Core needle biopsy verses fine needle aspiration cytology in palpable breast lesions- a comparative study

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Abstract

Background: Cytological diagnosis has its own limitations specially in suspicious lesions and poorly circumscribed lesions in Breast. Core needle biopsy (CNB) emerged as an important tool in assessment of breast lesion with high sensitivity and specificity. The present study was conducted to evaluate the utility, advantages and limitations of FNAC and CNB in palpable breast lumps in the region of Punjab.

Methods: The study was conducted on 93 patients attending the cytology section of Pathology Department at SGRDIMSAR, Amritsar. All the patients were subjected to Fine needle aspiration (FNAC) and CNB simultaneously. Both the FNAC smears and sections from CNB were subjected to microscopic examination and were reported according to standard National Health Service Breast Screening Programme criteria.

Results: CNB detected 4.4% more cases of malignancy. The suspicious rates on FNA (C3 & C4) with total percentage of 17.2% were 4.1% on CNB (B3 & B4). For diagnosing the malignant lesions concordance rate between FNAC and CNB was 92.3% and for benign lesions it was 80.5%. The sensitivity and specificity of FNAC was 92.15% and 96.5% respectively. Positive predictive value was 97.9% while negative predictive value was 87.5% for FNAC.

Conclusion: In the present study we concluded that CNB detects more malignant cases and assign the category of benign and malignant to suspicious/borderline lesions detected on FNAC more definitively. Therefore providing better alternative to open biopsy in such cases for diagnostic purpose. But seeing the advantages of FNAC technique, FNAC is preferred technique in definitely benign lesions.

Keywords: CNB, FNAC, Palpable Breast Lesion

Introduction

Breast cancer is the leading cause of morbidity and mortality among women of developed and developing countries as well.[1] But the scenario is worse in developing countries due to lack of implementation of the screening programme. Women present at an advanced stage even at first time of presentation in developing countries like India.[2] Triple assessment is the mainstay in diagnosis consisting of clinical examination, radiological examination and Fine needle aspiration cytology (FNAC).[3] Cytological diagnosis has its own limitations specially in suspicious lesions and poorly circumscribed lesions. Core needle biopsy (CNB) emerged as an important tool in assessment of breast lesion with high sensitivity and specificity.[4] In the west there are enormous studies regarding the comparison of FNAC and CNB in screen detected breast cancers but the comparative studies of FNAC and CNB on palpable breast lumps are relatively less. With this point of view present study was conducted to evaluate the utility, advantages and limitations of FNAC and CNB in palpable breast lumps in the region of Punjab.

Material and Methods

The study was conducted on 93 patients attending the cytology section of Pathology Department at SGRDIMSAR, Amritsar. A detailed clinical history was taken and examination was done as per proforma attached. Patients with positive clinical examination were subjected to FNAC as CNB by same operator. FNAC was done as per the standard procedure using the 22 G needle, 20 ml syringe and FNAC handle. The smears were air dried for May Grunwald Giemsa (MGG) stain and were wet fixed with 95% ethanol for Papanicolaou and haematoxylin & eosin stain. CNB was done unguided freehand using 18 G automatic Trucut biopsy needle after informed consent from the patient. It was done as per procedure described by Bishop J et al.[5] Three to five cores were taken from different part of the lesion. The cores taken were fixed in 10% neutral buffered formalin for six hours minimum and were processed in single block after parallel arrangement arrays of the cores. Both the FNAC smears and sections from CNB were subjected to microscopic examination and were reported according to standard National Health Service Breast Screening Programme (NHSBSP) criteria.[6] (Table 1). All the results were analysed statistically and the findings of FNAC and CNB were compared to establish the utility of both the procedures.

Table 1: Reporting categories for FNAC and for CNB

	Cytology reporting		Core biopsy reporting
C1	Unsatisfactory	B1	Unsatisfactory tissue only
C2	Benign	B2	Benign
C3	Atypia probably benign	B3	Benign, but of uncertain malignant potential
C4	Suspicious of malignancy	B4	Suspicious of malignancy
C5	Malignant	B5	Malignant
			B5a Non-invasive cancer
			B5b invasive cancer
			B5c Cancer of non-assessable invasiveness

Results

Total 93 cases of palpable breast lumps were subjected to FNAC and CNB simultaneously. The presenting age of the patients varied from 16-75 years. The size of the lump varied from 1cm to 10 cms. 89 patients had single lump, four patients presented with more than one and multiple lumps.

FNAC and CNB diagnosis and comparison between two was as per Table 2.

Table 2: Comparison study of FNAC and CNB

FNAC	CNB					
	B1	B2	B3	B4	B5	Total
C1	0	0	0	0	0	0(0%)
C2	1	28	0	0	0	29(31.2)%
C3	0	6	1	2	2	11(11.8%)
C4	0	1	0	1	3	5(5.4%)
C5	0	1	0	0	47	48(51.6%)
Total	1(1.07%)	36(38.7%)	1(1.07%)	3(3.3%)	52(56.0)%	93(100%)

Distribution of cases according to CNB diagnosis category B2 and B5 was as Table 3.

Table 3: Distribution of cases according to CNB diagnosis category B2 and B5

Diagnosis B2	No. of cases	Diagnosis B5	No. of cases
FA	25	IDC	50
FCD	08	MC	01
FAD	01	ILC	01
GM	01		
CM	01		

FA-Fibroadenoma, FCD-Fibrocystic Disease, FAD-Fibroadenosis, GM- Granulomatous Mastitis, CM- Chronic Mastitis, IDC-Invasive Ductal Carcinoma, MC-Medullary Carcinoma, ILC- Invasive Lobular Carcinoma
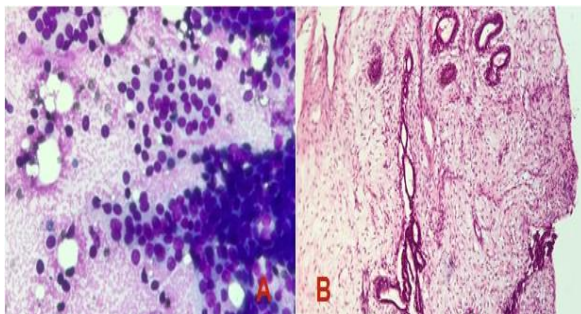

Fig. 1A: C2(Benign Category) showing benign ductal epithelial cells with uniform nuclei arranged in monolayered sheets with admixed myoepithelial cells-MGG 400X, B: B2(Benign Lesion) showing fibroadenoma with benign ducts lined by epithelial cells and myoepithelial cells along with benign looking spindle cell stroma-H&E100X
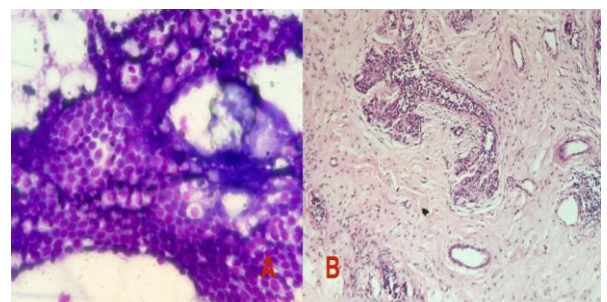

Fig. 2A: C4(Suspicious of Malignancy) showing cohesive and discohesive ductal epithelial cells with micro-windowing-MGG 400X, B: B4(Suspicious of

Malignancy) showing atypical tumour cells arranged in cords and acini with pleomorphic cells, increased N:C ratio and hyperchromatism-H&E-100X
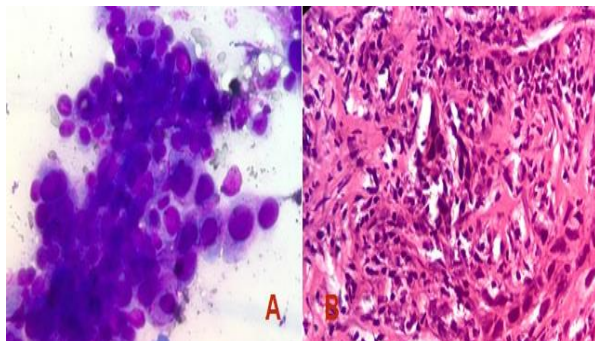

Fig. 3A: C5(Malignancy) showing pleomorphic cells with moderate amount of cytoplasm-MGG 400X, B: B5(Malignancy) showing infiltaring ductal carcinoma- H&E-400X

CNB of C1 (Unsatisfactory) category: No case was of C1 category but only one case of B1 category was there which was C2 (benign) on FNAC.

CNB of C2 (Benign) category: Benign cases C2 were 29 in number. On all case CNB was done. 28 cases turned out to be benign on CNB as well (B2). One case belonged to B1 (normal tissue) category.

CNB of C3 (Atypia probably Benign) category: Out of 11 C3 cases, 6 cases turned out to be B2 (Benign) on CNB. One case belonged to B3, 2 cases to B4 (Suspicious for malignancy) and 2 cases to B5 (Malignant).

CNB of C4 (Suspicious of malignancy) category: Three out of five cases of C4 were diagnosed as B5 (Malignant) on CNB. One case turned out to be B4 (Suspicious of malignancy) only and one case was B2 benign on CNB.

CNB of C5 (Malignant) category: 48 cases were categorized as C5 on FNAC. 47 cases were found to be malignant B5 on biopsy as well and one case was diagnosed as Benign on CNB.

Malignant diagnosis on CNB (B5) was 56% as compared to 51.6% on FNAC (C5). Therefore, CNB was able to detect 4.4% more cases of malignancy. The suspicious rates on FNAC (C3 & C4) with total percentage of 17.2% dropped to only 4.1% on CNB (B3 & B4). FNAC diagnosed 31.2% cases of benign lesion (C2) as compared to 38.7% on CNB (B2). Thus CNB detected 6.5% more benign cases definitely than FNAC. For diagnosing the malignant lesions concordance rate between FNAC and CNB was 92.3% and for benign lesions it was 80.5%. The sensitivity and specificity of FNAC was 92.15% and 96.5% respectively. Positive predictive value was calculated to be 97.9% while negative predictive value turned out to be 87.5% for FNAC.

Discussion

Breast cancer is emerging as number one cancer especially in the cities of India. Due to the lack of awareness and lack of screening programme in our country patients presents with palpable and at times with large lumps at first time of presentation.[7] There are enormous studies regarding the comparison of FNAC and CNB in screen detected breast cancers but the comparative studies of FNAC and CNB on palpable breast lumps are relatively scarcely available specially from the region of Punjab.

Some surgeons are reluctant to start the treatment on the basis of cytological diagnosis only as distinction between non infiltrative lesions from infiltrative lesions is not possible on cytology. Preoperative chemotherapy is based on ER PR and Her-2-neu status which can be done on core biopsy only.[8]

The sensitivity of FNAC in diagnosing malignancy was 92.15% in our study which was more than the results of previous studies where it varied from 64.5%-86.3%.[7,9,10] The specificity and positive predictive value of FNAC was 96.5% and 97.9% respectively which was in concordance with the various studies conducted in the past.[11,12] Thus FNAC could detect good number of malignant cases but four cases were missed in diagnosis and were false negative. These cases were given as C4 and one case as C3 (suspicious lesions) on FNAC. The negative predictive value of FNAC was 87.5% which was slightly higher than the value calculated by other researchers.[7,11,12] CNB was able to detect 4.4% more cases of malignancy and the suspicious rates on FNAC (C3&C4) with total percentage of 17.2% dropped to only 4.1% on CNB (B3&B4) corroborating the findings of other studies.[13,14,15] Therefore CNB was able to detect more definite cases of benign and malignant as compared to FNAC. B3 and B4 category consisted of only four cases but C3 and C4 cases were 16 in number. This proves the importance of CNB in diagnosing the borderline/suspicious lesions. Thus CNB biopsy improves the reoperative diagnosis more definitely than FNAC.

For diagnosing the malignant lesions concordance rate between FNAC and CNB was 92.3% and for benign lesions it was 80.5% while other authors have calculated medium rate of concordance ranging from 60-80%.[15,16]

The inadequacy rate for CNB was 1.07% in our study was parallel to inadequacy rate of 2-4% calculated in other studies.[12,17] CNB has the advantage of high specificity and positive predictive value. Thus can give more definitive diagnosis in large proportion of the cases. CNB can differentiate between in situ and invasive carcinoma. Assessment of the grade is also likely though concordance with final grade has not established by various studies.[18,19] CNB also offers the application of immunohistochemistry in this era of

preoperative chemotherapy. Genetic studies can also be performed on the cores obtained by CNB.

  FNAC has its advantage of being cost effective, fast, less time consuming and early reportability. FNAC has its advantage in aspiration of axillary lymph nodes in the case of metastasis where it is difficult to perform the core needle biopsy. Thus FNAC is preferred in the diagnosis of clinically benign appearing lesions. In case of malignant and potential malignant lesions fast and cost affectivity advantage of FNAC is irrelevant. Also taking histopathology as gold standard CNB is an OPD procedure, more cost effective and minimal invasive as compared to open biopsy. FNAC is more cost effective in diagnosing the benign lesions but overall expense in diagnosing malignant and suspicious lesions increases.

Conclusion

  In the present study we concluded that CNB detects more malignant cases and assign the category of benign and malignant to suspicious/borderline lesions detected on FNAC more definitively. Therefore providing better alternative to open biopsy in such cases for diagnostic purpose. But seeing the advantages of FNAC technique, FNAC is preferred technique in definitely benign lesions.

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