Original Research Article

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Efficacy of FNAC in the Diagnosis of Salivary Gland Lesions

Sandhya M.*, Vani D.**

*Tutor, Department of Pathology, Hassan Institute of Medical Sciences, Hassan, Karnataka 573201, India. **Professor, Department of Pathology, Mysore Medical College and Research Institute, Mysore, Karnataka 570001, India.

Abstract

Background: Malignancies of Salivary gland are not uncommon. Among all the neck and head tumors, they account for 2-6.5% of all tumors. For evaluation of tumors of salivary gland, fine needle aspiration cytology (FNAC) is a commonly used method. *Objective:* To study the efficacy of FNAC in the diagnosis of salivary gland lesions. *Methods:* Present study was hospital based diagnostic evaluation study conducted among 96 FNACs from December 2013 to May 2015. The study was conducted in the department of Pathology at a tertiary care hospital. Gold standard used was histopathology of lesions. *Results:* The FNAC findings in this study were: Non-neoplastic 40, Benign 46, Malignant 7, and Suspicious for malignancy 2 and unsatisfactory. Biopsy examination for comparison was available in 37 cases. Sensitivity of FNAC was 100% and the specificity was found to be 96.97%. The positive predictive value was 80% and the negative predictive value was 100%. The overall diagnostic accuracy in the present study was 97.3% for FNAC. *Conclusion:* FNAC is less costly, rapid, safe technique. The best part is that this technique is minimally invasive technique. It is as good as a diagnostic test.

Keywords: Histopathology; Salivary Gland; Lesions; Technique; Diagnostic Test; FNAC.

Introduction

Fine needle aspiration cytology (FNAC) is commonly used technique especially in the diagnostic evaluation of the salivary gland tumors. It is an approved technique. It is highly sensitive and highly specific. It is useful not only in the diagnosis of non-neoplastic tumors but also in the diagnosis of neoplastic tumors [1,2].

It is simple and accurate. It is less costly and reliable. Compared to biopsy, it is tolerable by the patients. It is also not harmful to the patients undergoing FNAC. It is also minimally invasive technique [3].

The problem in the diagnosis of salivary gland tumors is difficulty in the diagnosis of them. The clinical characteristics vary and pose problems in the diagnosis. The radiology features are also not convincing. Given this background, FNAC carries a lot of importance. It has a good sensitivity and specificity. The sensitivity varies from 62% to 97.6% in various studies. The specificity varies from 94.3% to 100% in various studies [4].

The overall burden of salivary gland tumors is lesser. The prevalence varies from 2% to 6.5%. The salivary gland tumors are easily accessible, located superficially. Hence they can be evaluated by FNAC [4,5].

The biopsy is highly invasive and carries the risk of bleeding, swelling, damage and spillage. It can also lead to the damage of facial nerve. Compared to this FNAC complications are negligible [6]. Hence present study was carried out to study the efficacy of FNAC in the diagnosis of salivary gland lesions.

Material and Methods

Type of Study: Hospital based diagnostic evaluation study

Corresponding Author: Sandhya M., 135, LaxmiRanga Nilaya, Hunarinkere Extension, Hassan, Karnataka – 573201.
E-mail: devakina@yahoo.com

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Screening Method Considered

FNAC of the salivary gland tumors

Gold Standard Used

Histopathology of the salivary gland tumors

Settings

Department of Pathology

Sample Size

It was possible to study a total 96 samples from 96 patients during the study period

Ethical Considerations

Institutional Ethics Committee permission was sought before the initiation of the study. Informed consent was taken from each and every patient included in the present study.

Inclusion Criteria

1. Patients having salivary gland tumors
2. Patients willing to participate in the present study

Exclusion Criteria

1. Patients having tumors other than salivary gland tumors
2. Seriously ill patients
3. Patients who were not willing to participate in the present study

Methodology

The data of patients with salivary gland tumors included in the present study was recorded in the pre designed, pre tested, semi structured questionnaire approved for the present study. Details like age, sex, type of salivary gland involved, type of lesion was recorded in the questionnaire in the present study. FNAC was done for all the lesions. It was possible to perform the biopsy in 37 cases for comparison.

Statistical Analysis

The data was recorded in the Microsoft Excel Worksheet. The sensitivity, specificity, diagnostic accuracy, positive predictive value and the negative predictive value were calculated.

Results

Out of 96 cases of salivary gland FNACs, 57 were neoplastic and remaining 39 cases were non-neoplastic lesions. Thus 59.4% of the cases were neoplastic and 40.6% of the cases were non-neoplastic. Out of 96 cases, 53 (55.2%) were males and 43 (44.8%) were female patients. The ratio of male to female was 1.23:1. It was found that maximum number of cases was in the age group of 31 to 40 years.

Among the 96 FNACs, maximum number of cases involved the parotid gland accounting to 55 (57.3%) cases, followed by submandibular gland in 40 cases (41.7%). Minor salivary glands were the least involved, comprising of 1 case in hard palate.

Among the 96 FNACs from salivary gland lesions, 40 (41.7%) were non neoplastic, 46 (47.9%) were benign neoplasms, 7 (7.3%) were malignant neoplasms, 2 (2.1%) were suspicious for malignancy and 1 case was considered unsatisfactory. Out of 96 cases, we found, 5 (5.2%) cases of cystic lesion, 6 (6.3%) cases of sialadenosis, 4 (4.2%) cases of acute sialadenitis, 25 (26%) cases of chronic sialadenitis, 43 (44.8%) cases of pleomorphic adenoma, 1 (1%) case of basal cell adenoma, 1 (1%) case of Warthin tumor, 1 (1%) case of myoepithelioma, 2 (2.1%) cases of suspicious for malignancy, 4 (4.2%) cases of mucoepidermoid carcinoma, 1 (1%) case of adenoid cystic malignancy 1 (1%) case of malignant myoepithelioma (Table 1).

Among the 96 cases, pleomorphic adenoma and mucoepidermoid carcinoma was the most benign and malignant neoplasms encountered respectively. Out of 96 cases, histopathological correlation was available in 37 cases. There were 2 cases categorized as suspicious for malignancy. On histopathology 1 was diagnosed as mucoepidermoid carcinoma and other as oncocytoma (Table 2).

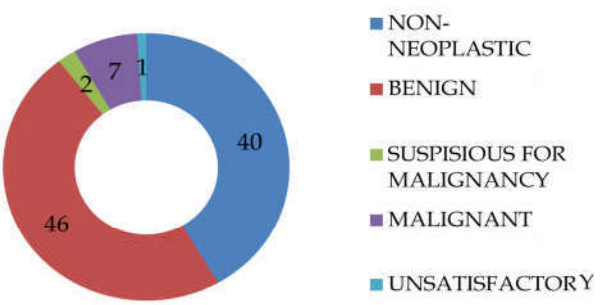

Fig. 1: Classification of aspirates

Table 1: Distribution of cases as per the type of lesions (based on FNAC)

Type of lesion	Sub type	Number	Percentage
Non neoplastic	Cystic	5	5.2
N = 40 (41.2%)	Sialadenosis	6	6.3
	Acute sialadentitis	4	4.2
	Chronic sialadentitis	25	26
Benign	Pleomorphic adenoma	43	44.8
N = 46 (47.4%)	Basal cell carcinoma	1	1
	Warthin tumor	1	1
	Myoepithelioma	1	1
Suspicious for malignancy (N = 2)		2	2.1
Malignant	Mucoepidermoid carcinoma	4	4.2
N = 7 (7.2%)	Adenoid cystic carcinoma	1	1
	Malignant myoepithelioma	1	1
	Carcinoma ex pleomorphic adenoma	1	1
Unsatisfactory	Hemorrhage	1	1

Table 2: Classification of FNAC and histopathological diagnosis cross-tabulation

Classification as per FNAC	Histopathological diagnosis										Total as per histopathological diagnosis
	AdCC	CS	He	MA	MEC	ME	OA	PA	SIA	WT	
Benign	0	1	0	0	0	2	0	14	0	0	17
Malignant	1	0	0	0	2	0	0	0	0	0	3
Non Neoplastic	0	9	0	1	0	0	0	0	3	1	14
Suspicious For Malignancy	0	0	0	0	1	0	1	0	0	0	2
Unsatisfactory	0	0	1	0	0	0	0	0	0	0	1
Total	1	10	1	1	3	2	1	14	3	1	37

AdCC = Adenoid Cystic Carcinoma, CS = Chronic Sialadentis, He = Hemangioma, MA = Monomorphic Adenoma, MEC = Mucoepidermoid carcinoma, ME = Myoepithelioma, OA = Oncocytoma, PA = Pleomorphic adenoma, SIA = Sialadenosis, WT = Warthin's tumor

Table 3: Diagnostic accuracy of FNAC

Screening test result	Diagnosis as per histopathology		Total
	Disease present	Disease absent	
Positive	4	1	5
Negative	0	32	32
Total	4	33	37

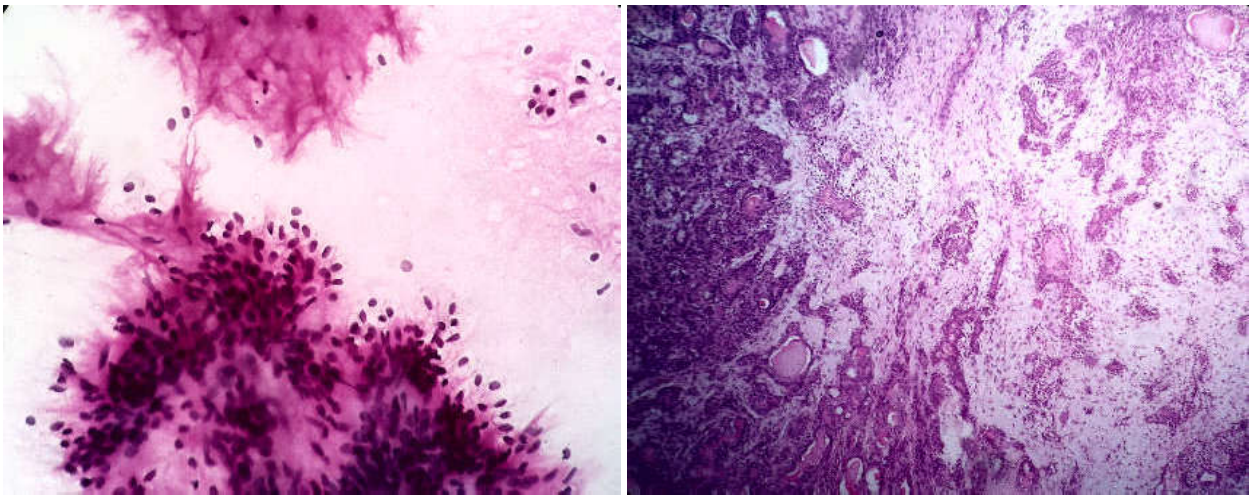

Fig. 2: Pleomorphic adenoma FNAC (H&E, 400X) tissue section (H&E, 100X)

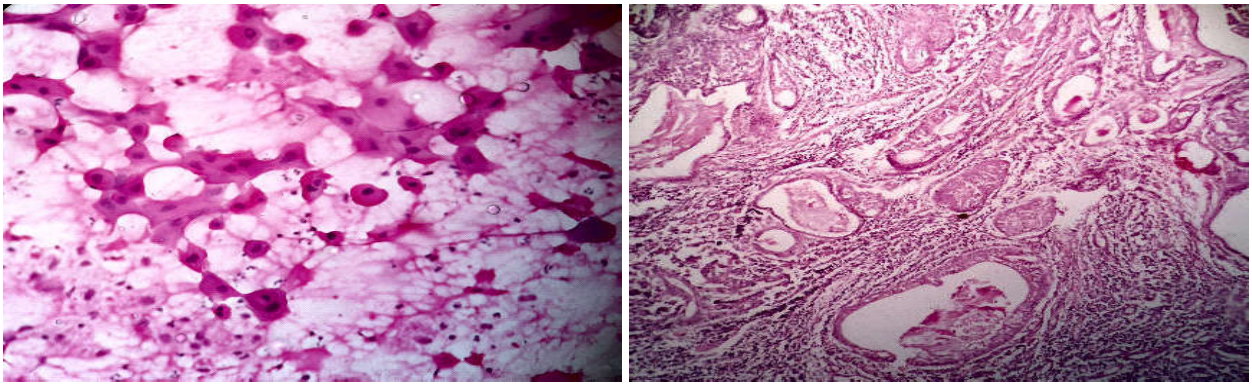

Fig. 3: Mucoepidermoid carcinoma FNAC (H&E, 400X) tissue section (H&E, 100X)

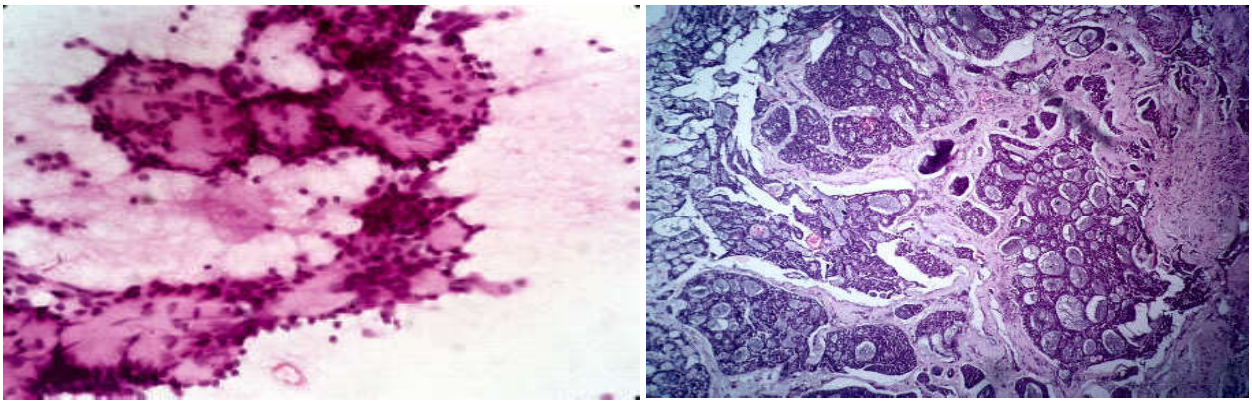

Fig. 4: Adenoid cystic carcinoma FNAC (H&E, 400X) tissue section (H&E, 100X)

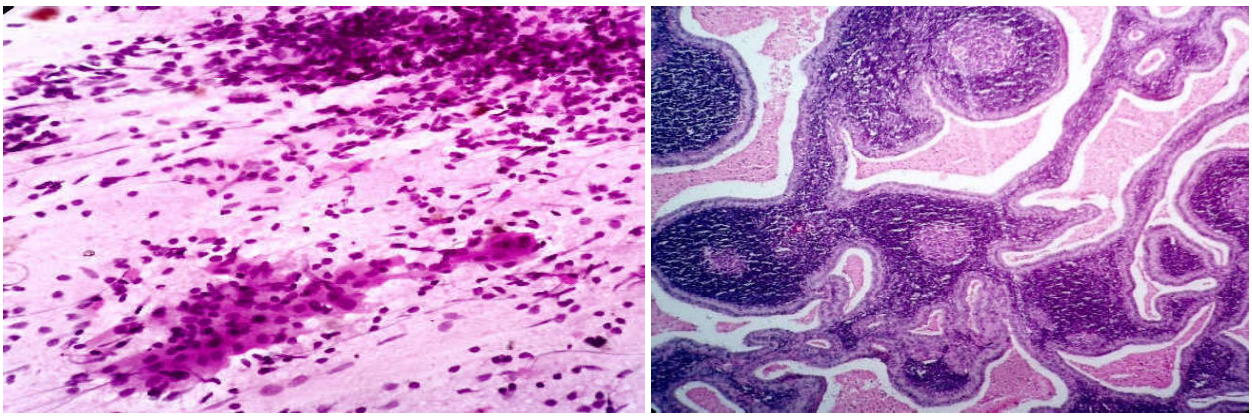

Fig. 5: Warthin tumor FNAC (H&E, 100X) tissue section (H&E, 100X)

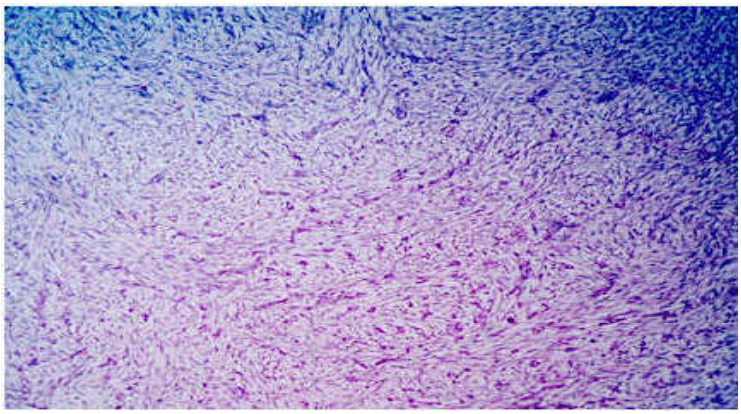

Fig. 6: Myoepithelioma, tissue section (H&E, 100X)

In this study, True positive = 4; True negative = 32; False positive = 1; False negative = 0; Sensitivity = 100%; Specificity = 96.97%; Positive predictive value = 80%; Negative predictive value = 100%; Diagnostic accuracy = 97.3%. Thus the overall diagnostic accuracy of FNAC was found to be 97.3% (Table 3).

Discussion

Efficacy of the FNAC in the diagnosis of the salivary gland tumors was assessed in the present study. Cytomorphological spectrum of salivary gland from non-neoplastic lesions to benign and malignant neoplasms was also assessed. In the present study we found that the sensitivity of FNAC was 100%. This was more when compared to the sensitivity rate of other studies [5-7].

Vaidya et al [7] found the specificity of FNAC as 100% and Nguansangiam et al [5] reported the specificity of FNAC as 99.1% in their study. The specificity was 96.97% in the present study. Gupta et al [8] and Iqbal et al [9] also found similar rates of specificity and they also stated that to rule out salivary malignancies FNAC alone may not be adequate. Further evaluation, including resection of the neoplasm, will have to be done.

We found that the diagnostic accuracy of FANC was 97.3% which was concordant to the study carried out by Nguansangiam et al [5] and Vaidya et al. [7] While Madani et al, [10] Iqbal et al [9] and Lukas et al [11] have found a lesser diagnostic accuracy.

We observed that most frequent FNAC diagnosis was benign, followed by non neoplastic lesions and then by malignant lesions, similar to a study done by Roy et al [12]. But it was in discordance with other studies by Ameliet al, [13] Jayaram et al [14] and Nguansangiam et al [5] where the common cytological diagnoses were non-neoplastic followed by benign neoplasms.

Akhter J et al [15] conducted a study to find the diagnostic accuracy of FNAC in swellings of various salivary glands. They also reported that the most common lesions were benign in nature (40%) similar to the observations of the present study (47.4%). This was followed by malignant lesion (12.5%) in their study. We found that the incidence of malignant lesions was 7.2%. The author recorded a sensitivity of 90% and specificity of 100% for FNAC in their study. Compared to present study, the authors found lesser sensitivity and more specificity. They concluded that FNAC was useful in the diagnosis of salivary gland tumors.

Piccioni LO et al [16] observed that the sensitivity was 81% and the specificity was 99% for FNAC. They also noted that the diagnostic accuracy was 97% for malignant lesion, and 83% for benign lesions. They reported the positive predictive value and negative predictive value as 93% and 98% respectively. In the present study we found that the positive predictive value and negative predictive value as 80% and 100% respectively, similar to this study.

Conclusion

Fine needle aspiration cytology procedure is a rapid, efficient, inexpensive, minimally invasive and safe diagnostic method. It has excellent patient acceptance and causes minimal morbidity. The chances of complications are very minimal.

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