Research Paper

Volume : 3 | Issue : 11 | November 2014 • ISSN No 2277 - 8179

Diagnostic Accuracy of Fine Needle Aspiration Cytology (Fnac) and Histopathology in Salivary Gland Lesions

Pathology

KEYWORDS : Fine needle aspiration cytology(FNAC) , Histopathology ,Salivary gland ,Comparison.

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ABSTRACT

Background: fine needle aspiration cytology is minimally invasive ,cost effective and considered gold standard test for the diagnosis of salivary gland lesion.

Aim and objective: An aim of our study was to co-relate the FNAC findings with Histopathological and diagnostic pitfall of the FNAC.

Method and Material: A retrospective study of 105 cases was done at pathology department ,B . J . Medical college, Ahmedabad from September 2012 to August 2013.The cases for which both cytological and Histopathological diagnosis were available was selected. FNAC results compared with histological diagnosis.

Observation And Result : FNAC sows among the total cases, 94cases(89.5%) were benign and 11 cases (10.5%) were malignant. Histopathological finding shows 92 cases benign and 13cases malignant. Sensitivity- 77%, specificity-98.9%, accuracy of our study to diagnose malignant lesion-96.1%.

Introduction

Fine needle aspiration cytology is minimally invasive cost effecative method, causes less discomfort to the patient with repetition. It has been applied routinely as a useful method to diagnose salivary gland lesion and to differentiate between benign and malignant salivary gland lesion. FNAC has allowed a dramatic decreased in unnecessary surgeries with salivary gland lesion. However Histopathological diagnosis is confirmatory for salivary gland lesion. purpose of our study is to find the diagnostic accuracy of FNAC in salivary gland lesion and compare it with Histopathological diagnosis. To understand the diagnostic pitfall of the FNAC.

Method and Material

This was a retrospective study done from September 2012 to August 2013 at tertiary Care center.FNAC was performed in 105 patients with clinically significant salivary gland lesion. After taking the informed consent, the aspiration was done following a thorough Clinical examination.Under aseptic precautions, a 10 cc syringe with a 22-25 gauge needlewas introduced into the lesion. The material was aspirated and smeared onto clean glass slides and thin smears were prepared between two slides.The air dried and ethanol fixed smears were stained with Hematoxylin & Eosin (H&E), MGG(May Grunwald's Giemsa) and Pap (papanicolau) respectively. Formalin fixed (10%), surgically resected specimens were received in the Departmentof Pathology, processed and stained with haematoxylin and eosin for histopathological examination. The stained cytological and histopathological slides were studied, analyzed and correlated.

OBSERVATION AND RESULT

- **Age of the patients ranged from 8-75 years with a median age of 40 years.**

Table- 1. Site of tumour

SITE	NO. OF CASE	(%)
PAROTID GLAND	54	(51.58%)
SUBMANDIBULAR	43	(40.85%)
MINOR SALIVARY GLAND	8	(7.52%)

Table 2. FNAC Diagnosis of Salivary Gland Lesions

	Diagnosis	Total	%
Benign	Benign cystic lesion	9	8.57%
	Chronic sialadenitis	28	26.66%
	Pleomorphic Adenoma	48	45.71%
	Warthin's Tumor	7	6.66%
	Lymphangioma	1	0.95%
	Inconclusive	1	0.95%
	Total	94	89.52%
Malignant	Mucoepidermoid Carcinoma	4	3.80%
	Acinic cell carcinoma	3	2.85%
	Adenocarcinoma	3	2.85%
	Adenoid cystic carcinoma	1	0.95%
	Total	11	10.48%
	Grand Total	105	100%

The results of FNAC were broadly categorized into inflammatory lesions, benign cystic lesions, benign neoplasms and malignant neoplasms. Of the 105 cases (94, 89.5%) were benign and 11 cases (10.5%) were malignant. Amongst the 105 cases, 68 cases (64.8%) were neoplastic while 37 cases (35.2%) were non-neoplastic.

1 False Positive case

Table-4 FNAC diagnosis	Histological diagnosis
Mucoepidermoid carcinoma	Pleomorphic adenoma

3 False Negative cases :

Table-5 FNAC diagnosis	Histological diagnosis
Pleomorphic adenoma	Mucoepidermoid carcinoma
Pleomorphic adenoma	Mucoepidermoid carcinoma
Benign cystic lesion	Adenoid cystic carcinoma

Table -6	HISTOLOGICALLY MALIGNANT	HISTOLOGICALLY BENIGN	TOTAL
FNAC MALIGNANT	10 (TRUE POSITIVE)	1 (FALSE POSITIVE)	11
FNAC BENIGN	3 (FALSE NEGATIVE)	91 (TRUE NEGATIVE)	94
TOTAL	13	92	105

- SENSITIVITY=TRUE +VE/(TRUE +VE) +(FALSE +VE) = 77%
- SPECIFICITY=TRUE –VE/(FALSE +VE)+(TRUE – VE) = 98.9%
- PPV=TRUE +VE/TOTAL +VE = 90.9%
- NPV=TRUE –VE /TOTAL –VE = 96.8%
- When Galen and Gambino method is applied this gives 77% sensitivity of FNAC for reporting malignancy and 98.9% specificity to rule out malignancy.
- The overall accuracy in detecting malignant tumors was 96.1% with positive predictive and negative predictive values 90.9% and 96.8% respectively.
- Pleomorphic adenoma was the most common salivary gland tumour followed by warthin tumor.
- Amongst the malignancies, Mucoepidermoid,, were more common than other tumors like adenoid cystic carcinoma, acinic cell carcinoma, polymorphous low grade adenocarcinoma, and infiltrating salivary duct carcinoma.

DISCUSSION :

The main objective of FNAC in salivary gland lesions is to differentiate between benign lesions and malignant tumors.In our study, a diagnostic efficacy of 96% was achieved for diagnosing both benign and malignant lesions. Overall, FNAC showed a sensitivity of 77.0%, specificity of 98.9%. These results were comparable to previously reported results.

Table -7. Cytohistocorrelation with other studies

First Author	No. of cases	Diagnostic Accuracy	Sensitivity	Specificity	PPV	NPV
Jayaram G	53	73.6%	90%	95%	-	-
Das D	712	91%	94.6%	75%	-	-
Stramandinoli RT	79	82.3%	68.2%	87.7%	68.2%	87.7%
Piccioni LO	176	97%	81%	99%	93%	98%
Iqbal M	49	96.4%	62.5%	96.97%	-	-
Stow N	104	92.3%	86.9%	92.3%	96.8%	86.6%
Postema RJ	380	96%	88%	99.%	95%	97%
Rehman H	50	78%	53.28%	88.57%	72.7%	79.9%
Lukas J	107	89.2%	85.0%	97.5%		
This study	105	96.0%	77.0%	98.9%	90.9%	96.8%

- Although a high diagnostic efficacy of FNAC in diagnosing salivary glands was achieved in this study. A lower diagnostic accuracy of FNAC in typing specific benign lesions was observed in this study while aspirating cystic lesions (9 cases).These lesions were cytologically categorized as benign cystic lesions, as no features of malignancy were seen in their respective smears Of the 9 cystic lesions, 7 cases were diagnosed on histology as chronic sialadenitis, 1 Pleomorphic adenoma and 1 warthin tumour. Postema(2011) et al also observed similar type findings when diagnosing cystic lesions, and concluded that cytologic diagnosis of "cysts" should be interpreted with caution.

Of the 13 malignancies, 3 were misdiagnosed in cytology as benign. One case diagnosed on cytology as a benign cystic lesion. The aspirate of the lesion yielded 2 ml of straw coloured fluid, which on microscopic examination showed foamy macrophages and few ductal cells only and on histology diagnosed as adenoid cystic carcinoma. 2 cases of Mucoepidermoid carcinoma.false-negative result was reported on cytology as a pleomorphic adenoma with epithelial hyperplasia.

- The reason for low lesion prediction in typing specific malignant salivary gland lesions is due to the fact that a large number of benign and malignant neoplasms arise in the salivary glands. And also there is considerable overlap of morphological features of these lesions causing diagnostic difficulties.
- As in other studies, pleomorphic adenoma was also the most common salivary gland lesion in this study, followed by Warthin's tumour.Amongst the malignancies, mucoepidermoid, adenoid cystic carcinoma and acinic cell carcinoma was more common than the others. The incidence of malignant salivary gland tumours in the literature are variable. In a study by Postema et al acinic cell carcinoma was most common while it was adenoid cystic carcinoma in studies by Akhter et al and Stewart et a.

CONCLUSION:

FNAC of the salivary gland is a safe and reliable technique in the primary diagnosis of salivary gland lesions. Although, limitations are encountered while predicting specific lesions on cytology, especially when dealing with cystic and some malignant lesions. This study has shown that FNAC has a high sensitivity, specificity and diagnostic accuracy in diagnosing salivary gland lesions.

Volume : 3 | Issue : 11 | November 2014 • ISSN No 2277 - 8179

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