

Utility of Fine Needle Aspiration Cytology in the Evaluation of Breast Lesions

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ABSTRACT

Background: Fine Needle Aspiration Cytology (FNAC) is a simple, minimally invasive, cost effective, outpatient based and a rapid diagnostic method for breast lesions. The aim of the present study was to correlate cytological findings with histopathological findings and to determine the accuracy of FNAC in the diagnosis of breast lesions.

Material and Methods: A total of 222 breast aspirates were studied. Histo-cytopathological correlations were obtained in 91 cases. All the aspirates were stained with Haematoxylin and Eosin (H and E) stain.

Results: Among 222 patients, 217 were females and 5 were males. Benign breast lesions were found in 144 cases (64.87%); among which fibroadenoma (30.18%) was the commonest lesion which was observed. Malignancy was observed in 69 cases (31.08%); among them, ductal carcinoma was the predominant

lesion (29.28%) which was seen. Histopathological confirmations were obtained in 90 cases out of 91 cases in which histo-cytopathological corrections were possible. All 45 malignant aspirates were confirmed by histopathology. Benign reports were confirmed in 45 out of 46 cases by doing histological examinations; except one case which was diagnosed as malignant by studying its histopathology. Sensitivity and specificity of FNAC in breast lesions were reported to be 97.82% and 100% respectively, with 100% positive predictive value and 97.85% negative predictive value. Diagnostic accuracy of FNAC in the present study was found to be 98.90%.

Conclusion: It is important to remember that a negative FNAC of a breast lesion does not preclude the diagnosis of a carcinoma, particularly in presence of a clinical suspicion of malignancy and/or an abnormal mammogram.

Keywords: FNAC, Breast lesions, Cyto-histopathological correlation

INTRODUCTION

Breast carcinomas are one of the leading causes of cancer in women. Fine Needle Aspiration Cytology (FNAC) is one of the important components of 'triple approach', which has been widely accepted for the preoperative diagnosis of breast lesions [1]. It is a multi-disciplinary approach that includes analysis of clinical and radiological findings in conjunction with FNAC features, to diagnose the breast lesions and to determine the best management plan for the patient.

Most cases of breast lumps are benign [2], but sometimes, it is difficult to determine whether a suspicious lump is benign or malignant, simply by doing a clinical examination. In these circumstances, as a widely accepted and established outpatient procedure, FNAC plays an important role in determining the nature of the lump. FNAC can reduce the number of open breast biopsies [3].

AIMS AND OBJECTIVES

To correlate the cytological findings with histopathological examinations for breast lesions.

To determine the accuracy of fine needle aspiration cytology in the diagnosis of breast lesions.

MATERIAL AND METHODS

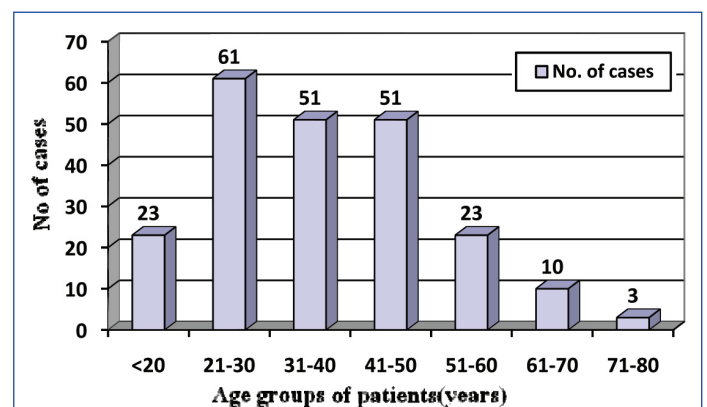
This Fine Needle Aspiration Cytology study was carried out at Smt. N.H.L. Municipal Medical College, Ahmedabad, on 222 patients with breast lesions; among which cyto-histopathological correlations were obtained in 91 cases.

FNAC was done by standard procedure. Palpable axillary lymph nodes were aspirated to exclude metastases. The slides were stained with Haematoxylin and Eosin (H and E) stain. Correlation

with imaging studies, including mammography, was done. Statistical analysis of results was performed.

RESULTS

The age of the patients in the present study varied from 16 to 80 years.



[Table/Fig-1]: Age distribution of patients with breast lesions

Out of 222 cases, female & male patients were 217 and 5 respectively [Table/Fig-1].

This study documented the fact that benign breast lesions were the most common lesions in young females, among which the Fibroadenoma was the commonest one. The malignant lesions were common in fourth and fifth decades of life, among which infiltrating ductal carcinoma was the most common lesion.

Category	Cytological Diagnosis	No. of Cases	Percentage (%)
Inflammatory Lesions (50 Cases-22.52%)	Acute mastitis/Abscess	34	15.32%
	Granulomatous mastitis	12	5.40%
	Tuberculous Mastitis	01	0.45%
	Fat necrosis	02	0.90%
	Duct ectasia	01	0.45%
Benign Breast Lesions (94 Cases-42.34%)	Fibroadenoma	67	30.18%
	Fibrocystic disease	11	4.96%
	Simple cyst	05	2.25%
	Epithelial hyperplasia	01	0.45%
	Galactocele	05	2.25%
	Lactational changes	02	0.90%
	Gynecomastia	03	1.35%
Lesion Not Recognized As Benign or Malignant (06 Cases-2.70%)	Phyllodes tumor	04	1.80%
	Papillary lesion	02	0.90%
Atypical/Indeterminate-Probably Benign (01case- 0.45%)	Epithelial hyperplasia with atypia	01	0.45%
Suspicious of Malignancy (02cases-0.90%)	Atypical cells suspicious of malignancy	02	0.90%
Malignancy (69cases* - 31.08%)	Ductal carcinoma	65	29.28%
	Lobular carcinoma	01	0.45%
	Mucinous carcinoma	01	0.45%
	Stromal sarcoma	02	0.45%
Unsatisfactory		00	00%
Total		222	100%

[Table/Fig-2]: Cytological diagnosis of breast lesions by FNAC (n=222)
*Six cases in which lymphnodes were palpable revealed evidence of metastasis

As has been shown in [Table/Fig-2], one case which was cytologically diagnosed as a benign cystic lesion was diagnosed as a malignant phyllodes tumour by doing a histopathological examination (false negative result). Rest of all cases showed good correlations between FNAC and histopathology.

The two cases which were categorized as “suspicious for malignancy” by cytology turned out to be malignant lesions on histopathology and they were diagnosed as ductal carcinoma in situ with foci of invasion and mucinous carcinoma.

The statistical analysis showed high sensitivity (97.82%) and specificity (100%) of FNAC in breast lesions, with Positive Predictive Value (PPV) and the Negative Predictive Value (NPV) being 100% and 97.82% respectively. The diagnostic accuracy was found to be 98.90% [Table/Fig-3,4].

DISCUSSION

FNAC of breast lumps is an accepted and established method for determining the natures of breast lumps with a high degree of accuracy [4,5]. Application of Fine Needle Aspiration (FNA) for the diagnosis of palpable breast masses was first introduced by Martin and Ellis in 1930 and since then, it has been established as an important tool in the evaluation of breast lesions.

Most of the patients with breast lumps are in a state of anxiety. So, in reducing anxiety and unnecessary surgical procedures as well as in minimization of delay in the diagnosis, FNAC proves very fruitful. FNA procedure is a safe method with only a few reported complications. It has been reported in the literature that the incidence of tumour translocation along the needle track by FNA procedure is only about 0.0045%, and even much lower in superficially located tumours [6].

In our study, out of 46 cytologically diagnosed benign cases, 45 cases were confirmed histopathologically as benign breast lesions. However, one case which was misinterpreted as a benign cystic lesion by FNAC, was later on diagnosed as a malignant phyllodes tumour on doing a histopathological examination (False negative rate-2.17%). This might be due to inadequate sampling, because of the cystic nature of lesion. So, in case of cystic lesions, it is better to re-aspirate the lesion from the solid area after evacuation of cyst or image guided FNA should be performed to locate solid area. It is always necessary to correlate the FNAC findings with clinical diagnoses and mammograms and to go for core biopsies whenever they are needed, to avoid misdiagnoses. The false negative rate varies from 1-8% in different studies [7-10].

FNAC ↓	Histopathological Diagnosis →					
	Inflammatory Lesion	Fibroadenoma	Fibrocystic disease	Phyllodes tumor	Lactational hyperplasia	Breast carcinoma
Inflammatory Lesion	13 (14.29%)					
Fibroadenoma		23 (25.27%)				
Fibrocystic disease			05 (5.49%)			
Benign cystic lesion				01 (1.10%)		
Phyllodes tumor				03 (3.30%)		
Lactational changes					01 (1.10%)	
Breast carcinoma*						45 (49.45%)

[Table/Fig-3]: Cyto-Histopathological Correlation (n=91)
*Two cases from the category of “suspicious lesion for malignancy” by FNAC are included in malignant lesion; as they were confirmed to be malignant by histopathological examination

Studies	No. of benign lesion	Histological diagnosis		No. of malignant lesion	Histological diagnosis		No. of suspicious cases	Histological diagnosis		Sensitivity	Specificity
		Benign	Malignant		Malignant	Benign		Malignant	Benign		
Tiwari M [7]	16	15 (93.75%)	01 (6.25%)	05	05 (100%)	00 (00%)	-	-	-	83.3%	100%
O'Neil S et al., [8]	166	153 (92.17%)	13 (7.83%)	401	398 (99.25%)	03 (0.75%)	125	84 (67.20%)	41 (32.80%)	97%	78%
Zhang Qin et al., [9]	215	213 (99.07%)	02 (0.93%)	73	73 (100%)	00 (0%)	28	26 (92.86%)	02 (7.14%)	97.1%	97.3%
A.Z. Mohammed et al., [10]	61	58 (95.08%)	03 (4.92%)	27	27 (100%)	00 (00%)	02 (2.15%)	02 (100%)	00 (00%)	90.6%	100%
Present study	46	45 (97.83%)	01 (2.17%)	43	43 (100%)	00 (00%)	02 (2.20%)	02 (100%)	00 (00%)	97.82%	100%

[Table/Fig-4]: Cyto-histopathological correlation & statistical evaluation of breast lesions

In the present study, all the 43 cytologically diagnosed malignant cases were confirmed as malignant on subsequent histopathological examinations. So, in our study, a 100% cyto-histopathological correlation was observed for malignant lesions. Zhang Qin et al., [9], AZ Mohammed et al., [10], Tiwari M [7] had also observed the same results in their studies.

In the present study, 2 cases which were cytologically diagnosed as lesions "suspect for malignancy" were confirmed as malignant lesions on doing histopathological studies. Other studies also noted an increase in rate of malignancy on histopathology in lesions which were previously diagnosed under the category of "suspect lesions for malignancy".

A difference was noted in the incidences of benign and malignant breast lesions amongst various studies, which may be explained on the basis of variables like the duration of study period, number of cases studied, age group of patients, etc.

In this study, sensitivity and specificity of breast FNAC were 97.82% and 100% respectively, which were quite comparable with the findings of other studies. Diagnostic accuracy in our study was reported to be 98.90%. Accuracy rates of 84-99.5% have been reported in various series [11].

CONCLUSION

Fine needle aspiration cytology is a simple, cost-effective, highly accurate, quick and relatively less painful procedure which can be used for the diagnosis of breast lumps. Some false negative results are inevitable. Sampling errors and interpretation errors are responsible for false negative results.

Therefore, correlation between clinical examination and histopathology holds high significance in diagnosis of breast cancer.

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