Original Research Article

Core Needle Biopsy and Final Surgical Excision Histopatholgy in Palpable Breast Lesions –A Comparative Study

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Abstract

Core needle biopsy (CNB) is a part of triple assessment for preoperative evaluation and diagnosis of breast cancer as it can distinguish benign and malignant lesion, insitu and invasive cancers. In addition to its primary role in establishing histologically diagnosis it can provide prognostic information like grade and type of tumor which can influence initial therapeutic decisions. We present the result of 80 patients of palpable breast lesion who underwent for core needle biopsy followed by therapeutic surgical excision. Diagnosis of lesion along with histological typing and grading of invasive carcinoma were determined in both core needle biopsy and excision and the result compared. We observed 83.2% agreement for histological typing. There was 66 % agreement with overall grade (kappa K value-0.56),71.2% for tubule formation score 66.6% for nuclear pleomorphism,55% for mitoses (component of Bloom Richardson grading).Only 45cases of grade 1 shows concordance but 80% of grade 3 cases show concordance between CNB and surgical excision. This result is of important clinical relevance as these are the patients potentially most likely to benefit from neoadjuvant therapy. The Major problem with assessing of grading of tumor on CNB is due to under sampling of most representative areas. Hence quadrant wise sampling with increase of attempts in different directions and assistance of image guidance would improve the accuracy of CNB.

Keywords: Core needle biopsy, Grade, Histological type, carcinoma.

INTRODUCTION

Breast cancer is the most common cancer in women in India [1]. It is also the 2nd leading cause of cancer death among women. The process of breast lesion diagnosis is initiated by detection of an abnormality through self -examination, or physical examination by a physician or surgeon and pathological examination and screening mammography (triple test). Pathological examination includes sampling of cells or tissue from suspicious lesion by Fine needle aspiration (FNAC) or core needle biopsy (CNB) or excisional biopsy. FNAC which retrieves a sample of cells, is generally considered less sensitive than both core-needle and open biopsy methods [2-4]. Excisional biopsy are considered to be most accurate but also appear to a carry a higher risk of complication such as bleeding, or infection when compared to core needle biopsy [5]. Core needle biopsy uses special needle of large gauge [14, 16] and retrieve a sufficient tissue for pathologist to make an accurate diagnosis. In most cases core needle biopsy not also provides primary histological diagnosis but also provide prognostic information such as grade and type of tumor and

predictive information which can influence initial therapeutic decision; especially in a case of planning of neo -adjuvant therapy. After the initial correct diagnosis and biomarker assessment patient has an opportunity to discuss, with the surgeon about available various therapeutic modalities and/or seek a second opinion [6]. In benign condition CNB avoids unnecessary breast surgery and it reduces the surgical burden and psychological stress to the patient [7, 8]. So past years the use of breast core needle biopsy has been a precise step in diagnostic and therapeutic breast lump managements.

METHODS

This prospective study of breast lesion was performed January 2015 to 2017 with total duration of 3 years in department of pathology. This study group enrolled 80 symptomatic patients who underwent for trucut needle biopsy for diagnosis, and subsequently later underwent for surgical excision. CNB was performed by surgeons with the use of 16 gauge trucut needle. On an average 3 tissue core were received. Demo- graphic data, clinical diagnosis, site and size of

tumour noted. All core tissue completely submitted for histopathology. Hematoxyline and eosin stained sections of breast cores were assessed. The reporting of breast lesion on CNB follows NHSBSP guidelines and further malignant lesion typed according WHO classification. Histological grade was assessed in all invasive tumours using the modified Bloom Richardson's scoring systems which based on pleomorphism, mitoses and tubule formation. Subsequent surgery was performed approximely one month following biopsy in majority of cases. Patients who received neoadjuvant chemo therapy or radiotherapy were excluded. The subsequent surgical specimens were asses in the same way. Histopathological finding of CNB and final surgical excision were compared. The kappa (K) value was calculated to determine the Agreement between CNB and final surgical excision specimen for histological diagnosis and tumour grade.

RESULTS

A total 80 patents were included .the mean age was 50± SD (range 28 to 80).lesion laterality was almost equal in either breast. 35(43.7%) tumors were located in upper outer quadrant of the breast. Reporting of CNB follows UK National Health Service Breast Screening Program (NHSBSP) guidelines which categorized breast lesions in to 5 categories (B1 to B5). 60 cases reported malignant on CNB; 50of them

reported invasive carcinoma of no special type (NST) and 10 as special type including invasive papillary carcinoma (n= 6), ILC (n=2), mucinous carcinoma (n=2) All 60 cases proved malignant upon surgical excision. The histological type correlate exactly (including 10 special type and IDC) with that surgical excision in 55 of 60 cases except in 5 cases of IDC which were reclassified in to medullary carcinoma (n=4) cases and mixed type lobular with ductal(n=1) on final surgical excision. Diagnosis could not be rendered in 2.5% (2 out of 80) cases labeled as a suspicious for malignancy (B4 category) all were confirmed with excision to be invasive carcinoma of no special type. Category 3 included 2 cases of fibro epithelial lesion and 2 cases of duct papilloma which were reported as a Phyllodes tumor and duct papilloma respectively on lumpectomy category 2 included benign cases 4 cases of mastitis on CNB, on lumpectomy 3 cases reported as duct ectasia and one necrotizing granulomatous mastitis.10 out of 80 cases reported inconclusive (category B1) on CNB shows fibrocollegenous and few TDLU after on final surgical excision Malignancy confirmed for 5 cases and 5 were Benign. Malignant cases included 3 cases of IDC, 1 cases of invasive lobular carcinoma, 2 cases of papillary carcinoma and benign cases accounted mammary hamartoma in 2 patients, fibrocystic change in 1patient, and fibroadenoma in 2 cases Concordance rate for histological type of lesion is 83.2%.

Table-1: Comparison of grade between CNB and surgical excision

Core Grade	Excision- Grade			Total
	1	**2**	**3**	
1	**5**	4	2	11
2	3	**27**	9	39
3	1	1	**8**	10
Total	9	38	20	60

K value =0.50, 66.6% agreement

Table-2: comparison of tubule score between CNB and surgical excision

Core tubule score	Excision- tubule score			Total
	1	**2**	**3**	
1	**1**	2	0	3
2	0	**14**	9	23
3	0	6	**28**	34
Total	1	22	37	60

K value-0.55, 71.6% agreement

Histological grade was evaluated in 60 cases that were identified as invasive carcinoma by both CNB and final excision. Present study shows 66.6% agreement with K value of 0.505for overall grade between CNB and final surgical excision which indicate moderate agreement 45.4% (5 out of 11) of grade 1 tumors, 69.2 % (27out of 39) of grade 2 tumors, 80% (8 out of 10) grade 3 cases, correlating well with that of

agreement of final surgical excision. 20 cases were discordant: 15 cases underestimated (1 grade discordant -13 cases, 2 grade discordant-2cases) 5 cases over - estimated (4 cases by one grade, 1 case by two grade (Table-1) we calculated agreement between CNB and surgical excision for individual component of Bloom-Richard son grading.

Table-3: Comparison of nuclear pleomorphism between CNB and surgical excision

Core nuclear pleo-morphism	Excision- nuclear pleomorphism			Total
	1	**2**	**3**	
1	1	3	0	4
2	0	**24**	10	34
3	1	6	**15**	22
Total	9	38	20	60

K value-0.45, 66% agreement

Results showed 71.6% agreed for tubule formation score, 66% cases agreed for nuclear pleomorphism 55% agreement for mitosis between CNB and final surgical excision (Table 2-4 respectively).

Table-4: Comparison of mitosis between CNB and surgical excision

Core mitoses	Excision- mitoses			Total
	1	**2**	**3**	
1	**24**	16	3	43
2	03	**08**	05	16
3	00	00	**01**	01
Total	9	38	20	60

K value- 0.40, 55.0 % agreement

DISCUSSION

The reliability of breast core biopsy in the diagnosis of carcinoma is well documented. In this study 67 masses were found to be malignant on final histopatholgy, their corresponding CNB reported 60 as malignant, 5 as inconclusive, 2 were suspicious. The result presented here of a 83.2% agreement for histologic type between excision and core biopsy similar to Badoual burge *et al*., Tamaki, Mohammad *et al*., and Harris *et al*., studies documenting a range of 76 to 100% [9-12]. Histological diagnosis on CNB generally reflect the characteristics of the area sampled from the primary tumor, hence its sensitivity in comparison to the surgical excision may be affected by regional difference in the structure and differentiation of the primary tumor eg. Tamaki *et al.*, [10], Piana *et al.*, [13] concluded under sampling and tumor heterogeneity is probable reason for discordance. CNB is more accurate when predicting the presence of a pure pathological morphology [14]. Present study also observed that Mucinous, Lobular papillary carcinoma were reported accurately on CNB. Thus precise pathological diagnosis provided better managements.
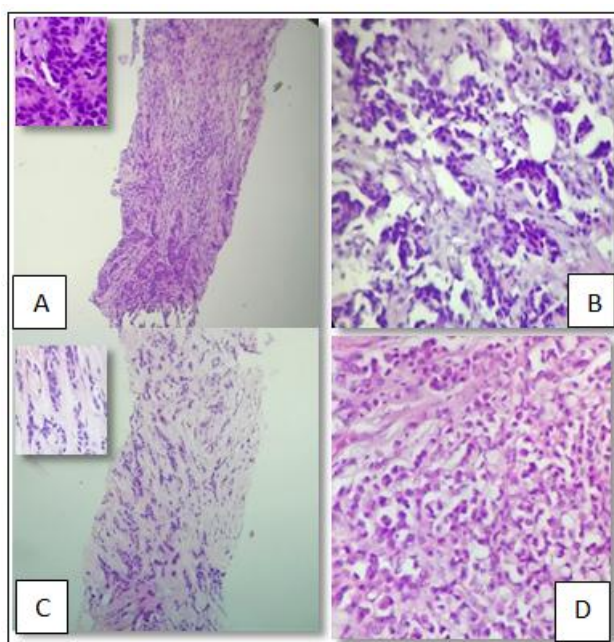

Fig-1: Concordant cases – moderately cellular core (A) and final excision (B) showing invasive carcinoma (NST) ; Core (c) and subsequent excision (D) showing lobular carcinoma(tumor cells arranged in cords and single file pattern
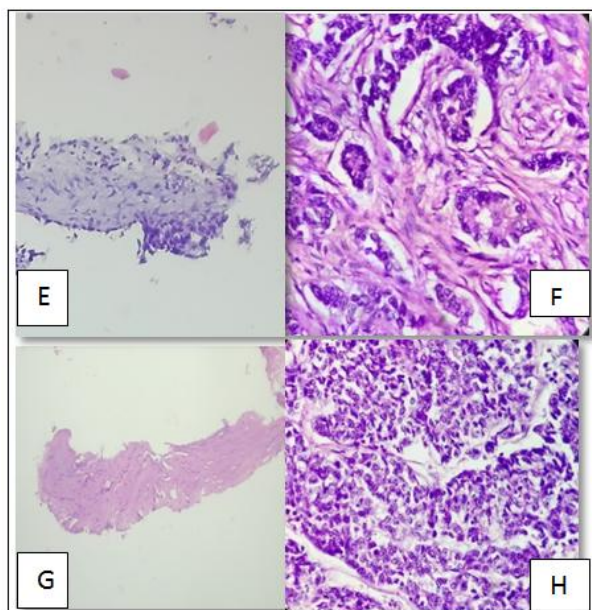
Fig-2: Discordant cases core (E) shows few atypical cells; subsequent specimen (F) shows invasive carcinoma (NST); (G) inconclusive core, subsequent final excision (H) shows invasive papillary carcinoma

There were 10 cases which showed few TDLU fibrocollegenous tissue and on CNB. Probable explanation for this type of cores are most likely a sampling error; or a tumor is very deep seated or; a small size or mobile tumor, since the needle may be slip off the masses which are difficult to locate on palpation guided biopsy In such cases image guided biopsies have been shown to have an increased reliability and accuracy in diagnosis, owing to the increased quality and quantity of tissue obtained [15]. In the absence of image guidance increased number of attempts in different direction would have helped in adequate representation of mass. Our institute surgeons showed more confidence in the palpation method Also all the patients enrolled in this study had palpable masses. The doer's technique and his experienced is also an important factor in yielding a right representative core especially in absence of image guidance Present study showed 66 % agreement for tumor grade with K value was 0.45 which means moderate degree agreement on tumor grade between CNB and final surgical resection; with highest level of agreement achieved for the grade 3 tumors as compared to grade 1 tumors ,which is similar to other studies where agreement was ranging from 67% to 80% [12, 16-19]. This result is particularly clinical relevance as these are the patients who would benefit from neoadjuvant therapy or early intervention. In core needle biopsies the overall grading seems to be underestimated rather overestimated In present study 15 cases were underestimated and 5 cases overestimated, although majority this was only by factor of 1. Mohammad et al., [11] Harris et al., [12] studies also documented under grading rather than over grading of tumor on CNB more likely for discordance. Looking at the three constitute of modified Bloom- Richardson grading system the lowest of concordance rate was observed in mitosis score. Present study showed the agreement was relatively high with respect to tubular formation (k=0.56) and nuclear grade (k=0.49) which reflected a high degree of reproducibility of these scores. The agreement of the mitotic count was lower 56% (k=0.45) suggesting that mitosis was also the main factor for disagreement on microscopic grades; mainly owing to under -estimation of mitosis scores in the CNB. Most workers conclude that the under grading of carcinoma on CNB most likely due to mitotic counts [10, 12, 20, 21]. Possible reasons are in- sufficient amount of tumor in the core or tumors are sampled randomly with CNB. The most representative tumor areas may be missed, especially in heterogeneous tumor, or when morphological preservation of biopsied tissue is often suboptimal, sometimes because of crush artifacts occurring due to needle sampling so mitoses counting is difficult. Tamaki et al., [10] concluded that in surgical specimen mitotic figure are counted in growing edge or periphery of tumor which always shows higher atypia and mitosis whereas in CNB narrow and limited area is available for examination.

CONCLUSION

Core biopsy is reliable, safe and accurate method in establishing the diagnosis of palpable breast lesion also provides useful preoperative prognostic and predictive information (Hormonal Studies) which can play major role in planning treatment strategies. However it is important to emphasize the following- meticulous operator technique is essential for providing representative samples; image guidance can definitely improve the diagnostic efficacy of core needle biopsy with respect to the heterogeneous areas in masses.

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