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Original Research Article

Correlation of fine needle aspiration cytology and histopathology in the diagnosis of salivary gland lesions in a tertiary care hospital in the Southern part of Assam: a 2 year observational study

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ABSTRACT

Background: Fine Needle Aspiration Cytology (FNAC) of the salivary gland is one of the most challenging in the field of cytopathology due to the wide spectrum of lesions. There is significant cytomorphologic diversity and overlap between many benign and malignant salivary gland tumours. Though FNAC is quite an effective tool for the diagnosis of salivary gland lesions, it has always been under scrutiny and histopathology continues to be the final method to establish a diagnosis.
Methods: A total of 80 patients who presented with clinical diagnosis of salivary gland mass at the Department of Pathology, SMCH, Assam from August 2017 to August 2019 were included in the study. FNAC was performed in all the cases and the cytological findings were correlated with that of the histopathological findings (wherever possible).
Results: The median age group of patients was in the range of 30-40 years (30%). 60 patients underwent surgical procedure and hence histopathological correlation could be done in these patients. Among the various diagnosis in FNAC, benign tumours constitute the majority with 36 cases (60%). The most commonly involved benign tumour was pleomorphic adenoma (27 cases). The overall sensitivity, specificity & diagnostic accuracy of FNAC were found to be 87.3%, 93.9% and 93.33% respectively.
Conclusions: FNAC is a safe, reliable, time saving, cost-effective, convenient and accurate method and should be considered as one of the pivotal investigations in the evaluation of salivary gland lesions.

Keywords: Fine needle aspiration cytology, Pleomorphic adenoma, Salivary gland lesions, Sensitivity, Specificity

INTRODUCTION

Fine Needle Aspiration Cytology (FNAC) of the salivary gland is one of the most challenging in the field of cytopathology. The spectrum of lesions can vary from reactive to neoplastic and it can be encountered in more than 500 salivary glands present in the human body.

Lesions mimicking salivary gland tumours can also arise in tissues close to the gland, such as lymph nodes, soft tissue and skin.[1] Non-neoplastic lesions include a variety of disorders like inflammatory lesions and cysts while neoplastic lesions represent about less than 2% of tumors of which majority occur in the parotid.

Both clinical examination and imaging studies of the salivary glands can be inaccurate in distinguishing between salivary tumours, an inflammatory process or enlarged lymph nodes.[2] Thus, a mass in the region of the salivary glands presents a diagnostic challenge with regards to its site of origin, histological behaviour, and tissue diagnosis. There is significant cytomorphologic diversity and overlap between many benign and malignant salivary gland tumours. FNAC is a simple and

rapid technique. No expensive instruments are needed. The FNAC procedure is relatively safe, easy to perform and causes little discomfort to the patients.[3] The single most important factor that determines accuracy is experience of both the pathologist and aspirator.

FNAC of salivary glands has achieved a pivotal role in the diagnosis and management of salivary gland lesions since its induction by Stewart et al in 1933.[4] However, it has always been under scrutiny when compared to histopathology. Histopathology of salivary gland lesions is still the final method to establish diagnosis and predicting prognosis in these lesions.

Aims and Objective to study the spectrum of salivary gland lesions in FNAC and its correlation with histopathology at SMCH

To calculate sensitivity, specificity and diagnostic accuracy of FNAC in the diagnosis of salivary gland lesions.

METHODS

A hospital based prospective study was done in the Department of Pathology, Silchar Medical College andHospital for a period of two years from August 2017 to August 2019. Samples for FNAC were collected from a total of 80 patients attending the cytology division of the Department of Pathology, SMCH with salivary gland swellings. Detailed clinical examinations followed by routine hematological and biochemical investigations were carried out in all cases. FNAC was performed in all the cases and the cytological findings were correlated with that of the histopathological findings (wherever possible) to obtain the accuracy of the cytological findings.

Inclusion criteria

- All salivary gland lesions, both males and females in the age group of 10 to 70 years.

Exclusion criteria

- Patients with bleeding diathesis, skin infection at needle aspiration site and those who didn't undergo surgery (histopathological examination could not be done)

Aspiration was performed using a 22-gauge needle. Smears were prepared from both dry and wet samples. MGG staining was done first in all the cytological samples. H and E staining was done wherever possible; the slides retrieved and evaluated. Unsatisfactory smears were discarded. The cellular details were studied under high power, specially for the size and shape of cells, cellular dissociation, detachment and cohesiveness, the nuclear and cytoplasm features individually. The cytological findings were then correlated with that of the histological diagnosis to obtain the accuracy of the cytological diagnosis. The parameters of diagnostic validity of FNAC in terms of sensitivity, specificity and accuracy were evaluated.

RESULTS

Age distribution: The patients under study were of the age group ranging from 10 years to 70 years. Majority of them were of the age group of 30-40 years (30%), followed by 40-50 years (21.25%) (Figure 1).

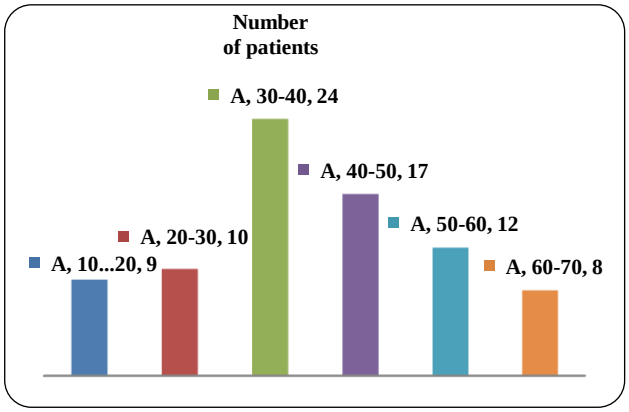

Figure 1: Bar diagram showing age distribution.

Sex distribution

Of these 80 patients, 45 were female and 35 were male, with a female to male ratio of 1.3:1.

Distribution

In present study among all salivary gland lesion, 75% occur in the parotid glands, 15% occur in the sub-mandibular glands, and 10% occur in minor salivary glands.

FNAC Diagnosis

Total of 80 patients underwent FNAC, but only 60 of these patients underwent surgery and hence histopathological examination of the lesions. These 60 patients were considered for our statistical analysis. Out of these 60 patients, 36 cases (60%) were benign tumors while malignant tumors accounted for 14 cases (23.33%). The most common benign tumor detected by FNAC was pleomorphic adenoma, 31 cases; followed by basal cell adenoma. The most common malignant lesion on FNAC was mucoepidermoid carcinoma, 10 cases. Non-neoplastic lesions comprised 10 cases (16.67%).

Correlation of FNAC and histopathological findings

Out of the 36 cases diagnosed as benign in FNAC, 33 were confirmed on histopathological examination. 2 cases turned out to be adenoid cystic carcinoma and 1 case as non-neoplastic. Out of the 14 cases diagnosed as malignant on FNAC, 12 had the same histopathology finding, while 1 case turned out to be pleomorphic

adenoma and the other case as sialoadenitis. Similarly of the 10 non neoplastic findings of FNAC, 9 were confirmed by histopathological examination while 1 was found to be a case of pleomorphic adenoma (Table 1). Comparison of sensitivity, specificity and accuracy among benign, malignant and non-neoplastic salivary gland lesions. The overall sensitivity, specificity and diagnostic accuracy came out to be 87.3%, 93.9% and 93.33% respectively (Table 2).

Table 1: Comparison of FNAC and histopathological findings.

FNAC diagnosis		No of cases	Consistent with histopathology	Not consistent with histopathology
Benign (36)	Pleomorphic adenoma	31	29	2 (Both adenoid cystic carcinoma)
	Basal cell adenoma	3	2	1 (Non-Neoplastic)
	Warthin's tumor	1	1	-
	Oncocytoma	1	1	-
Malignant Tumors (14)	Mucoepidermoid carcinoma	10	8	2 (1 Case of pleomorphic Adenoma and the other Sialoadenitis)
	Adenoid cystic carcinoma	2	2	-
	Acinic cell carcinoma	2	2	2
Nonneoplastic (10)	Acute sialoadenitis	7	6	1(turned out to be pleomorphic adenoma)
	Chronic sialoadenitis	3	3	-

Table 2: Comparison of sensitivity, specificity and diagnostic accuracy.

	Benign	Malignant	Non-neoplastic	Overall
Sensitivity	94.3	85.7	81.81	87.3
Specificity	88	95.66	97.9	93.9
Accuracy	91.67	93.33	95	93.33

DISCUSSION

FNAC has an important role in the preoperative evaluation of salivary gland lesions. The ease of performing FNAC as an outpatient procedure with little complications makes it preferred over open biopsies. The high degree of sensitivity, specificity and diagnostic accuracy also adds to the advantage of FNAC.

The age and sex distribution (slight female preponderance) found in our study correlates with that of the established literature. In our study, majority of patients were in the age group of 30 to 40 years (30%), followed by 40-50 years (21.25%). Kakoty et at, in their study noted that the incidence of the salivary gland lesions was as high as 30% in the age group of 31 to 40 years followed by 20% each in the age group of 21 to 30 years and 41 to 50 years.[5]Of these 80 patients, 45 were female and 35 were male, with a female to male ratio of 1.3:1. Some of the studies show female preponderance whereas others show slight excess in male, but sex differences are not significant.[6,7]

In present study among all the salivary gland lesions, 75% occur in parotid gland, 15% occur in sub-mandibular gland, and 10% occur in minor salivary gland. Similar findings were observed in the studies of Verma et al, Sengupta et al, and Panchal Upasana et al.[8-10]

The present study reconfirms the increased prevalence of benign salivary lesions (60%) in comparison to malignant lesions (23.33%). Similar findings were noted in studies by Cajulis et at, and Das et at.[11,12]

In the present study, out of the 36 cases diagnosed as benign in FNAC, 33 were confirmed on histopathological examination. 2 cases turned out to be adenoid cystic carcinoma and 1 case as non-neoplastic.

Out of the 14 cases diagnosed as malignant on FNAC, 12 had the same histopathology finding, while 1 case turned out to be pleomorphic adenoma and the other case as sialoadenitis. Similarly of the 10 non neoplastic findings of FNAC, 9 were confirmed by histopathological examination while 1 was found to be a case of pleomorphic adenoma.

The present study shows the increased incidence of benign neoplastic lesions compared to malignant lesions and non-neoplastic lesions which again correlates with established literature. Various benign lymphoepithelial lesions, cysts, basal cell adenocarcinoma, epithelial myoepithelial carcinoma etc. were not encountered in this study due to the limited study period of 2 years.

The overall sensitivity, specificity and diagnostic accuracy of FNAC as found in our study was 87.3%, 93.9% and 93.33% respectively and it correlates with various other studies (Table 3).

Table 3: comparison of present study with other studies with respect to sensitivity, specificity and diagnostic accuracy.

	Sample size	Sensitivity	Specificity	Diagnostic accuracy
Panchal et al,[10]	120	89.29	91.67	86.21
Jayaram et al,[13]	53	90	95	73.6
Stow et al,[14]	104	86.95	92.3	92.3
Lucas et al,[15]	107	89.2	85	97.2
Present study	60	87.3	93.9	93.33

CONCLUSION

The technique of FNAC is a logical extension of the time-consuming biopsy procedures. It can be used in conjunction with clinical & radiological findings to provide the best possible initial assessment based on which a management decision can be made. Considering the high rate of accuracy in almost all cases, treatment modalities can be planned. Thus, FNAC is a safe, reliable, time saving, cost-effective, convenient & accurate method and should be considered as one of the pivotal investigations in the evaluation of salivary gland lesions.

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