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Original Research Article

Study of Fine Needle Aspiration Cytology of Salivary Gland Lesions with Histopathological Correlation

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ABSTRACT

Introduction: Fine Needle Aspiration Cytology (FNAC) is a reliable diagnostic method for evaluation of the lesions salivary glands. The main goal of FNAC of salivary gland lesions is to assist clinicians in the management of patients who present with mass lesions. The present study designed to compare the cytological findings of salivary gland lesions with their histologic diagnoses, in order to assess the sensitivity, specificity, predictive values and diagnostic accuracy of FNAC, with an emphasis on discordant cases in relation with FNAC pitfalls.
Method: present study is prospective study, carried out over 130 case of salivary gland swelling who had undergone FNAC were enrolled. Out of 130patients 77 patients underwent surgery; their histopathological examination was done and correlated with cytological diagnosis.
Results: Most common age group was 21 to 60 years. Mean age for non-neoplastic lesion, benign tumours & malignant tumours was 40.16 years, 45.17 years &53.58 years respectively.
46.15% patients were male and 53.85% patients were female with M: F ratio of 1:1.14.Parotid gland was the most common site of involvement (65.38%) followed by submandibular gland (31.54%). 46.15% lesions were non-neoplastic and 53.85% were neoplastic. Among neoplastic lesions, 65.72% tumours were benign and 34.28% were malignant. The histopathologic correlation was possible in 77 patients. On histopathology pleomorphic adenoma was the most common benign tumours (46.80%) and mucoepidermoid carcinoma was the most common malignant tumour (23.40%). The overall accuracy of cytologic diagnosis in identifying correct lesion was 85.7%. Diagnostic Accuracy for malignant lesions was 68.75%, 100%, 100%, 92.42% &93.50%. Sensitivity and specificity for benign lesions was 96.77% and 95.65 % Sensitivity and specificity for malignant lesion was 68.75% and 100%.
Conclusion - we recommend FNAC study as a preliminary investigation to reliably differentiate neoplastic and non-neoplastic lesions of salivary gland. However, specific histopathologic typing is a must in any doubtful case, more so in malignant lesions.

Key Words: FNAC. Histopathology, Correlation, Salivary lesions, Sensitivity, Accuracy

INTRODUCTION

Salivary gland lesions constitute one of the most interesting lesions in head and neck region, as they provide a vast range of morphologic patterns at a single site. [1]

Bland Sutton aptly said “Tumours of the salivary gland are a pathological puzzle and a source of unsatisfactory speculation. The nature of the lesion cannot be determined on clinical examination and therefore pathological examination is required for definite diagnosis in suspected cases of neoplastic disease. [2]

Fine Needle Aspiration Cytology (FNAC) is a reliable diagnostic method for evaluation of these lesions because of

rather the superficial location and easy accessibility of the salivary glands. The main goal of FNAC of salivary gland lesions is to assist clinicians in the management of patients who present with mass lesions. [3]

However, recent years have witnessed emergence of FNAC as a useful, reliable method and fast diagnostic technique which serves as a useful adjuvant to histopathology and provides a reasonable diagnosis to guide further course of management. [4] It is widely used for the diagnosis of the salivary gland lesions for a fast clarification of the nature of the lesion whether it is benign or malignant. [5]

FNAC is useful to avoid unnecessary surgery in non-neoplastic benign lesions such as sialadenitis and provide a preoperative diagnosis, staging and determine the surgical modality and the follow-up of the neoplastic salivary gland lesions. [5]

The present study designed to compare the cytological findings of salivary gland lesions with their histologic diagnoses, in order to assess the sensitivity, specificity, predictive values and diagnostic accuracy of FNAC, with an emphasis on discordant cases in relation with FNAC pitfalls.

MATERIAL AND METHODS

The present study was carried out in the prospective study of salivary gland lesions with cytohistopathological correlation was carried out in the Department of Pathology over a period of three years from June 2015 to June 2018 at Government Medical College Aurangabad.

Study Population: Present study included patients attending Out-Patient Department (OPD) / In-Patient Department (IPD) of various surgical units in our institute without any consideration of age and sex, with a clinical or radiological diagnosis of salivary gland involvement. In every case, a detailed clinical and thorough physical examination done.

Study Design: Prospective Study

Case Selection:

Inclusion Criteria: All patients presenting with salivary gland swelling and patients referred for FNAC in Department of Pathology.

Exclusion Criteria:

1) Patients presenting with non-palpable salivary gland swelling.
2) Patients with bleeding tendencies.

A detailed clinical history was obtained and thorough clinical examination with special reference to symptoms and signs of salivary gland disease was recorded on the specific proforma, prior to procuring sample for cytology study. Written informed consent of the patient was obtained and proper information regarding the procedure was given to the patient.

After FNAC the Smears prepared were dried and fixed on 95% alcohol and stained by H & E stain or/and Papanicolaou stain. Stained smear was examined under the microscope and results were correlated with histopathological sections wherever possible. The sections were studied thoroughly for their histopathological types and classified according to WHO classification (2005).

Then the patients were subjected to surgery and the specimens were sent for histopathological study. Cytological diagnosis was correlated with the histopathological diagnosis.

FNAC results were then compared with the definitive histopathological diagnosis. Cases with cytohistopathological disparity were also evaluated. The sensitivity, specificity, positive predictive value and negative predictive value of cytological diagnosis were evaluated on the basis of gold standard histopathological diagnosis. These values were calculated by the following formulae. Patients with non-diagnostic FNACs were excluded from the calculations.

STATISICAL ANALYSIS FORMULAE:

Sensitivity = True Positive / (True Positive + False Negative) X 100

Specificity = True Negative / (True Negative +False Positive) X 100

Positive Predictive Value = True Positive / (True Positive + False Positive) X 100

Negative Predictive Value = True Negative / (True Negative + False Negative) X 100 Accuracy = True Positive + True Negative / (True Positive + False Positive + True Negative + False Negative) X 100

OBSERVATIONS

In present study130 case of salivary gland swelling that had undergone FNAC were enrolled. Out of 130 patients 77 patients underwent surgery; their histopathological examination was done and correlated with cytological diagnosis.

In the present study, age range was 7 to 78 years; the youngest patient was a 7 years old female child with chronic inflammatory lesion suggestive of sialoadenitis and the oldest was of 78 years diagnosed as suspicious of malignancy suggestive of epithelial-myoepithelial carcinoma. Overall maximum number of patients 31(23.84%) were in the age group of 31-40 years. In the non-neoplastic lesion 12(20%) cases out of 60 cases were found in 41-50years. In the benign lesion 16(34.78%) cases out of 46 cases were found in 31-40 years age group. In the malignant lesion, maximum no of patients 6(25%) cases out of 24 cases were found in 61-70 years age group.

TABLE - I DIAGNOSTIC CATEGORY-WISE DISTRIBUTION OF SALIVARY GLAND LESIONS

SR. NO.	DIAGNOSTIC CATEGORY	TOTAL	PERCENTAGE
1	NON -NEOPLASTIC LESIONS	60	46.15%
2	NEOPLASTIC LESIONS -BENIGN -MALIGNANT	 46 24	 35.38% 18.47%
	TOTAL	130	100%

In this study, non-neoplastic lesions were 60(46.15%), benign lesions 46(35.38%) and malignant lesions 24(18.46%) out of 130 cases.

In the present study out of 130 cases, 60 were males (46.15%) and 70 were females (53.84%) with M: F ratio was 1:1.14. Benign tumours were more common in Female patients 24(52.17%) and malignant tumours in male patients15 (62.5%).

Present study showed parotid gland as the most frequent site of involvement in all categories of salivary gland lesions 85 (65.38%) followed by submandibular gland 41(31.53%). While sublingualgl and 01(0.77%) and minor salivary gland 03(2.31%) contribute less.

TABLE - II: RESULTS OF CYTOLOGY

LESIONS		NO. OF CASES	PERCENTAGE
A) Non-neoplastic lesions (n=60)			
I. Chronic Sialoadenitis		36	
II. Chronic Granulomatous Sialadenitis		10	46.15%
III.Cystic Lesions		14	
B) Neoplastic Lesions :			
1) Benign tumours (n=46)			
I.	Pleomorphic Adenoma	35	
II.	Monomorphic Adenoma	04	
III.	Warthin Tumour	04	
IV.	Myoepithelioma	01	35.38%
V.	Oncocytoma	02	
2) Malignant tumour(n=24)			
I.	Mucoepidermoid Carcinoma	06	
II.	Adenoid Cystic Carcinoma	01	
III.	Myoepithelial Carcinoma	01	
IV.	Duct Carcinoma	02	
V.	Epithelial-Myoepithelial Carcinoma	02	
VI.	Poorly Differentiated Carcinoma	01	
VII.	Suspicious of Malignancy	11	18.46%

TABLE –II shows distribution of various lesions encountered

On cytological examination. Out of 130 cases, 60(46.15%) were of non-neoplastic lesions. Total neoplastic lesions

were 70 (53.84%). Among neoplastic lesions, benign neoplastic were 46(35.38%) and malignant were 24 (18.46%) on cytology.

In present study, out of 130 patients – 77 cases underwent follow-up histopathology in our institute. Out of these 77 cases, 34 cases (44.16%) were non-neoplastic category, 32 cases (41.58%) benign neoplastic category and 11cases (14.28%) malignant category.

TABLE -III: CYTOLOGY AND HISTOPATHOLOGY DIAGNOSIS CORRELATION

HISTOPATHOLOGY DIAGNOSIS	NO. OF CASES	CYTOLOGY DIAGNOSIS	
		CORRELATED	NOT CORRELATED
A)Non-neoplastic Lesions			
Chronic Sialadenitis	19	18	01
Chronic Granulomatous Sialoadenitis	05	05	-
Non-neoplastic Cyst	05	05	-
Sclerosing Polycystic Adenosis	01	01	-
B) Benign Neoplasms :			
Pleomorphic adenoma	22	22	-
Monomorphic Adenoma	03	03	-
Warthin Tumour	04	03	01
Myoepithelioma	01	01	-
Oncocytoma	01	01	-
C) Malignant Neoplasms			
Mucoepidermoid Carcinoma	11	06	05
Adenoid Cystic Carcinoma	02	02	-
Myoepithelial Carcinoma	01	01	-
Duct Carcinoma	01	01	-
Epithelial-Myoepithelial Carcinoma	01	01	-
TOTAL	77	70	07

TABLE -IV: CORRELATION BETWEEN CYTOLOGY DIAGNOSIS & HISTOPATHOLOGY DIAGNOSIS

SR. NO.	HPE DIAGNOSIS → FNAC DIAGNOSIS ↓	NNC	CSA	GSA	SPA	PLA	MOA	WT	Myoepi	ONCO	MEC	AdCC	MyEC	DC	Ep-My Ca	TOTAL
1	CIL S/O CSA	-	18	-	-	-	-	-	-	-	01	-	-	-	-	19
2	CGL S/O CGSA	-	-	05	-	-	-	-	-	-	-	-	-	-	-	05
3	Cystic Lesion	05		-	01	-	-	01	-	-	03	-	-	-	-	10
4	Pleomorphic Adenoma	-	-	-	-	22	-	-	-	-	01	-	-	-	-	23
5	Monomorphic Adenoma	-	-	-	-	-	03	-	-	-	-	-	-	-	-	03
6	Warthin Tumour	01	-	-	-	-	-	03	-	-	-	-	-	-	-	04
7	Myoepithelioma	-	-	-	-	-	-	-	01	-	-	-	-	-	-	01
8	Oncocytoma	-	-	-	-	-	-	-	-	01	-	-	-	-	-	01
9	Mucoepidermoid Carcinoma	-	-	-	-	-	-	-	-	-	06	-	-	-	-	06
11	Adenoid Cystic Carcinoma	-	-	-	-	-	-	-	-	-	-	02	-	-	-	02
12	Myoepithelial Carcinoma	-	-	-	-	-	-	-	-	-	-	-	01	-	-	01
13	Duct Carcinoma	-	-	-	-	-	-	-	-	-	-	-	-	01	-	01
14	Epithelial-Myoepithelial Ca	-	-	-	-	-	-	-	-	-	-	-	-	-	01	01
TOTAL		06	18	05	01	22	03	04	01	01	11	02	01	01	01	77

Note :- CIL - Chronic Inflammatory Lesion; CGL - Chronic Granulomatous Lesion; CGSA -Chronic Granulomatous Sialoadenitis; NNC - Non-neoplastic Cyst; CSA - Chronic Sialoadenitis; GSA - Granulomatous Sialoadenitis; SPA -Sclerosing Polycystic Adenoma; PLA - Pleomorphic Adenoma; MOA - Monomorphic Adenoma; WT - WarthinTumour; Myoepi.-Myoepithelioma; ONCO.- Oncocytoma; MEC - Mucoepidermoid Carcinoma; AdCC- Adenoid Cystic Carcinoma; MyEC - MyoepithelialCarcnoma; DC - Duct Carcinoma; Ep-My Ca - Epithelial-Myoepithelial Carcinoma

TABLE - V: DISCORDANT (NOT CORRELATED) CASES AS PER CYTOLOGICAL & HISTOPATHOLOGICAL DIAGNOSIS

SR. NO.	CYTOLOGY DIAGNOSIS	HISTOPATHOLOGY DIAGNOSS	NO. OF CASES
1.	Chronic Sialoadenitis	Mucoepidermoid Carcinoma	01
2.	Cystic Lesion	Mucoepidermoid Carcinoma	03
3.	Cystic Lesion	Warthin Tumour	01
4.	Monomorphic Adenoma	Chronic Sialoadenitis	01
5.	Pleomorphic Adenoma	Mucoepidermoid Carcinoma	01
TOTAL			07

In our study, out of 130 patients only 77 cases underwent surgery and so follow-up histopathology. Out of these 77 cases, 34 cases (44.16%) were non-neoplastic category, 32 cases (41.58%) benign neoplastic category and 11cases (14.28%) malignant category. Out of 77 cases underwent surgery so included in Histopathology 70 cases were correlated while 7 cases were discordant (TABLE –V]

Out of 60 (non-neoplasticlesion) cases on cytopathology, 34cases underwent surgery and from these casesone case (Chronic Sialoadenitis on Cytopathology) was diagnosed as Mucoepidermoid carcinoma while four cases (Cystic Lesion on Cytopathology) were diagnosed as Mucoepidermoid Carcinoma (three cases) and Warthin Tumour(one case) on Histopathology follow-up.

Out of 46 cases (Benign Neoplastic Lesion) on Cytopathology, 32 cases underwent surgery and from these cases one case (Monomorphic Adenoma on Cytopathology) was diagnosed as Chronic Sialoadenitis while other one case.(Pleomorphic Adenoma on Cytopathology) as Mucoepidermoid Carcinoma on Histopathology follow-up. Out of 24 cases (Malignant Neoplastic Lesion) on Cytopathology, 11 cases underwent surgery and all these cases were diagnosed as malignant on Histopathology follow-up.

In the present study the Cytopathology and Histopathology diagnoses were correlated with 90.90% cases while no correlation was observed in 9.09% of cases.

In non-neoplastic lesions, Chronic Sialadenitis is the most common non-neoplastic lesion in the present study, followed by chronic granulomatous sialadenitis and non-neoplastic cysts. Very rare one case, found in this study was Sclerosing Polycystic Adenosis.

Among neoplastic lesions, pleomorphic adenoma to be the most common tumour 22cases (46.81%) followed by MucoepidermoidCarcinoma 11cases (23.40%), Warthin tumour 04 Cases(8.51%), MonomorphicAdenoma03 cases (6.38%)

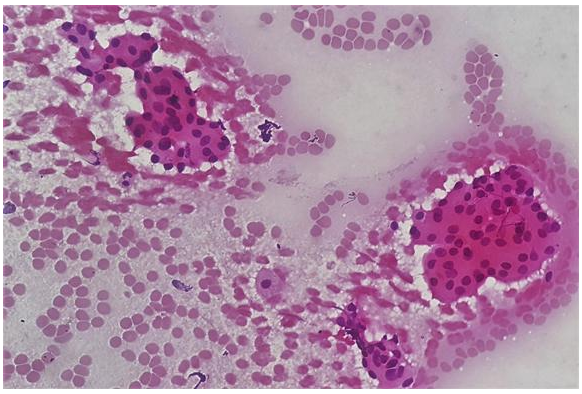

FIGURE 1 : FNAC ONCOCYTOMA (PAP 400X)

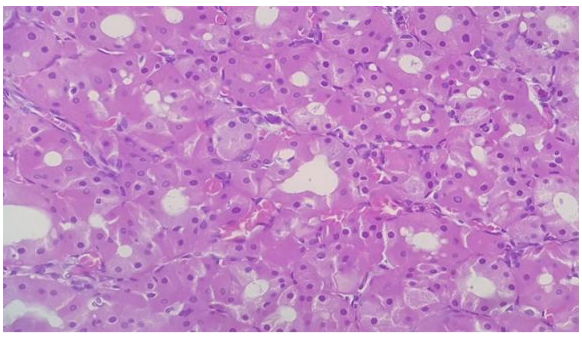

FIGURE 2 : ONCOCYTOMA (H & E 400X)

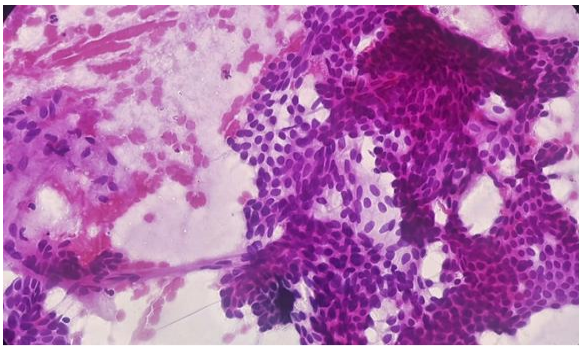

FIGURE 3 : FNAC PLEOMORPHIC ADENOMA (PAP, 400X)

TABLE - VI: SENSITIVITY, SPECIFICITY, PPV, NPV & ACCURACY FOR NON-NEOPLASTIC LESIONS, BENIGN, MALIGNANT LESIONS AND OVERALL SALIVARY GLAND LESIONS

SR.NO.	TYPE OF LESION	SENSITIVITY	SPECIFICITY	PPV	NPV	ACCURACY
1.	NON-NEOPLASTIC LESIONS	96.67%	89.36%	85.29%	97.67%	92.20%
2	BENIGNLESIONS	96.77%	95.65%	93.75%	97.78%	96.10%
3.	MALIGNANT LESIONS	68.75%	100%	100%	92.42%	93.50%
4.	OVERALLSALIVARY GLANDLESIONS	89.36%	96.67%	97.67%	85.29%	92.21%

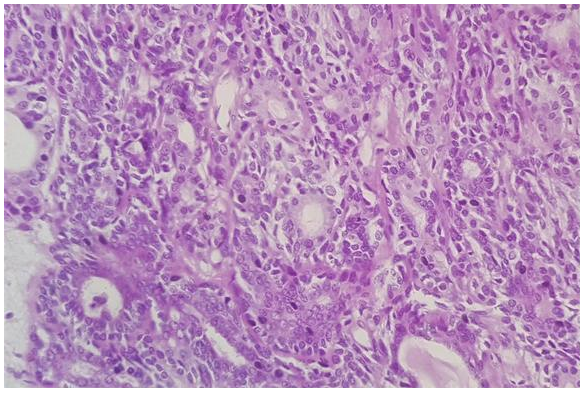

FIGURE 4 : PLEOMORPHIC ADENOMA (H & E 400X)

DISCUSSION

Total 130 cases FNAC studied out of which, 77cases underwent surgical resection in our institute. Salivary gland tumours develop in a wide range of age. In present study, range of age for benign tumours was 31-40 years and it correlates with the studies of Huq AHMZ et al 2013, [8] Ritu Jain et al 2013, [9] Anita Omhare et al 2014, [13] Vidyadhara Rani et al 2014, [14] Panchal et al 2015. [16] Range of age for malignant tumours was 61-70 years and it correlates with the studies of Vaidya S et al 2011, [7] Anita Omhare et al 2014 [13] and Kacharu et al 2016. [19]

In present study 46.15% male and 53.85% female patients were seen. There was slight female preponderance with male to female ratio (M: F ratio) of 1:1.14 in present study. Our finding is comparable to the studies of N. Sangeetha et al 2013 [11] and Vidyadhara Rani et al 2014. [14] The higher number of cases in female patients had been reported by our study.

Present study showed 65.38%caseswithparotidinvolvementwhich correlates with other studies of Ritu Jain et al 2013, [9] Shilpa H Gandhi et al 2013, [11] Kacharu et al 2016. [19] Submandibular gland was involved in31.53%casesand this finding is comparable with that of Ritu Jain et al 2013, [9] Sonal Verma et al 2016, [18] Kacharu et al 2016. [19] There was only one case (0.77%), 26 years old female with diagnosis of Chronic Sialadenitis which showed involvement of sublingual gland. Also there were three cases (2.32%) showed involvement of minor salivary glands; one case was 36yearsoldmalewithdiagnosisofLowGrade Mucoepidermoid Carcinoma which showed involvement of minor salivary glands of palate; second case was 35 years old male with diagnosis of Pleomorphic Adenoma showed involvement of minor salivary gland left cheek; and third case was 60 years old female patient with diagnosis of Low Grade Mucoepidermoid Carcinoma which showed involvement of minor salivary glands of right cheek.

In present study, the patients presented with a swelling in parotid gland, submandibular or minor salivary glands. Present study showed, overall salivary gland swellings presented with unilateral and there was no single case with bilaterality.

TABLE - VII : RELATIVE FREQUENCY OF DIFFERENT LESIONS

AUTHOR (YEAR)	NON-NEOPLASTIC LESIONS	NEOPLASTIC LESIONS
Shilpa H. Gandhi et al 2013 [10]	40%	60%
Koirala S et al 2014 [12]	52.20%	47.80%
Anita Omhare et al 2014 [13]	53.22%	46.78%
Hilda Fernandes et al 2014 [15]	42.05%	57.95%
SamreenNaz et al 2015 [17]	39.5%	60.5%
Kacharu et al 2016 [19]	34.8%	65.20%
Present Study 2017	46.15%	53.85%

Present study showed non-neoplastic lesions to represent 46.15% of total cases and rest 53.85% were neoplastic lesions. These findings were comparable with study of Hilda Fernandes et al 2014. [15] Our Study showed 66.40% of salivary gland lesion located in parotid gland as comparable in the study by Kacharu et al 2016. [19]

Present study showed 65.71% lesions to be benign tumour and 34.29% lesions to be malignant tumours, which correlated with previous studies Koirala S et al 2014, [12] Anita Omhare et al 2014. [13] Among benign tumours, pleomorphic adenoma was the most common tumor (76.09%). There were 3 cases diagnosed as suggestive of Monomorphic Adenoma. Out of these three, one case was diagnosed as Monomorphic Adenomaon Cytopathology but Histopathology revealed it as Chronic Sialadenitis. There were four cases of Warthin tumour, two cases of Oncocytoma, one case of Myoepithelioma.

Among malignant tumors, 6 cases were suggestive of mucoepidermoid carcinoma, two were suggestive of adenoid cystic carcinoma, two were suggestive of Duct Carcinoma, two were suggestive of Epithelial-Myoepithelial Carcinoma, one was suggestive of Poorly Differentiated Carcinoma and eleven cases were with diagnosis of suspicious of malignancy.

TABLE - VIII: FREQUENCY OF VARIOUS HISTOLOGICAL TYPES

AUTHOR (YEAR)	TOTAL HPE CASES	HPE-NEOPLASTIC CASES	PLA	MOA	WT	MyE	ONCO.	MEC	AdCC	MyE CA	DC	Ep-My CA	OTHER
Vaidya S et al 2011[7]	58	43	24	2	6	-	-	2	1	1	1	1	5
Huq AHMZ et al 2013[8]	60	60	35	1	7	-	-	7	5	-	-	-	5
Shilpa H. Gandhi et al 2013[10]	40	40	27	1	4	-	-	4	3	-	-	-	1
N. Sangeetha et al 2013[11]	58	43	29	1	3	-	-	5	2	-	-	-	3
Panchal et al 2015[16]	87	82	60	3	6	2	-	5	-	-	1	-	5
Present Study 2017	77	47	22	03	04	01	01	11	02	01	01	01	00

TABLE VIII showed in present study pleomorphic adenoma was the single most common tumor (46.80%) which was seen in most of the studies in the Literature. The present study showed uncommon benign tumours like Myoepithelioma (one case), Oncocytoma (one case).

Mucoepidermoid carcinoma was the most common malignant tumour in the present study (23.40%). This finding showed agreement with studies of Huq AHMZ et al 2013, [8] N. Sangeetha et al 2013, [11] Koirala S et al 2014, [12] Panchal et al 2015. [16]

The present study showed uncommon malignant tumours like Duct Carcinoma (one case), Myoepithelial Carcinoma (one case) and Epithelial-Myoepithelial Carcinoma (one case).

In the present study sensitivity, Specificity, PPV, NPV and Diagnostic Accuracy of FNAC technique for diagnosing Non-neoplastic Lesion was 96.67%, 89.36%, 85.29%, 97.67% and 92.20% respectively. These present study findings were correlating with the study by Koirala S et al 2014. [12]

TABLE -IX: OVERALL FNAC SENSITIVITY, SPECIFICITY, PPV, NPV ANDDIAGNOSTIC ACCURACY

AUTHOR (YEAR)	SENSITIVITY	SPECIFICITY	PPV	NPV	ACCURACY
N. Sangeetha et al 2013 [11]	90.22	95.92	-	-	95.32
Koirala S et al 2014 [12]	100	87.73	-	-	88.89
Anita Omhare et al 2014[13]	88.2	97.1	88.2	97.1	95.3
Present Study 2017	89.36	96.67	97.67	85.29	92.21

In the present study Sensitivity, Specificity, PPV, NPV and Diagnostic Accuracy of FNAC technique for diagnosing overall salivary gland Lesions was 89.36%, 96.67%,97.67%, 85.29% and 92.21%respectively.These present study findings were correlating with the studies by N. Sangeetha et al 2013 [11] and Anita Omhare etal 2014. [13]

TABLE - X: FNAC SENSITIVITY, SPECIFICITY, PPV, NPV AND DIAGNOSTICACCURACY FOR BENIGN LESIONS IN VARIOUS STUDIES

AUTHOR (YEAR)	SENSITIVITY	SPECIFICITY	PPV	NPV	ACCURACY
Vaidya S et al 2011 [7]	100	81.80	95.9	100	96.6
N. Sangeetha et al 2013[11]	93.75	92.31	-	-	94.74
Koirala S et al 2014[12]	100	86.95	-	-	91.67
Present Study 2017	96.77	95.65	93.75	97.78	96.10

In the present study Sensitivity, Specificity, PPV, NPV and Diagnostic Accuracy of FNAC technique for diagnosing Neoplastic Benign salivary gland Lesions was 96.77%, 95.65%, 93.75%, 97.78% and 96.10% respectively. These present study findings were correlating with the study by N. Sangeetha et al 2013. [11]

TABLE XI: FNAC SENSITIVITY, SPECIFICITY, PPV, NPV AND DIAGNOSTICAC CURACY FOR MALIGNANT LESIONS IN VARIOUS STUDIES

AUTHOR (YEAR)	SENSITIVITY	SPECIFICITY	PPV	NPV	ACCURACY
N. Sangeetha et al 2013[11]	76.92	100	-	-	94.74
SevincSahin et al 2015[5]	62.5	92	55.6	93.9	87.9
Present Study 2017	68.75	100	100	92.42	93.50

In the present study Sensitivity, Specificity, PPV, NPV and Diagnostic Accuracy of FNAC technique for diagnosing Neoplastic benign salivary gland lesions was 68.75%, 100%, 100%, 92.42% and 93.50% respectively. These present study findings were comparable with the studies by SevincSahin et al 2015 [5] and N. Sangeetha et al 2013. [11]

Aarthi R. Rau et al 2006 [6] published their study on effects of FNAC related tissue changes on subsequent histological evaluation. They concluded that the changes do not interfere with subsequent histological evaluation of tumours.

To summarize it all, use of FNAC can provide helpful preoperative diagnostic information for deciding the line of management.

SUMMARY AND CONCLUSIONS

Present Study was conducted in Department of Pathology for three years, to study the cytological and histopathological profile of salivary gland lesions and evaluate the efficacy of FNAC as a fast and reliable method to give a preoperative reasonable assessment of underlying lesion.

SUMMARY:

- Among 130 patients undergone FNAC for salivary gland swellings, 92.20% aspirates were diagnostic.
- 14% of total smears were of inflammatory etiology, which responded to conservative management. Hence, FNAC avoided unnecessary surgery in 14% of patients.
- Most common age group was 21 to 60 years. Mean age for non-neoplastic lesion, benign tumours & malignant tumours was 40.16 years, 45.17 years & 53.58 years respectively.

- 46.15% patients were male and 53.85% patients were female with M: F ratio of 1:1.14.
- Salivary gland tumours comprised 1.5 % of all malignant tumours diagnosed in the study period.
- Parotid gland was the most common site of involvement 65.38% followed by submandibular gland 31.54%.
- 46.15% lesions were non-neoplastic and53.85% were neoplastic. Among neoplastic lesions, 65.72% tumours were benign and 34.28% were malignant.
- The histopathologic correlation was possible in 77 patients. On histopathology, pleomorphic adenoma was the most common benign tumours 46.80% and mucoepidermoid carcinoma was the most common malignant tumour 23.40%. There were two cases of adenoidcystic carcinoma 4.25% and each of myoepithelial carcinoma, duct carcinoma, epithelial-myoepithelial carcinoma 2.13% each.
- The overall accuracy of cytologic diagnosis in identifying correct lesion was 85.7%
- Sensitivity, Specificity, Positive Predictive Value, Negative Predictive Value, Diagnostic Accuracy for non-neoplastic lesions was96.67%, 89.36%, 85.29%, 97.67% & 92.20%.
- Sensitivity, Specificity, Positive Predictive Value, Negative Predictive Value, Diagnostic Accuracy for benign lesions was 96.77%, 95.65%, 93.75%, 97.78% &96.10%.
- Sensitivity, Specificity, Positive Predictive Value, Negative Predictive Value, Diagnostic accuracy for malignant lesions was 68.75%, 100%, 100%, 92.42% &93.50%.
- Sensitivity and specificity for benign lesions was 96.77% and 95.65%
- Sensitivity and specificity for malignant lesion was 68.75% and 100%.

CONCLUSION

To conclude it all, we recommend FNAC study as a preliminary investigation to reliably differentiate neoplastic and non-neoplastic lesions of salivary gland to plan further management accordingly. It provides a fairly accurate idea of a benign or malignant tumour. However, specific histopathologic typing is a must in any doubtful case, more so in malignant lesions.

The accuracy of FNAC can be further improved, if the diagnostic pitfalls are given due attention. In spite of few limitations, FNAC is valuable in saving the time for diagnosis, cost involved in surgical procedures and the patient counselling preoperatively based on cytologic diagnosis.

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Abbreviations

Lt.	:	Left
Rt.	:	Right
B/L	:	Bilateral
M	:	Male
F	:	Female
SM	:	Submandibular Gland
SL	:	Sublingual Gland
S/O	:	Suggestive of
CL	:	Cystic lesion
CIL	:	Chronic Inflammatory Lesion
CGL	:	Chronic Granulomatous Lesion
CSA	:	Chronic Sialoadenitis
GSA	:	Granulomatous Sialoadenitis
SPA	:	Sclerosing Polycystic Adenosis
NNC	:	Nonneoplastic Cyst
PLA	:	Pleomorphic adenoma
MOA	:	Monomorphic Adenoma
WT	:	Warthin Tumour
MyE./Myoepi.	:	Myoepithelioma
ONCO.	:	Oncocytoma
MEC	:	Mucoepidermoid carcinoma
AdCC	:	Adenoid cystic carcinoma
MyEC	:	Myoepithelial Carcinoma
DC	:	Ductal carcinoma

Ep-My-Ca: Epithelial Myoepithelial Carcinoma
PLGA :Polymorphousb Low Grade Adenocarcinoma
FNAC : Fine Needle Aspiration Cytology
NOS : Not Otherwise Sp

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