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Original Research Article

A comparative study to evaluate the efficacy of the USG and USG guided FNAC of axillary lymph node of carcinoma breast in clinically node negative cases

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ABSTRACT

Background: Breast cancer remains the most common malignancy among women and accounts for 32% of all cancers in women. The average age of developing cancer is shifted from 50-70 years to 30-50 years. Cancers in young tend to be more aggressive. In the absence of distant metastasis, assessment of axillary status is the important part of initial staging process because of its subsequent importance in management. And the absence of presence or absence of axillary metastasis is the strongest prognostic indicator available for breast carcinoma. The objectives were to assess the accuracy USG and USG guided FNAC of axillary lymph nodes of carcinoma breasts in clinically node negative cases and to determine USG guided FNAC can be used to detect axillary lymph nodes metastasis.
Methods: This was a comparative study conducted at KIMS Hospital from November 2013 to November 2015. All the patients with clinically node negative carcinoma breasts were evaluated with USG Axilla and those found to be having lymph nodes were subjected to USG guided FNAC and these were correlated with the HPR report.
Results: A total 12 patients who satisfied the inclusion criteria were included in study. The most common age group involved in this study was 30-40 years. Upper outer quadrant was the most common location of the group. The sensitivity of the USG in detecting axillary lymph node was 50%, specificity 75%, positive predictor value 805, negative predictor value 42.8% and accuracy of 58.3%. Sensitivity of USG guided FNAC was 50%, specificity 100%, positive predictor value 100%, negative predictor value 50% and accuracy of 66.6%.
Conclusions: In conclusion USG-FNAC of axillary lymph node is a simple, minimally invasive and reliable technique for the initial determination of ALN status in patients with breast carcinoma. In present study, the PPV of 100% and NPV of 50% indicate that the predictor power of a positive result is excellent but as expected a negative result is less helpful.

Keywords: Axillary lymph node, Breast carcinoma, USG guided FNAC

INTRODUCTION

The Smith Surgical Papyrus (3000-2500 B.C.) is the earliest known document to refer to breast cancer. The cancer was in a man, but the description encompassed most of the common clinical features. In reference to this cancer, the author concluded, "There is no treatment".[1]

Breast cancer remains the most common malignancy among women and accounts for 32% of all cancers in women. The average age of developing cancer is shifted from 50-70 years to 30-50 years. Cancers in young tend to be more aggressive.[2,3] In the absence of distant metastasis, assessment of axillary status is the important part of initial staging process because of its subsequent

importance in management. And the absence of presence or absence of axillary metastasis is the strongest prognostic indicator available for breast carcinoma.

Axillary lymph node dissection is a useful staging procedure for patients with breast cancers. Physical examination alone is neither sensitive nor reliable way to ascertain lymph node status, because metastatic lymph nodes are often reliable and reactive lymph nodes may be mistaken for metastasis.[2,3] Axillary lymph node dissection is found to be positive in 30% of palpable tumour and 10% of non-palpable tumours in patients with clinically negative axillary involvement. The remaining 70-90% undergo unnecessary axillary dissection.[4,5]

Today because of wide spread use of mammography as screening tool has led to detection of lesion in early stage.[6,7] the rate of lymph node involvement in early stage is very low. So, in order to avoid unnecessary ALND and the morbidity associated with it. Different techniques have been used for detection of axillary metastasis preoperatively.

The SLNB has been introduced for that only. But this technique is time consuming and may require immunohistochemistry study, technical expertisation and also requires a team of nuclear medicine specialist, surgeon and pathologist. Moreover, facilities for it are not available in all centres and is also not cost effective.

Among the imaging modalities ultrasound has been investigated for its non-invasive nature and the ease for it in evaluating the axilla. It visualise not only alteration in size, shape contours of lymph nodes, but also changes in cortical morphology and texture that can reflect the presence of axillary metastasis. The sensitivity of USG is further increased if combined with USG guided FNAC of any sonologically detected suspicious lymph node.[8-10]

Objective of this is to assess the accuracy of USG and USG guided FNAC of axillary lymph node of carcinoma in clinically node negative cases and to determine USG guided FNAC can be used to detect axillary lymph node metastasis.

METHODS

Source of data

12 clinically and FNAC proved carcinoma breast in KIMS hospital, Hubli, Karnataka, India.

Inclusion and exclusion criteria

All the cases proved carcinoma breast of all age group and both sexes and clinically node negative cases were included. Previously operated, previously treated patients, those with negative node but having evidence of systemic metastasis and clinically node positive cases were excluded.

Method of collection of data

All cases satisfying the inclusion criteria were taken for the study. After taking informed consent the patients were subjected to USG and USG guided FNAC of the axillary lymph nodes and the report obtained from the pathologist regarding the status of the axillary lymph nodes and were compared with post-operative HPR of the specimen regarding the status of the nodes after axillary dissection and the accuracy of USG and USG guided FNAC was assessed by appropriate statistical methods.

RESULTS

60 patients were seen during period out of which 12 patients were clinically negative for axilla. So, 20% of cases are found to be clinically negative for axillary lymph node. This was a comparative study conducted at KIMS hospital Hubli, Karnataka, India. All the patients with clinically node negative carcinoma breast were evaluated with USG axilla and those found to be having lymph nodes were subjected for USG guided FNAC and these were correlated with the histopathology report. A total of 12 patients were included in this study. Data was analyzed and appropriate statistical methods used to present the data. Out of 12 patients studied in this group most of them were in the age group of 30-40 years as shown in Table 3 and most of the lump/tumour were seen in the upper outer quadrant which constitutes about 66.5% (Table 4).

Table 1: Correlation between lymph nodes detected in USG and with HPR.

a (true positive) =5	b (false positive) =0
c (false negative) =3	d (true negative) =4

Sensitivity of USG =a/a+cx100=63.33%; Specificity of usg =d/b+dx100=100%; Positive predictive value =a/a+bx100=100%; Negative predictive value =d/c+dx100=55%; Accuracy =a+d/a+b+c+dx100=75%.

Table 2: Correlation between USG guided FNAC and HPR.

a (true positive) =4	b (false positive) =0
c (false negative) =4	d (true negative) =4

Sensitivity =a/a+cx100=50%; Specificity=d/b+dx100=100% Positive predictive value =d/a+bx100=100%; Negative predictive value =d/c+dx100=50%; Accuracy=a+b/a+b+c+dx100=66.

Table 3: Age distribution of patients in the study.

Age	No. of Patients	Percentage
20-30	1	8.3%
30-40	5	41.6%
40-50	1	8.3%
50-60	3	25%
60-70	2	16.6%

Table 4: Lump location.

Quadrants	No. of patients	Percentage
RUIQ	O	33.33%
RUOQ	4	33.33%
LUIQ	4	33.33%
LUOQ	4	33.33%

USG of the axilla showed positive lymph nodes in 5 (41.7%) patients and negative nodes in other 7 (58.3%) patients (Table 5). Among the USG positive 5 lymph node patients, FNAC of the node was done and 4 of 5 patients showed metastatic deposits in the lymph node (Table 6).

Table 5: USG Of Axilla.

Lymph nodes detected	No. of patients	Percentage
LN +	5	41.6%
LN -	7	58.3%

Table 6: USG guided FNAC of Axillary lymph node.

Metastatic deposit of LN	No. of patients	Percentage
Positive	4	33.33%
Negative	8	66.66%

All the 12 clinically node negative patients the specimen i.e. breast tissue and the axillary tissue was sent for hispopathology evaluation and in 8 of 12 patients the lymph nodes were positive for the metastatic deposits (Table 7).

Table 7: Lymph nodes positive for tumour deposits in histopathology specimen.

Lymph node tumour deposit	No. of patients	Percentage
Positive	8	66.66%
Negative	4	33.33%

Table 8: TNM staging of study patients.

TNM Staging	Stage
T3N0M0	Stage 2b
T3N0M0	Stage 2b
T3N0M0	Stage 2b
T3N0M0	Stage 2b
T2N0M0	Stage 2a
T2N0M0	Stage 2a
T2N0M0	Stage 2a
TXN0M0	
T3N0M0	Stage 2b
T4aN0M0	Stage 3b
T4bN0M0	Stage 3b
T2N0M0	Stage 2a

DISCUSSION

Breast cancer remains the most common malignancy among women and accounts for 32% of all cancers in women. The average age of developing cancer is shifted from 50-70 years to 30-50 years, cancer in young tend to be more aggressive. In the absence of distant metastasis, Assessment of axillary status is the most important part of initial staging process because of its subsequent importance in management. And the absence or presence of axillary metastasis is the strongest prognostic indicator available for breast carcinoma.[2,3]

Axillary lymph node dissection is a useful staging procedure for patients with primary breast cancer. Physical examination alone is neither sensitive nor reliable way to ascertain lymph node status, because metastatic lymph nodes are often not palpable and reactive lymph nodes may be mistaken for metastasis.[2,3] Axillary lymph node dissection is found to be positive in 30% of palpable tumors and 10% of non-palpable tumours in patients with clinically negative axillary involvement. The remaining 70-90% undergo unnecessary axillary dissection.[4,5]

Today because of wide spread use of mammography as screening tool has led to detection of lesion in early stage.[6,7] The rate of lymph node involvement in early stage is very low. So, in order to avoid unnecessary ALND and the morbidity associated with it different techniques have been used for detection of axillary metastasis preoperatively. The SLNB has been introduced for that only. But this technique is time consuming and may require immunohistochemistry study, technical expertisation and also required a team of nuclear medicine specialist, surgeon and pathologist. Moreover, facilities for it are not available in all centres and is also not cost effective.

Among the imaging modalities ultrasound has been investigated for its non-invasive nature and the ease for it in evaluating the axilla. It visualise not only alteration in size, shape contours of lymph nodes, but also changes in cortical morphology and texture that can reflect the presence of axillary metastasis. The sensitivity of USG is further increased if combined with USG guided FNAC of any sonographically detected suspicious lymph node.[8-10]

Ultrasound-guided fine-needle aspiration cytology has a higher NPV (55.56%) than US alone (50%). This means that probability of a patient with negative USG-FNAC not having axillary node metastasis is higher than that with negative US alone. It also signifies that USG-FNAC can detect negative ALN preoperatively but only with a predictive valve of 55.56%.[11]

In a study conducted by Dana et al which was done in 256 clinically node negative patients showed the sensitivity and specificity of AUS alone were 79% and 81%, respectively. The sensitivity and specificity of

FNAB/needle core biopsy alone were 89% and 93%, respectively. The overall combined sensitivity and specificity for AUS-guided FNAB/needle core biopsy were 71% and 99%, respectively, with a NPV of 84% and PPV of 97%.[12]

In a study conducted by Tahir M et al which was done in 197 patients with clinically node negative patients showed the sensitivity of ultrasound guided fine needle aspiration biopsy was 47.1%, specificity 100%, positive predictive value 100%, negative predictive value 70%, with overall accuracy of the procedure 76.3%.[13] In a study conducted by Jung J et al showed the sensitivity, specificity and positive and negative predictive values of the ultrasound alone were 67, 84, 75 and 78%, retrospectively. The sensitivity, specificity and positive and negative predictive values of the US-FNAC were 84, 97, 97 and 85%, respectively.[14]

The study conducted by de Kanter AY et al concluded that in patients without palpable lymph nodes sentinel lymph node biopsy could be avoided in 17% since usg and usg guided FNAC has already diagnosed axillary metastasis. Axillary lymph node echo guided fine needle aspiration cytology enables breast cancer patients to avoid a sentinel lymph node biopsy.[15] In a study conducted by Sumita et al showed USG of axilla in correlation with USG Guided FNA showed the sensitivity, specificity, positive predictive value and negative predictive value of 92.2%, 87.8%, 94.6% and 82.7% respectively. The overall sensitivity and specificity of USG alone was 67.9% and 91%, but by adding USG Guided FNA, the sensitivity increased to 92.2% and specificity to 87.8%. USG alone showed the accuracy of 86.5% which was improved to 90.9% by adding USG guided FNA.[16]

Table 9: Comparison of sensitivity and specificity of USG-FNAC in different studies.

Authors	Sensitivity (%)	Specificity (%)
Tahir et al[13]	47.1	100
Popli et al[11]	78.9	100
Topal et al	90	100
Brancato et al	58.6	100
Krishnamurthy et al	86.4	100
Present study	50	100

In present study, of the 12 cases of breast cancer, US correctly identified 63.33% cases with ALN metastasis (sensitivity). It also correctly identified 100% cases without ALN metastasis (specificity). The probability of a patient with positive nodes on USG having ALN metastasis on ALND was 100% (PPV). The probability of a patient with negative nodes on US not having metastasis on ALND was 55% (NPV). The overall diagnostic accuracy was 75%. It is generally well recognized that the rate of detection of suspicious lymph nodes increases significantly as the number of lymph nodes seen on US examination of the axilla increased. Because of overlapping sonographic features of benign/reactive/suspicious/metastatic lymph nodes, USG was combined with FNAC for more accurate results. The sensitivity of USG-FNAC was 50%, whereas specificity was 100%. The positive predictive value is 100%, negative predictive value is 50% and accuracy of 66.6%.

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