

Comparison between FNAC and Core Needle Biopsy in the Diagnosis of Palpable Breast Lesions

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Abstract: The most common sign and symptom of breast disease is a palpable mass. Lumps in breast may be due to benign or malignant lesions. FNAC and core needle biopsy both procedures are used as a screening test in suspicious breast lesions. Objective of this study was to compare the diagnostic accuracy of FNAC and core needle biopsy in detection of palpable breast lesion with the goal of identifying a sensitive, specific, efficient and economical approach to diagnose breast masses. This study included a total of 50 patients presenting with palpable breast lesions to Northern Railway Central Hospital (NRCH), New Delhi from May 2012 to June 2015. All the patients underwent fine needle aspiration cytology and core needle biopsy. Later on all of them had excision biopsy or mastectomy. The results were then compared with the final diagnosis by histopathology. In the fifty patients selected for study the age ranged from 16–80 years with a mean age of 41.62 years. In our study, the sensitivity of FNAC procedure was 92%, 96% specificity, 94% accuracy, 95.83% PPV and 92.31% NPV, while CNB was 96% sensitive, 100% specific, 98% accurate, 100% PPV and 96.15% NPV. Fine needle aspiration cytology from predominant number of patients had similar results in terms of sensitivity, specificity, accuracy, PPV and NPV as compared to core biopsy. Thus use of the appropriate combination of FNAC and/or core biopsy is the best approach for the diagnosis of breast lesions.

Keywords: Breast cancer, Breast lumps, Fine needle aspiration cytology, Core needle biopsy

INTRODUCTION

One of the most common surgical problems in females is a breast lump which may be due to benign or malignant lesions. Breast carcinoma is the most common malignant tumour and the leading cause of carcinoma death in women, with more than 10, 00,000 cases occurring worldwide annually [1]. FNAC and core needle biopsy both procedures are used as a screening test in suspicious breast lesions. FNAC has become an increasingly popular technique in the diagnosis of palpable breast mass owing to its distinct advantages of being quick, simple and inexpensive procedure. It is generally less traumatic than core biopsy, is associated with a low complication rate and, in most instances, does not require local anaesthesia[2]. But FNAC reports lack important information about the histopathological type, grade, receptors, and intrinsic behaviour of the tumor. All of this information is of great importance for correct preoperative evaluation by both surgeon and oncologist [3]. Core biopsy which is based on histological study, yields tissue fragments,

useful in the determination of low grade tumors, differentiation of DCIS or invasive carcinoma and tissue may also be available for adjunctive tests [4,5]. It is useful in the evaluation of lesions likely to be of low histological grade and in those presenting as architectural distortions for which FNAC may fail to provide a diagnosis. Core biopsies are associated with an increased risk of complications, including haematoma and haemorrhage. Core biopsy specimens require adequate fixation and processing, require more time before results can be available. Core biopsy requires local anaesthesia and is generally more expensive than FNAC. This study was undertaken to compare the results of FNAC and core needle biopsy in detection of palpable breast lesions.

MATERIAL AND METHODS

This prospective study was done at Northern Railway Central Hospital (NRCH) from May 2012 to June 2015, involving 50 patients with breast lump(s) who gave their consent to take part. After detailed

history, physical examination, and both FNAC and core needle biopsy were performed in an outpatient setting. After sterilizing the skin, Fine-needle aspiration cytology was performed first using a 22 G needle attached to a 10 ml syringe, with an average of 4-6 passes without local anesthesia. The aspiration was examined after standard Giemsa and Papanicolaou staining.

Core needle biopsy was performed using a core biopsy needle under local anaesthesia. After skin cleansing and lesion fixation, using a scalpel blade, a small cut was made at the selected entry point and the needle was introduced through this entry point. Typically three to five cores were taken through different parts of the lesion to ensure adequacy of sampling. After immediate immersion of the specimen in fixative, core biopsy specimen was sent to histopathology department. After three to four hours fixation in 10% buffered formalin they were routinely processed and stained with haematoxylin and eosin stain. Later on all of them had excision biopsy or mastectomy according to their final diagnosis. The diagnostic accuracy, sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) of both FNAC and CNB were compared with the final histopathological diagnosis obtained either by excision biopsy or mastectomy.

STATISTICAL METHODS

According to the objectives of the study, the collected data were compiled and tabulated. Data analysis was done by using SPSS-11.0, student t-test and chi-square tests wherever applicable. A p value of less than 0.05 was taken as significant.

RESULTS

50 patients presenting with a palpable breast lesion were included in this study. Patient’s age ranged from 16–80 years with a mean age of 41.62 years. Out of 50 patients 17 were diagnosed as fibroadenoma, 3 were reported as fibrocystic disease, 3 as gynecomastia, 1 as phyllodes tumor while 24 were given a diagnosis of malignancy (Table1). Comparison of fine needle aspiration cytology and final diagnosis was done on excision biopsy/ mastectomy specimen by histopathology. FNAC did not correlate with histopathology in 3 patients; one case was erroneously diagnosed as malignant on FNAC (false positive) whereas it was found to be benign as intraductal papilloma on histopathology. 2 cases were declared inadequate due to sampling error, after modified radical mastectomy invasive ductal carcinoma (IDC) was confirmed on histopathology in these cases.

For the same patients, comparison of core biopsy and final diagnosis on excision biopsy was made (Table-2). The results were comparable apart from only one case which was non diagnostic because of inadequate specimen later confirmed as IDC on histopathology.

Table-1: FNAC vs Final diagnosis

Cases	FNAC Results	Histopath report
Fibroadenoma	17	17
Fibrocystic ds	3	3
Gynecomastia	3	3
Phyllodes tumor	1	1
BPBD (benign proliferative breast disease)	0	1
IDC	24	25
Inadequate	2	-

Table-2: CNB vs Final diagnosis

Cases	FNAC Results	Histopath report
Fibroadenoma	17	17
Fibrocystic ds	3	3
Gynecomastia	3	3
Phyllodes tumor	1	1
BPBD	1	1
IDC	24	25
Inadequate	1	-

Table-3: Distribution of cases on FNAC

FNAC↓	Malignant	Benign	TOTAL
Positive	23	1	23
Negative	2	24	27
TOTAL	25	25	50

Sensitivity = $\frac{\text{True positives} \times 100}{\text{True positives} + \text{False negatives}} = \frac{23}{23+2} \times 100 = 92\%$

Specificity = $\frac{\text{True negatives} \times 100}{\text{True negatives} + \text{False positives}} = \frac{24}{24+1} \times 100 = 96\%$

Positive predictive value (PPV) = $\frac{\text{True positives} \times 100}{\text{True positives} + \text{False positives}} = \frac{23}{23+1} \times 100 = 95.83\%$

Negative predictive value NPV = $\frac{\text{True negatives} \times 100}{\text{True negatives} + \text{False negative}} = \frac{24}{24+2} \times 100 = 92.31\%$

Table-4: Distribution of cases on CNB

CNB↓	Malignant	Benign	TOTAL
Positive	24	0	24
Negative	1	25	26
TOTAL	25	25	50

In similar way, diagnostic value of CNB was calculated (Table-4). The sensitivity of core biopsy was 96%, specificity was 100%, the predictive value of a

positive result was 100%, and the diagnostic efficiency was 98%.

Table-5: Comparison of diagnostic values

Value	FNAC	TRUCUT	p-value
Sensitivity	92.00%	96.00%	0.27
Specificity	96.00%	100.00%	0.15
PPV	95.83%	100.00%	0.15
NPV	92.31%	96.15%	0.27
% of F-	8.00%	4.00%	0.27
% of F+	4.00%	0.00%	0.15
Diagnostic Accuracy	94.00%	98.00%	0.34

There was no significant difference in the diagnostic value (sensitivity, specificity and accuracy) of CNB and FNAC with a *p* value of more than 0.05(Table-5). The results of both techniques were comparable to each other.

DISCUSSION

Cancer of the breast is responsible for the greatest number of deaths from malignant disease in women and the incidence appears to be rising. Prognosis is thought to be improved by early diagnosis and therefore any method which contributes to this deserves due consideration. Our present study was conducted on 50 female patients with a palpable breast lump, each of whom underwent a fine needle aspiration cytology and core needle biopsy of the lump followed by excisional surgery either in the form of lumpectomy or a definitive surgical procedure like mastectomy,

depending on the final diagnosis. The results of FNAC and CNB were then compared with the final diagnosis of excision biopsy i.e by histopathology. In the fifty patients selected for our study, the age ranged from 16–80 years with a mean age of 41.62 years. Maximum numbers of patients with benign lesions were between the age 20-30 years and maximum patients with malignant lesions were between the age 50-60 years. In a similar study done by Hussain *et al.* [6], the age distribution for breast lump was between 15-65 years. Hatada *et al.*[4]reported a mean age of 52 years Studies done by Homesh *et al.* [7] and Ariga *et al.* [8] showed similar age patterns. In our study, the sensitivity of FNAC procedure was 92%, 96% specificity, 94% accuracy, 95.83% PPV and 92.31% NPV, while CNB was 96% sensitive, 100% specific, 98% accurate, 100% PPV and 96.15% NPV. Inadequate samples were considered as a false result, similar to the findings of

Hatada *et al.* [9]. While the value of sensitivity of FNAC in our study was 92%, an absolute value of 90.9% was obtained by Hussain *et al.* [6]. Franco *et al.* [10], in the study of 300 patients on the utility of FNAC, reported a positive predictive value of 100% and a negative predictive value of 92%. A very large study of 1297 patients by Choi *et al.* [11], on correlation of FNAC and histopathology reports, PPV was found to be 98.4% and NPV was 88%. Considering patients comfort, lack of requirement of anaesthesia, rapid analysis and reporting and absence of false positive results make FNAC as accepted and established method in breast lumps. Although several studies have demonstrated a high degree of diagnostic accuracy in breast cancer with aspiration cytology Alderson *et al.* [12] its role in the management of breast lesions is still controversial Garre *et al.* [13]. Many surgeons are reluctant to consider positive cytology results as the only criterion for performing definitive surgery Dejmeek *et al.* [14] since no distinction is possible between infiltrating and no infiltrating lesions. The sensitivity of core biopsy was 96%, specificity was 100%, the positive predictive value was 100%, negative predictive value was 96.15% and the diagnostic efficiency was 98%. CNB also gives the definitive histological type and grade which can be correlated with the final histopathology report [4]. Other important information about the immunohistochemistry of the tumor i.e the hormone receptor status can also be obtained from core needle biopsy tissue blocks which enables the use of neoadjuvant therapy for down-staging of advanced tumors [15]. CNB is reported to have a higher sensitivity and specificity compared with FNAC in some studies (Chuo & Corder [16], while others maintain the FNAC was more sensitive and more cost-effective than CNB Ballo & Sneige [17]. However core biopsy needle causes more patients' morbidity in terms of pain and bleeding as compared to FNAC needle [18]. Also, CNB do not have the advantage of early reporting like FNAC [18]. Yong *et al.* [17] reported a higher detection rate (90%) for FNAC compared to 67% for Trucut biopsy.

In this study we found out that fine needle aspiration cytology from predominant number of patients had similar results in terms of sensitivity, specificity, accuracy, PPV and NPV as compared to core biopsy and then results were comparable to the final diagnosis on excision biopsy. Our results were also consistent with those of Hatada *et al.* [9] and Westenend *et al.* [19] showed that core needle biopsy and FNAC perform equally well on most reported values such as sensitivity, positive predictive value for malignancy, and inadequate rate. Cheung *et al.* [20] obtained almost identical values for sensitivity and specificity of FNAC and CNB with the use of Tru-cut biopsies and concluded that one technique is not superior to the other. The main purpose of breast FNAC

is to distinguish between patients with benign and possibly malignant breast lumps. In lesions suspicious for malignancy core biopsy should be performed for histological examination, evaluation of hormone receptor status, confirmation of invasive disease.

CONCLUSION

Fine needle aspiration cytology (FNAC) is a reliable and relevant method for the pathological diagnosis of breast lesions in developing nations. It is highly useful as an initial method of pathological assessment for palpable breast lumps. The accuracy and sensitivity of diagnosis on fine needle aspiration cytology is high. The only limitation is due to sampling error i.e failure to obtain a representative sample resulting in inadequate cases and this precludes a definitive role of FNAC as compared to CNB. Overall, CNB is a more reliable biopsy method, but for palpable lesions, FNAC should be used as the first line test and inadequate or inconclusive FNAC can be largely resolved by using core needle biopsy (CNB) as a second line method for confirmation of pathological diagnosis, and more importantly for assessment of receptor status to plan for neo-adjuvant chemotherapy in certain breast cancer cases. So FNAC and CNB are complementary procedures. We suggest that there are advantages in combining fine needle aspiration cytology, core needle biopsy, clinical impression and imaging findings to reach to a definitive diagnosis.

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