision, a preoperative diagnosis of benign or malignant assists the clinician in planning the extent of surgery.<sup>(6)</sup>



Various studies in literature have reported a diagnostic accuracy of 86-98% for cytologic diagnosis of salivary gland neoplasms. The sensitivity has ranged from 62% to 97.6% and specificity from 94.3% to 100%.<sup>(2-5)</sup> In our study, the majority of salivary gland swellings subjected to FNAC are non-neoplastic. Similar results are noted in a study by Stewart et al.<sup>(7)</sup> The inadequate sampling rate in the present study was 0.8%, which is in concordance with the 5-10% inadequacy rate reported in literature.<sup>(2-4)</sup> Cytohistologic correlation was not concordant in 2 cases.

1 case of Warthin's tumour was misdiagnosed as reactive lymphoid cells due to insufficient epithelial elements. 1 case of retention cyst in cytology came out to be pleomorphic adenoma. The case was missed due to cystic degeneration. There was no false positivity in the study, so specificity was 100%. Sensitivity was 97.2%. The rates of false negative diagnoses made on cytology, which have been reported in the literature, range from 0 to 37%.<sup>(5)</sup> The false negative rate in our study was 3.8%.

This had occurred because one case of WT misdiagnosed as reactive lymphoid cells and single case of pleomorphic adenoma misdiagnosed as retention cyst. The false positive rate has been reported to be low (0-10%).<sup>(2)</sup> In the present study, the false positive rate was 0%. The sensitivity and specificity were 7.2% and 100%, respectively.

These results suggested that FNAC could serve as a good preoperative diagnostic tool for salivary gland lesions. A preoperative malignant diagnosis allows the surgeons to plan the treatment while a benign diagnosis relieves the patient from anxiety and surgical procedures.

### Comparison with Other Studies

Various Authors	No. of Cases with Histopathological Confirmation	Diagnostic Accuracy	Sensitivity	Specificity
Shintani <sup>(8)</sup>	43	93%	88.90%	94.10%
Jayaram <sup>(9)</sup>	57	87.70%	80.90%	94.30%
Qizilbash <sup>(10)</sup>	146	98%	87.50%	92.05%
Cristallini-EG <sup>(11)</sup>	63	97.90%	97.60%	98.45%
Our Series	69	96%	97.20%	100%

### CONCLUSION

Fine needle aspiration cytology is a safe and economic procedure with acceptable diagnostic accuracy especially in the experienced hands. It has an important role in the preoperative evaluation and categorisation of various salivary gland lesions. Proper sampling of lesions and adequate cellularity of the smears are the prerequisites for an accurate diagnosis. The overall diagnostic accuracy of FNAC in this series was 96% with a sensitivity of 97.2% and a specificity of 100% for detecting malignancy. Pitfalls in cytologic diagnosis were due to errors in sampling and interpretation of smears. This study highlights the utility of FNAC in distinguishing benign and malignant salivary gland tumours, which are of utmost value in planning the further management of the patient.

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