

## Comparative Evaluation of Fine Needle Aspiration Cytology (FNAC) and Core Needle Biopsy (CNB) In Categorizing Premalignant Breast Lesions

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### Abstract:

**Background:** The premalignant breast lesions are histologically relatively well defined but there is a certain overlap; more important in FNAC smears and it is not possible to situate a particular case within the spectrum. The CNB may help in some of these cases and disfiguring surgical procedures can thus be avoided.

**Method:** The present study included those cases that came in for FNAC of lump breast. Out of those cases 25 such patients were selected which were diagnosed as benign or indeterminate cases by the FNAC. Core needle biopsy was performed on those cases in the department. The clear cut cases of malignancy and inflammatory lesions were excluded.

**Results:** Peak incidence was seen in the third decade (36%). Out of 25 cases, maximum number was of fibroadenoma (28%) followed by fibrocystic disease (24%), benign ductal hyperplasia (20%). There was 1 case (4%) each of pleomorphic adenoma, atypical ductal hyperplasia. The diagnosis on core needle biopsy was consistent with histopathology in all the cases in which follow up histopathology reports were available. Therefore, the diagnostic accuracy of core needle biopsy in these cases was 100%.

**Keywords:** Core needle biopsy, FNAC, Premalignant breast lesions.

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### I. Introduction

The breast or mammary gland is a modified sweat gland and forms an important accessory organ of female reproductive system. Majority of the breast lesions are benign in nature, most of these are not true neoplasms but rather hormonally induced hyperplastic processes, which may be seen from prepubertal age group to postmenopausal age group. The common causes of palpable breast lumps are cysts, fibroadenoma and carcinoma. According to Ellis and Cox about 30% women were considered to have no breast disease, 40% had fibrocystic disease, 7% had benign tumor fibroadenoma, 10% were suffering from carcinoma and remainder were suffering from miscellany of breast lesions.<sup>1</sup>

Since the presence of any breast mass raises the question of carcinoma, it is important to understand the pattern of various benign breast lesions and their relation with malignancy of breast. The aim in the modern management of breast cancer is to make a rapid pre-operative diagnosis to allow the planning of a therapeutic operation with the patient.<sup>2</sup> FNAC and radiological imaging- mammography and ultrasonography as complements to clinical examination (Triple test) have become the standard approach to the investigation of palpable breast lumps and this has to some extent overcome the limitations of each individual method.<sup>3</sup> Clinically, it is often difficult to determine whether a palpable mass is benign or malignant, therefore the need of definitive tissue diagnosis by biopsy. For the preoperative pathologic diagnosis of breast lumps, FNAC, core needle biopsy, excisional biopsy and incisional biopsy all are used.<sup>4</sup>

FNAC is regarded as an initial diagnostic procedure for palpable breast lesions. It is a technique for obtaining cellular material using a fine needle. The diagnosis is based on cytological examination of aspirate. It is a fast and cost effective diagnostic method that can be done as an outpatient procedure and requires little special equipment, causes minimal morbidity and has an excellent patient compliance.

Even if sufficient specimens are obtained, a definitive diagnosis is not always possible with FNAC as it cannot differentiate between ADH and intraductal carcinoma.<sup>5</sup> Another limitation of FNAC is the inability to differentiate invasive from in situ carcinoma.<sup>6</sup> The distinction between intraductal papilloma/florid papillomatosis, intracystic papillary carcinoma/ papillary DCIS, and well-differentiated papillary carcinoma is difficult by FNAC.<sup>7</sup> The conditions in which FNAC can be inconclusive include papillary lesions, radial

scar/complex sclerosing lesion, fibroadenoma, regenerative epithelial atypia, atypia of ductal epithelium in cysts, DCIS, complex proliferative lesions, tubular and lobular carcinoma.<sup>8</sup>

As a result of these limitations, core needle biopsy of breast lesions has gained popularity over last years, replacing FNAC as preferred modality prior to excision. Core needle biopsy (CNB) of breast provides a solid cylinder of tissue for histological evaluation, rather than just cells, like in FNAC. Its merits are ability to distinguish in-situ from invasive tumors, eliminate false positives, enable grading of malignant tumors and provide more definitive diagnosis. The technique can be used as a substitute for open biopsy for diagnosis of benign lesions and in preoperative planning of surgery in malignant lesions. The CNB is of great value both in nonpalpable and palpable lesions where FNAC is suspicious but not diagnostic of malignancy, as the case in low grade cancers, particularly in tubular carcinoma and invasive lobular carcinoma.<sup>9</sup>

CNB is preferred method when FNAC provides scarce material and suspicion of a lobular carcinoma and radial scar arises as concluded by Berner et al in their study.<sup>10</sup> As the results of CNB are conclusive in most of the cases, in the present study we planned to evaluate the diagnostic accuracy of CNB over FNAC.

## II. Material And Methods

The present study included those cases that came for FNAC lump breast in the Pathology Department. Out of those cases 25 such patients were selected diagnosed as benign or indeterminate by the FNAC. Core needle biopsy was performed on those cases in the department after taking consent. The clear cut cases of malignancy and inflammatory lesions were excluded. The relevant clinical history, family history, investigations and physical examination were recorded.

## III. Results

Peak incidence was seen in the third decade (36%). The youngest patient was 12 years old and the oldest was 50 years of age. Lesions were present in right breast in 9 cases and left breast in 13 cases. In 3 cases lesions were bilateral. In 18 (72%) cases lump was present in upper outer quadrant (UOQ), in 2 (8%) it occurred in upper inner quadrant (UIQ). The lump was seen in lower outer quadrant (LOQ) in 3 (12%) cases and in 2 (8%) cases in axilla. No tumor was seen in lower inner quadrant (LIQ).

### Diagnosis on FNAC:

**Table 1:** showing the diagnosis on FNAC (n=25)

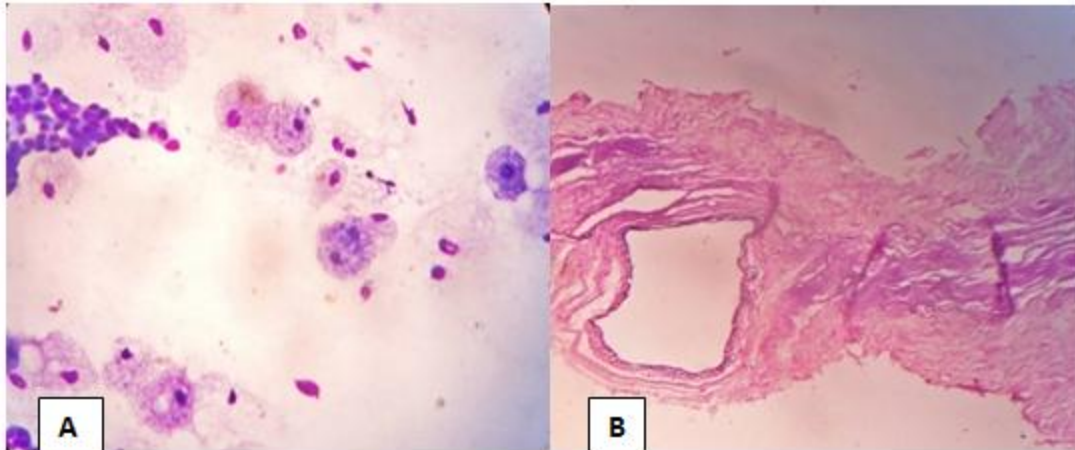
Cytology diagnosis	Number of cases	Percentage
Fibroadenoma	7	28%
Fibroadenoma with ductal hyperplasia	2	8%
Fibrocystic disease	6	24%
Fibrocystic disease with marked atypical ductal hyperplasia	1	4%
Benign ductal hyperplasia	5	20%
Ductal hyperplasia with atypia	1	4%
Pleomorphic adenoma	1	4%
Suspicious	1	4%
Inadequate	1	4%
Total	25	100

Out of 25 cases, maximum number was of fibroadenoma (28%) followed by fibrocystic disease (24%), benign ductal hyperplasia (20%). There was 1 case (4%) each of pleomorphic adenoma, atypical ductal hyperplasia.

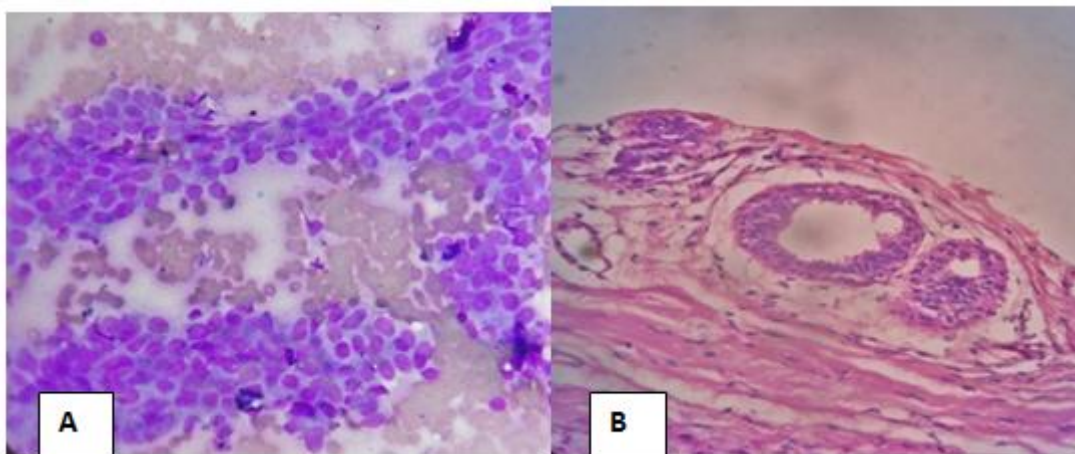
The most common lesion was fibroadenoma (7 cases), characterized by large branching sheets of bland epithelial cells and fragments of fibromyxoidstroma in the background of benign bipolar nuclei. The fibromyxoidstroma stained pink to magenta with MGG stain and had a fibrillary structure. There were 2 cases of fibroadenoma with ductal hyperplasia.

There were 6 cases of fibrocystic disease, which is characterized by sheets of ductal epithelial cells showing apocrine change and scattered single bipolar nuclei in the background of variable amount of cyst fluid and macrophages (Figure 1). There was 1 case each of fibrocystic disease with ductal hyperplasia and fibrocystic disease with marked atypical ductal hyperplasia.

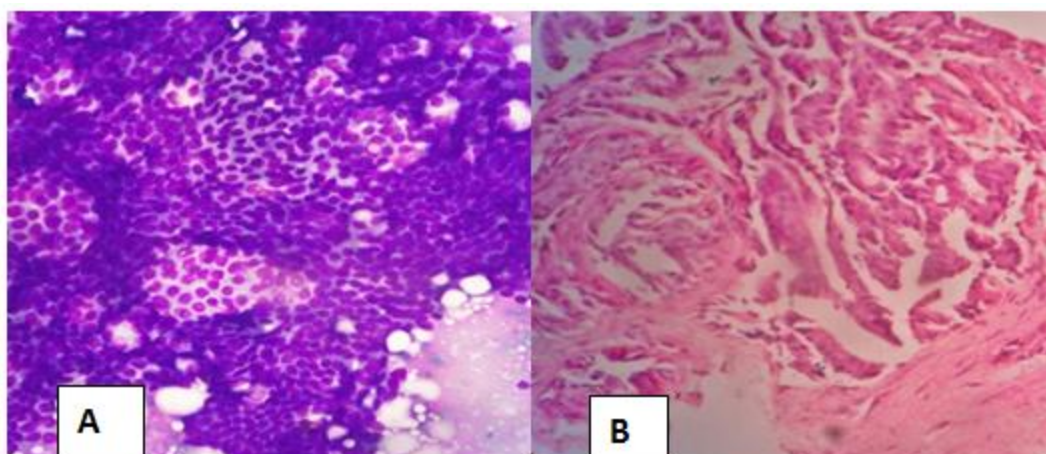
There were 5 cases of benign ductal hyperplasia consisting of cell rich smears, large sheets of cohesive epithelial cells and few single cells. The cells showed streaming pattern, focal crowding and overlapping of nuclei (Figure 2). There was 1 case of ductal hyperplasia with mild nuclear atypia (Figure 3). There was 1 case of pleomorphic adenoma showing benign epithelial cells arranged in sheets, groups and lying singly along with spindle shaped cells in the background of abundant chondromyxoidstroma.



**Figure 1:** FIBROCYSTIC DISEASE (A) FNAC smear showing benign ductal epithelial cells and foamy macrophages in the background (MGG  $\times$  400), (B) CNB shows cystic dilatation of ducts and fibrosis (H&E  $\times$  100).



**Figure 2:** DUCTAL HYPERPLASIA. (A) FNAC smear showing large sheets of cohesive epithelial cells and few single cells. The cells show streaming pattern, focal crowding and overlapping of nuclei (MGG  $\times$  400) (B) CNB showing ductal hyperplasia of usual type (H&E  $\times$  400).



**Figure 3:** ATYPICAL DUCTAL HYPERPLASIA. (A)FNAC smear showing large sheets of mildly atypical cells; 'holes' indicating a cribriform pattern, myoepithelial nuclei not seen (MGG  $\times$  400).(B) CNB (H&E  $\times$  400).

**Diagnosis on core needle biopsy:**

**Table 2:** showing the diagnosis on core needle biopsy

Diagnosis on core needle biopsy	Number of cases	Percentage
Fibroadenoma	6	24%
Fibroadenoma with ductal hyperplasia	6	24%
Fibroadenoma with sclerosingadenosis	1	4%
Fibrocystic disease	6	24%
Fibrocystic disease with ductal hyperplasia	3	12%
Sclerosingadenosis	3	12%
Ductal epithelial hyperplasia	2	8%
Pleomorphic adenoma	1	4%
Phyllodes	1	4%
Total	25	100

Out of 25 cases, maximum number of cases was of fibrocystic disease and fibroadenoma (24%) followed by sclerosingadenosis (12%), fibrocystic disease with ductal hyperplasia (12%) and ductal epithelial hyperplasia (8%). There was 1 case (4%) each of phyllodes and pleomorphic adenoma.

In the cases diagnosed as fibrocystic disease (6 cases), the sections showed cystic dilatation of ducts, apocrine metaplasia of duct epithelium and varying fibrosis. There were 3 cases showing fibrocystic disease with ductal epithelial hyperplasia. There were 6 cases of fibroadenoma showing proliferation of varying amounts of glandular and connective tissue.

**Diagnosis on Histopathology**

The histopathology reports were available for 12 cases out of 25 cases following lumpectomy. Out of 25 cases maximum number was of fibroadenoma (50%) followed by fibrocystic disease (25%). There were 2 cases (16.7%) of sclerosingadenosis and 1 case (8.3%) of phyllodes.

**Comparison of diagnosis on FNAC and Histopathology (n=12)**

**Table 3:**

Diagnosis on FNAC	No. of cases	Diagnosis on Histopathology		Diagnostic Accuracy %
		Consistent	Inconsistent	
Fibroadenoma	6	5	FCD-1	83.3%
Fibrocystic disease	1	1	0	100%
Ductal Hyprplasia	4	0	FA-1 FCD-2 SA-1	0%
Inadequate 1	1	0	SA-1	0%
Total	12	6	6	

**Comparison of diagnosis on core needle biopsy and histopathology**

**Table 4:**

Diagnosis on Core Needle Biopsy	No. of cases	Diagnosis on Histopathology		Diagnostic accuracy (%)
		Consistent	Inconsistent	
Fibroadenoma	5	5	0	100%
Fibrocystic disease	4	4	0	100%
Fibrocystic disease with ductal hyperplasia	1	1	0	100%
Ductal hyperplasia	1	1	0	100%
Sclerosingadenosis	1	1	0	100%
Total	12	12	0	

The diagnosis on core needle biopsy was consistent with histopathology in all the cases in which follow up histopathology reports were available. Therefore, the diagnostic accuracy of core needle biopsy in these cases was 100%.

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#### **IV. Review of Literature**

Various studies have been done to determine the efficacy and usefulness of both FNAC and CNB and the results vary. FNAC has been found to have sensitivity of 84-97.5% and specificity of 99-100%. The positive predictive value of malignant diagnosis is approximately 99%; but rare, although occasional, false positive diagnosis of malignancies are recorded in most series.<sup>11</sup> Khanna et al did a comparative evaluation of FNAC, imprint cytology and tru-cut needle biopsy in 86 patients with breast lump and the results of these techniques were finally compared with the incisional or excisional biopsy in all the patients. FNAC had the sensitivity of 96.8% and specificity of 100% and the tru-cut needle biopsy had the sensitivity and specificity of 100%. They concluded that if FNAC reports a malignant lesion, one can go ahead with a definitive operation but if in a clinically suspected case, FNAC is negative than tru-cut biopsy is ideal for getting the histological report. If a tru-cut needle biopsy report comes out to be negative, one should proceed with incisional or excisional biopsy and imprint cytology and if that comes out to be positive, one goes ahead with the radical operation.<sup>12</sup>

Muhammad et al did a study to evaluate the role of Tru-Cut biopsy as a method of pre-operative histological diagnosis of palpable breast lumps. Tru-cut biopsy was done in 104 female patients with palpable breast lumps and the results were compared with histological findings in all cases after excision. They found that the overall accuracy rate was 92.3%, sensitivity was 94.3% and specificity was 91.3%. After excluding inadequate tissues for histology obtained by tru-cut needle for calculations, the sensitivity was same i.e., 94.3% while specificity was 100%. No false positive or false negative diagnosis was made in the study. They concluded that the method of tru-cut biopsy is simple, well acceptable to the patients, require no hospitalization and can be repeated in case of inadequate tissue or if negative result is obtained while clinically strong suspicion of malignancy is there.<sup>13</sup>

Gukas et al studied 112 patients with palpable breast lesions who had both tru-cut biopsy and excision biopsy as a pre-operative diagnostic procedure. The aim of the study was to establish the role of tru-cut needle biopsy in the pre-operative diagnosis of breast lesions in developing country. They found that 4 patients had specimens that were inadequate for histological diagnosis. Tru-cut biopsy diagnosed 42 of the remaining 108 as malignant and 66 as benign, but only 40 and 61 cases were confirmed to be malignant and benign respectively by excision biopsy. Tru-cut biopsy achieved a sensitivity of 88.9%, specificity of 96.8% and an overall diagnostic accuracy of 93.5%. There was a false positive rate of 4.8%, a false negative rate of 7.6% and a positive predictive value of 95.2%. They concluded that if tru-cut biopsy is done instead of excision biopsy, it will sufficiently reduce the waiting time and therefore, it is useful as an adjunct and a practical option for accurate pre-operative diagnosis of breast lesions.<sup>14</sup>

#### **V. Conclusion**

Both FNAC and CNB are safe, simple and reliable but CNB is more sensitive and provides more definitive diagnosis as compared to FNAC. The method of CNB is simple, requires no hospitalisation, is well acceptable to the patients and is therefore useful adjunct in the preoperative diagnosis of premalignant breast lesions. Premalignant breast lesions are more common in the third decade and the left upper outer quadrant is most commonly involved.

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