

Role of Ultrasonic Guided Fine-Needle Aspiration Cytology in Evaluation of Axillary Node Status in Breast Cancer

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ABSTRACT

The standard axillary treatment for breast cancer patient without clinical evidence of axillary nodes is SLNB and if positive leads to axillary clearance but this has some inherent pitfalls. The main objective of this study was to evaluate the diagnostic accuracy and utility of ultrasound guided FNAC in preoperative assessment of axillary lymph nodes and selecting those who should and should not be offered SLNB in breast cancer patients. All symptomatic or screen detected patients of breast cancer with clinically negative axilla were included in this prospective study. Of 131 patients 67 has negative axillary ultrasonography while 64 patients with suspicious nodes had FNAC and 27 turned to be positive for malignancy. Final histopathological examination revealed positive node in 57 patients: 42/64(66%) of suspicious nodes and 15/67(22%) of negative axillary ultrasonography. The U/S has sensitivity of 73% and specificity of 70% while U/S guided FNAC has sensitivity of 64% but specificity of 100%. It correctly diagnosed 27/57(47%) positive nodes and 21% of all patients where axillary clearance was performed directly without SLNB. Hence, we conclude that axillary ultrasonography and FNAC is useful diagnostic tool which will add valuable preoperative information about axillary node status, minimizing false negative rate, as well as will save cost and time by avoiding SLNB in nearly a quarter of patients.

Keywords: Ultrasound guided FNAC, Axillary Lymph Nodes, Breast Cancer, Ultrasound examination.

INTRODUCTION

Breast cancer is the most common cancer in females which carries significant morbidity and mortality. Axillary lymph node status remains most important prognostic indicator and best guide to adjuvant chemotherapy¹ that's why the search for ideal assessment tool continues. Sentinel lymph node (SLN) biopsy over the last decade has become a standard method for evaluation of nodal status². The inherent pitfalls of the procedure are hospital admission, general anaesthetic, cost and above all the false negative rate^{2,3} which can lead to an erroneous decision about treatment. The reported incidence of 1-15% patients with negative sentinel node biopsy will have metastasis in other affected nodes in same axilla⁴. Thus raise the question of whether another sole or supplemental procedure can help to overcome these drawbacks.

There are sporadic reports about the use ultrasound guided fine-needle aspiration cytology for preoperative evaluation of axillary node metastasis. Hence, we designed a prospective study to evaluate the efficacy of ultrasound guided fine needle aspiration cytology (FNAC) in preoperative assessment of axillary nodes

PATIENTS AND METHODS

Between March 2004 to July 2005, all symptomatic or screen detected breast cancer patients with negative axillary nodes on clinical examination evaluated on high frequency ultrasonic probes (7.5-12 MHz) with colour imaging by single ultrasonologist were included in this study. The arm was abducted to about 90 degrees, after identification of pectoralis muscle's lateral border examination started from level 1 and proceeded towards higher level. The ultrasonographic examination was considered suspicious of metastasis if one or more of following criteria was present: (1) eccentric cortical enlargement (>3 mm) or lobulation with displacement of hilum, (2) absent hilum and irregular border (3) hypochoic echotexture, (3) spherical node, (4) perinodal vascularity. Where nodes were suspicious of involvement as described above were considered as positive ultrasonographic examination and all these underwent ultrasound-guided FNAC examination.

The patients who on ultrasonography have normal looking nodes or non-visible nodes were considered as negative or normal examination and no FNAC was carried out. The patients with negative ultrasonographic findings or negative FNAC (C1- C4) of nodes underwent sentinel node biopsy and further treatment was based on the result of SLN biopsy result. While, patients with positive (C5) FNAC result went straight for axillary dissection. However to reduce the affect of variables like preoperative

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neoadjuvant chemotherapy, patients with positive (C5) FNAC referred for preoperative chemotherapy were excluded from study. Similarly, the patients without final histopathology report were also excluded from study.

Finally, the result of preoperative ultrasonography and FNAC were correlated with final histopathology of axillary nodes. The statistical analysis was performed by Epicalc 2000.

RESULTS

A total of 191 patients of breast carcinoma had preoperative axillary ultrasonography and FNAC where indicated over the period of 15 months, out of which 131 patients with available final histopathology result and no neoadjuvant therapy were included in the study. The majority 74(56%) of patients came from symptomatic patients while 57(46%) were screen detected cases. The ultrasound examination was normal in 67(51%) patients, whereas positive in 64(49%) patients. The average diameter of positive nodes was 16.5mm against the 14.4mm average diameter of negative nodes. The average cortical thickness of positive was 4.7mm in contrast to 2.2mm of negative nodes. Apart from minor bruising in few cases, there was no major complication related to FNAC neither was any affect on subsequent procedure on axilla. Among the patients with normal U/S examination of axilla, the 8 of the 29 patients with no visible nodes on axillary ultrasonography turned out to be positive for node metastasis while 38 patients with normal looking nodes on ultrasonography, 7 patients have positive nodes on final histopathology. The correlation of U/S examination and final histopathology findings are shown in table 1. The patients with suspicious or indeterminate findings on axillary ultrasonography has higher incidence of nodal metastasis (65.6%) on histopathology as compared with normal or negative axillary ultrasonography examination (22.3%) regardless the result of FNAC. Similarly, symptomatic patients have more incidences (39/74) of metastasis to axillary nodes on histopathology as compared with (18/57) screen detected cases. Furthermore, 21/39(54%) of symptomatic cases were diagnosed preoperatively by FNAC while 6/18(33%) screen detected cases was diagnosed preoperatively.

The result of FNAC and its correlation with final histopathology are shown in table II. Only C5 results were taken as positive for metastasis, while C1-C4 was considered negative and subjected to SLN biopsy.

Overall, 57 patients had positive node on final histopathology out of which 27(47.4%) were correctly diagnosed on preoperative U/S guided FNAC, while

30(52.6%) positive nodes were misdiagnosed. The sensitivity, specificity, positive & negative predictive values, accuracy rate and 95% confidence interval of axillary ultrasonography as well as FNAC are shown in Table III, which shows ultrasonography is more sensitive but less specific while, U/S guided FNAC has low sensitivity but very high specificity and positive predictive value.

Table I: Results of Axillary Ultrasonography and Histopathology

Axillary U/S Examination	HP +ve	HP -ve	Total
+ve 64	42	22	64
-ve 67	15	52	67
G. Total	57	74	131

*HP = Histopathology

Table II: U/S Guided FNAC and Histopathology Results

FNAC	=n	HP +ve	HP -ve	HP not available
C5	37	27(100%)	00	10
C4	04	3(100%)	00	01
C3	03	00	01	02
C2	68	10(14.7%)	19	39
C1	12	2(16.6%)	02	08

Table III: Statistical Analysis Results

Type of Analysis	Ultrasonography Result		U/S guided FNAC Result	
	Result	95% CI	Result	95% CI
Sensitivity	73%	60.3-84.5%	64%	48-78%
Specificity	70.3%	58.5-80.3%	100%	82-100%
+ve Predictive V	65.3%	52.7-77.1%	100%	84-100%
-ve Predictive V	77.6%	65.8-86.9%	59%	42-75%
Accuracy Rate	71.8%	63.2-79.3%	77%	64-86%

*CI= Confidence Interval

DISCUSSION

Axillary dissection remains the gold standard for evaluation of nodal status in breast cancer patients but it carries high morbidity, cost and prolonged recovery time⁵. Hence, has been largely replaced by sentinel node biopsy^{1,3}. However, SLNB in addition to its other disadvantages is in fact not a true pre-operative assessment tool. Patients who are candidates for neo-adjuvant chemotherapy need accurate pre-treatment staging of axilla which is not possible without an operation. Furthermore, if SLNB is performed after chemotherapy the false negative rate increases from an average 5% to about 12% of cases⁶. For these reasons the search for ideal preoperative tool goes on and multiple imaging modalities has been evaluated for detection of nodal metastasis like ultrasonography, CT, MRI and immunoscintigraphy but all have accuracy equal to or less than that of high resolution ultrasonography of

axilla⁷ with added advantages' like cheapest, easiest, least invasive and freely available among all.

The accuracy of preoperative ultrasonography diagnosis of nodal metastasis has been enhanced with advent of high frequency ultrasonography technology and more précised criterion of nodal involvement^{8,9,10}. Many investigators has used ultrasonography for assessment of axilla in non-palpable nodes and based on morphological criteria the sensitivity varies from 48.8-75.9% with 55.6 – 97% of specificity^{11,12}. The present study has sensitivity of 73, specificity of 70% and accuracy of 71% is well within the reported figures. Furthermore, the low sensitivity and specificity of ultrasonography are further improved by addition of U/S guided FNAC of suspicious nodes. The current study showed U/S guided FNAC although has somewhat low sensitivity (64%) but has very high (100%) specificity and positive predictive value which has been observed by others too^{8,12,13} which makes this method a promising tool in detecting axillary metastases in breast cancer patients.

Another reason of SLNB failure is skip lesions. The SN idea is based on the fact that the lymph flows to first drainage node before it go to rest of the nodes, therefore the SN will catch up metastasis before the rest. However, in case of extensive infiltration the inflow is blocked and lymph is diverted to succeeding nodes.^{3,14} This neo-Sentinel node may not have tumour deposit at the time of evaluation, hence resulting in false negative result. The preoperative ultrasonography and FNAC may well identify this skip lesion and will help to overcome this shortcoming, hence minimizing false negative rate. The other potential advantages are; the ultrasonographic guided FNAC is an outpatient procedure without the need for hospital admission, general anaesthesia and is far less time consuming procedure as compared with SLNB.^{16,17} Another possible use may be expanding suitability criteria for SLNB. Many centre, including ours, only offer SLNB to <3cm unifocal carcinomas. Could this be expanded to include larger / multifocal tumours if axillary U/S is negative? This would need further validation before implementation. We believe that this is a useful way for preoperative screening of axilla in patients planned to undergo a SLNB.

Finally, the patients who are diagnosed to have metastasis on FNAC will go for axillary clearance directly, therefore will reduce number of SLN procedures thus saving time and cost. In present study 27/57 (47%) which proved to have lymph node metastases on FNAC was spared from SLNB and underwent ALND directly.¹⁸ These results are comparable to reported figures which vary between 30-50% as observed by Bonnema¹⁹ 1997, de

Kanter²⁰ 1999, Boumeester²¹ 2003 and Deurloo²² 2003. However, there are many reasons for this minor disparity of results like patient selection, experience of radiologist and equipment etc. Highest detection of Bonnema is probably due to the fact that his study has 43% T2 tumours, while our study and Sapino²³ study has above 80% T1 tumours and only these two studies included DCIS as well. At the same time 47% detection rate of our study is perhaps due to the reason that in all these cases we used high frequency colour imaging ultrasonography and procedure was carried out by single dedicated breast radiologist.

The ultrasonography and FNAC are simple, outpatient procedures which are quite reliable in experienced hands and will add additional preoperative information without any major extra cost or equipment. We suggest that ultrasound guided FNAC should be part of preoperative assessment of all breast cancer patients. It will possibly help to minimize false negative rate and spare a significant number of SLNDs, by selecting those patients who need axillary clearance at primary surgery, hence avoiding psychological trauma to patient and financial cost of hospital as well as provide more accurate staging for patients going for neoadjuvant chemotherapy.

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