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Original Research Article

Relationship between Fine Needle Aspiration Cytology and its Histopathology in Breast Lump Diagnosis

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Abstract

Background: Breast lesion diagnosis by fine needle aspiration cytology (FNAC) is easy, cheap, minimally invasive, outpatient-based, and quick. The current study set out to investigate the accuracy of FNAC in the identification of breast lesions and to connect cytological findings with histological findings.

Material and Methods: 109 breast aspirates in total were investigated. In 62 cases, histo-cytopathological associations were found. Haematoxylin and Eosin (H and E) stain was used to colour all of the aspirates.

Results: Among the 109 patients, 106 of them were women and only 3 were men. In 74 instances (67.9%), benign breast lesions were discovered, with fibroadenoma being the most prevalent lesion (30.27%). In 17 cases (15.59%), malignancy was noted; ductal carcinoma was the most common lesion (13.76%) among these. In 71 out of 72 instances, histopathological confirmations were obtained. Histopathology determined that all 35 aspirates were malignant. Histological exams were used to confirm the benign reports in 35 of the 36 cases, with the exception of one case, which had its histology used to determine that it was cancerous. According to reports, FNAC's breast lesions sensitivity and specificity were 97.2% and 100%, respectively.

Conclusion: It's crucial to keep in mind that a breast lesion's FNAC results do not rule out the diagnosis of carcinoma, especially when there is a clinical suspicion of malignancy and/or an abnormal mammography.

Keywords: Breast tumors, fine needle aspiration cytology, histopathology, proliferative lesions, ductal carcinoma, fibroadenoma.

Introduction

The most common form of cancer among women globally is breast cancer, and managing breast lesions requires a thorough preoperative evaluation of breast masses. Both general practitioners and surgeons frequently encounter the diagnostic issue of a palpable breast mass. Although excisional biopsy was once a common procedure, needle biopsy now allows for the minimal surgical excision of benign breast lesions. The main goals of fine needle aspiration cytology (FNAC) of breast masses are to

exclude surgery in some benign diseases and to preoperatively confirm malignancy. The study's goal was to compare the results of the cytological and histological investigations of breast lesions.

Materials and Methods

The study was conducted in the Department of Pathology of Sri Krishna Medical College, Muzaffarpur, Bihar from September 2021 to August 2022.

72 of the 109 fine needle aspirations (FNA) for various breast masses carried out over this time period resulted in cyto-histopathological correlations. Tumors, both benign and malignant, were monitored. A disposable 5ml syringe and a 23-gauge needle were used for aspirations. Cytological smears were stained with H and E after being fixed in 95% alcohol. In 10% formalin, the surgical specimens were fixed. The findings of the gross and cut sections were recorded. A number of pieces were collected from suitable locations for processing and paraffin embedding. Sections were cut at a thickness of 4-5 microns from each block and stained with H and E.

Results

Patients in the current study ranged in age from 16 to 80. In 109 cases, there were 109 female patients and 3 male patients, respectively.

According to this study, benign breast lesions, of which the Fibroadenoma was the most prevalent, were the most common lesions in young females. In the fourth and fifth decades of life, malignant lesions were common, with infiltrating ductal carcinoma being the most prevalent one.

A histological investigation of one case that had been cytologically identified as a benign cystic lesion revealed that it was actually a malignant phyllodes tumour (Table.1).

Table 1: Cytological diagnosis of breast lesions by FNAC (n=109)

Category	Cytological Diagnosis	No. of cases	Percentage (%)
Inflammatory Lesion (26 cases – 23.85%)	Duct ectasia	14	12.84%
	Granulomatous Mastitis	5	4.58%
	Abscess	4	3.66%
	Fat necrosis	3	2.75%
Benign breast lesions (56 cases – 51.37%)	Fibroadenoma	33	30.27%
	Fibrocystic disease	15	13.67%
	Galactocoele	4	3.66%
	Lactational changes	1	0.9%
	Gynacomastia	3	2.8%
Atypical/indeterminate-probably benign (1 case – 0.9%)	Atypical epithelial hyperplasia	1	0.9%
Lesion not recognized as benign or malignant (5 cases – 4.58%)	Phyllodes tumor	5	4.58%
Suspicious for malignancy (3 cases – 2.75%)	Atypical cells suspicious for malignancy	3	2.75%
Positive for malignancy with cystic change (1 case – 0.9%)		1	0.9%

Malignancy (17 cases – 15.59%)	Ductal carcinoma	15	13.76%
	Medullary carcinoma	2	1.9%
Total		109	100%

*5 cases in which lymph nodes were palpable revealed evidence of metastasis.

The two instances that cytology had labelled as "suspicious for malignancy" turned out to have malignant lesions on histopathology, and infiltrating ductal carcinoma was identified as the cause.

The statistical study revealed that FNAC in breast lesions has high specificity (100%) and sensitivity (97.2%). It was discovered that the diagnosis accuracy was 98.90%. (Table 2).

Table 2: Cyto-Histopathological Correlation (n=72)

FNAC	**Histopathological Diagnosis**					
	Inflammatory Lesion	**Fibroadenoma**	**Fibrocystic disease**	**Phyllodes Tumour**	**Lactational Hyperplasia**	**Breast Carcinoma**
Inflammatory Lesion	9(12.5%)					
Fibroadenoma		15(20.9%)				
Fibrocystic disease			7(9.7%)			
Phyllodes Tumour				3(4.2%)		
Benign cystic changes				1(1.4%)		
Lactational Hyperplasia					1(1.4%)	
Breast Carcinoma						35(48.7%)

Two cases from the FNAC category of "suspicious lesion for malignancy" are included in the category of "malignant lesion," as their malignancy was established through histological analysis.

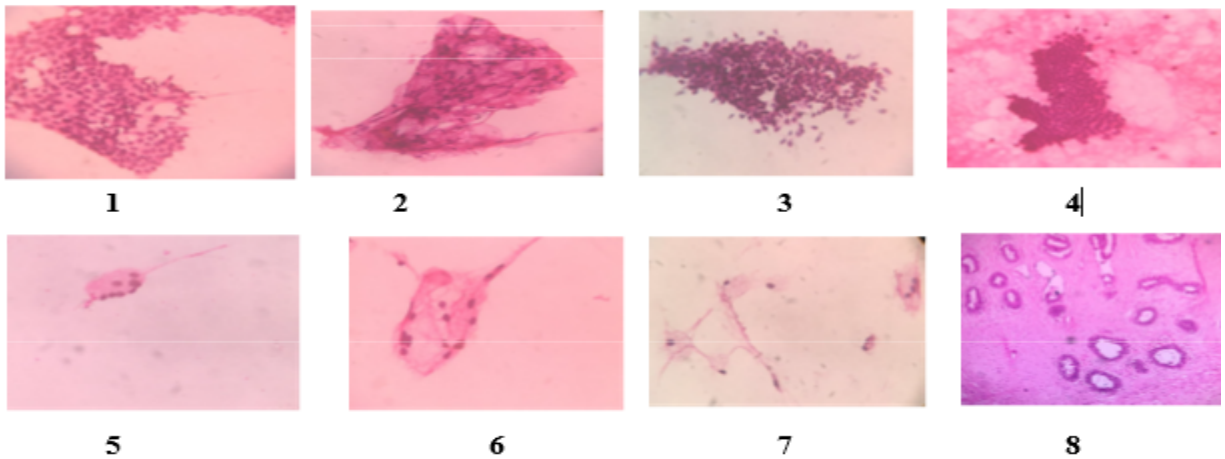

Figure 1, 2: FNAC Suggestive of Gynacomastia,40x: Cohesive clusters of duct epithelial cells and fibrofatty tissue in a clear background.

Figure 3: FNAC Suggestive of Carcinoma breast,40x:Smear showing non cohesive clusters of ductal epithelial cells with pleomorphic nuclei in serofibrinous background.
Figure 4: FNAC suggestive of Fibroadenoma, 40x: Clusters of ductal epithelial cells in tightly cohesive clusters with few benign bare nuclei.
Figure 5, 6: FNAC Suggestive of Fibrocystic disease, 40x: Smear shows sheets of benign ductal epithelial cells along with apocrine cells and cyst macrophages.
Figure 7,8: FNAC Suggestive of Galactocele, 40x: Smear shows cyst macrophages, inflammatory cells and occasional duct epithelial cells in a proteinaceous background.

Discussion

Asymptomatic women can be screened for breast cancer as part of screening programmes in several nations. FNAC had a significant part in the "Triple test [1]. FNAC of breast lumps is a recognised and well-established approach for accurately identifying the types of breast masses [2,3]. Martin and Ellis initially suggested the use of fine needle aspiration (FNA) for the identification of palpable breast masses in 1930, and since then it has become well-established as a crucial technique in the assessment of breast diseases.

The majority of patients who have breast lumps feel anxious. FNAC thus appears to be quite beneficial in lowering anxiety and unneeded surgical procedures as well as in minimising diagnosis-related delays. The FNA operation is a safe one with few documented side effects.

In our investigation, 35 of the 36 benign breast lesions that were cytologically determined to be benign were also histopathologically determined to be benign. However, one example that FNAC mistook for a benign cystic lesion was ultimately identified by a histological study as a malignant phyllodes tumour. As a result of the lesion's cystic structure, this may be the result of insufficient sampling. Therefore, it is preferable to aspirate the lesion again from the solid area after the cyst has been evacuated in cases of cystic lesions, or image guided FNA should be used to locate the solid area. To prevent misdiagnoses, it is always required to compare the FNAC findings with clinical diagnoses, mammograms, and to do core biopsies where appropriate. Various investigations have found a false negative rate ranging from 1–8% [7-11].

In the current investigation, all 35 cases of malignancy that were first detected using cytology were later determined to be malignant through histological analysis. So, for malignant lesions, a 100% cyto-histopathological association was found in our study. In their investigations, Zhang Qin *et al* [7]. AZ Mohammed *et al* [8]. Tiwari M [11]. and others had also noticed the similar outcomes.

Two cases in the current investigation that were cytologically identified as lesions "suspicious for malignancy" were later determined to be malignant lesions after histological examination. In lesions that were previously classified as "suspicious lesions for malignancy," other studies have observed an increase in the risk of malignancy on histology.

Conclusion

The comfort of the patient, the lack of a need for anaesthesia, the speed of analysis, and the ease of reporting make FNAC an appropriate first-line diagnostic method for breast masses. Fine needle aspiration cytology is a rapid, painless, highly accurate, and cost-effective method for determining the presence of breast masses without doing an invasive biopsy. Unavoidably, some false negative outcomes will occur. False negative outcomes are the result of sampling and interpretation problems.

The relationship between the clinical examination and histology is therefore very important in the diagnosis of breast cancer.

Without clinical and mammographic information, it is challenging to subcategorize the lesions cytologically. Following the Triple Test approach and developing technical, observational, and interpretive skills will improve the diagnostic precision of breast lesions even more.

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