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Role of USG for evaluation of axillary lymph node status in carcinoma breast

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***Abstract*---**Introduction: Breast cancer is the most frequent cancer detected globally and leading cause of cancer related death in women. One of the other methods which can assess the status of the axillary lymph node is USG. Methods and Materials: This is a Hospital based Observational Study, Patients who are admitted in the Department of General surgery, PBMH, Kalinga Institute of Medical Sciences, Bhubaneswar for Breast carcinoma during the period September 2018 to August 2020. A total of 70 patients will be selected after applying the following inclusion and exclusion criteria. Results It was observed that, the clinical presentation of patients with carcinoma breast in this series were breast lump, nipple discharge and nipple retraction. Most common presentation was breast lump. All cases presented with lump in the breast, 5(7.14%) cases presented with lump with nipple discharge and 6(8.57%) cases presented with lump with nipple

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retraction. Tumor size was less than or equal to 2 cm (T1) in 24 (34.29%) cases, tumor size greater than 2 cm but less than or equal to 5 cm were in 46 (65.71%) cases and tumor size more than 5cm were 0 (100%) cases. Mean and Standard Deviation of all Doppler USG parameters i.e. L/S ratio, H/L ratio, Resistivity Index (RI), Pulsatility Index (PI). The L/H ratio ranged from 1.12 to 4, the H/L ratio ranged from 0 to 0.96, RI from 0.34 to 1.23 and PI from 1.25 to 4.25. Conclusion: In our study we have found high specificity of axillary ultrasound in detecting metastatic axillary nodes. So it can be concluded that targeted axillary dissection (TAD) is a better option. Only those with USG negative patients who are having Early breast cancer (size<5cms. T1/T2) and planning for breast conservative surgery must be offered SLNB and referred to centre having such facility.

***Keywords*---**axillary lymph node, breast cancer, ultrasonography.

Introduction

Breast cancer is the most frequent cancer detected globally and leading cause of cancer related death in women. Historically, surgery remained the only modality for its treatment and the prognosis remained poor. [1] However, with the advent of multimodal management, the prognosis has improved. Still then, surgery remains as an important component in multimodal management protocol for loco regional control as well as staging of the breast cancer. Over the years, surgery has evolved from radical mastectomy in the Halsted's era to Breast Conservative Surgery. [2] Now a day, any how the surgery for breast cancer has broadly two components, one is removal of primary tumour and second is axillary staging. Previously Mastectomy was the treatment for all breast cancer primary, now it is BCS in selected early breast cancer. [3] Similarly, the only method for axillary staging was axillary dissection, which carried lot of morbidity in the form of lymphoedema, lymporrhoea, post-operative shoulder dysfunction. Moreover, it is also technically challenging in some cases. As axillary dissection doesn't improve survival and in many cases, it is done unnecessarily. [4]

Carcinoma of the breast is the second most common cancer among females in India next only to carcinoma cervix. [5] It occurs more common in western world, accounting for 3-5% of all deaths in women. In developing countries, it accounts for 1-3% of deaths. [6] Significant numbers of malignant lesions are considered benign by clinical examination and mammography. [7] This appears to be a particular problem in patient below 50 yrs of age where 40% of carcinomas are considered benign or normal by clinical examination. [8] Thus clinical diagnosis calls for further investigation for confirmation of diagnosis particularly in clinically doubtful cases. Axillary lymph node staging of patients with breast carcinoma is essential for treatment planning. Assessment of the axillary lymph node status is crucial in the treatment of breast cancer. It can be done by detection of sentinel lymph node by Isosulfan vital blue dye & through gamma probe /gamma camera. SLNB (Sentinel Lymph Node Biopsy) requires the availability of a radioactive colloid, facilities of lymphoscinti scan and that of

frozen section analysis. Sentinel lymph node biopsy can lead to lymphoedema, pain, and shoulder joint stiffness. [9] It is also associated with a false negative rate of 5-10% [10]. This includes the increased cost and complexity of the surgical procedure. The morbidity associated with SLNB although less than that of axillary lymph node dissection is still considerable.

One of the other methods which can assess the status of the axillary lymph node is USG. Doppler USG of axilla which is a non-invasive procedure and it does not have any complication. It can be done as an OPD procedure. Given the limitations of SLNB, In our study we have tried to establish utility of high frequency Ultrasonography with addition of doppler by comparing its accuracy with that of final histopathological analysis of axillary node (the gold standard) in clinically No carcinoma breast cases.

Methods and Materials

This is a Hospital based Observational Study, Patients who are admitted in the Department of General surgery, PBMH, Kalinga Institute of Medical Sciences, Bhubaneswar for Breast carcinoma during the period September 2018 to August 2020. A total of 70 patients will be selected after applying the following inclusion and exclusion criteria.

Inclusion criteria

The study included all consecutive female and male patients from all age groups presenting with confirmed cases of carcinoma breast and clinically impalpable and insignificant axillary nodes admitted and undergone elective breast surgeries with removal of axillary nodes in the Department of Surgery, Kalinga Institute of Medical Sciences Bhubaneshwar, Odisha.

Exclusion criteria

- Previously undergone any treatment for carcinoma breast.
- Those with node negative but having evidence of
- systemic metastasis
- Clinically node positive case.

Doppler ultrasound evaluation of the ipsilateral axilla was done using high resolution real time Phillips Healthcare ultrasound device with a high frequency linear array probe of 7.5 MHz. The patients were examined in supine position with the arm in 90-degree abduction and external rotation. In this position, the axillary vessels have a nearly straight course facilitating orientation and all parts of the axilla can be thoroughly examined. The pectoral and infra clavicular region around the subclavian vessels were also scanned. The following parameters were recorded. The results of Doppler parameters were correlated with the result of the histopathology of the lymph nodes harvested from the axilla along with breast specimen. The cut off value of each parameter were determined from the Receiver Operating Characteristic (ROC) Curve by using SPSS Statistical Data Analysis software version 16. Then no of True +ve, True –ve, False +ve and False –ve cases were recorded for each parameter to calculate the sensitivity, specificity, positive

predictive value, negative predictive value, diagnostic accuracy of Doppler USG to identify metastatic lymph node. Significance of various parameters were calculated using Student t test and other statistical methods and compared with results from similar other studies.

Results

In table 1 shows the incidence of cases of carcinoma breast. There were 2(2.85%) cases in the 20-30 years age group, 6(8.57%) in the 31-40 years age group, 31(44.3%) in the 41-50 years age group, 14(20%) in the 51-60 years age group, 17(24.28%) in the >60 years of age group. The youngest patient was 22 years of age and the oldest one was 80 years old (both are female) with a mean age of 45.6 yrs of the study population.

Table 1
Age incidence of carcinoma breast

Age group	No of cases	%
20-30	2	2.85
31-40	6	8.57
41-50	31	44.3
51-60	14	20
>60	17	24.28
TOTAL	70	100

Table 2
Duration of symptoms at the time of presentation

DURATION (MONTHS)	NO. OF CASES
1-3	13(18.57%)
4-6	37(52.86%)
7-9	17(24.89%)
>9	3(4.29%)

Table 2 shows the duration of symptoms of cases of carcinoma breast at the time of presentation to this hospital. The number of patients present within 1-3 months were 13(18.57%), within 4-6 months were 37(52.86%), within 7-9 months were 17(24.89%) and 3 (4.29%) cases were more than 9 months.

Table 3
Types of presentation in carcinoma breast

SYMPTOMS	NO. OF CASES
LUMP ONLY	59(84.29%)
LUMP WITH NIPPLE DISCHARGE	05(7.14%)
LUMP WITH NIPPLE RETRACTION	6(8.57%)

It was observed from the table 5 that, the clinical presentation of patients with carcinoma breast in this series were breast lump, nipple discharge and nipple

retraction. Most common presentation was breast lump. All cases presented with lump in the breast, 5(7.14%) cases presented with lump with nipple discharge and 6(8.57%) cases presented with lump with nipple retraction.

Table 4
Location of breast lump in breast

Site of Lump	Side of lump		Total
	Right breast	Left breast	
Upper outer (UO)	15(21.43)	12(17.14%)	27(38.57%)
Upper Inner (UI)	11(15.71%)	7(10%)	18(25.71%)
Lower Outer (LO)	8(11.43%)	6(8.57%)	14(20%)
Lower Inner (LI)	3(4.29%)	0(0%)	3(4.29%)
Central (C)	5(7.14%)	3(4.29%)	8(11.42%)
Total (%)	42(60%)	28(40%)	70(100%)

In Table 4 shows the location of breast lump. There were 42(60%) cases with involvement of right breast, whereas 28(40%) had left breast involvement. So, right breast had higher involvement which is statistically significant ($p<0.05$). The number of cases in upper and outer quadrant of right breast were 15(21.43%) and left breast were 12(17.4 %). Total cases in upper outer quadrant were 27(38.57%). The number of cases in upper inner quadrant of right breast were 11(15.71%) and that in left breast were 7(10%). Total cases in upper inner quadrant were 18(25.71%). The number of cases in lower outer quadrant of breast of right breast were 8(11.43%) and in left breast were 6(8.57%).

Table 5
Tumour size of carcinoma breast

Clinical Stage	Tumor size<(2cm)	(>2cm - <5cm)	(>5cm)
No of case	24	46	0
Percentage	34.29%	65.71%	100%

The table 5 shows that tumor size was less than or equal to 2 cm (T1) in 24 (34.29%) cases, tumor size greater than 2 cm but less than or equal to 5 cm were in 46 (65.71%) cases and tumor size more than 5cm were 0 (100%) cases.

Table 6
Histological types of carcinoma breast

Type of breast carcinoma	No of cases	Percentage
INFILTRATING DUCTAL CARCINOMA	55	78.58%
INFILTRATING LOBULAR CARCINOMA	15	21.42%

Table 6: shows that the most common histological type of carcinoma breast was infiltrating ductal carcinoma (78.58%) and least common type was infiltrating lobular carcinoma (21.42%).

Table 7
Histopathological status of Axillary lymph node

ALN status on HPE	No of Cases	Percentage
Metastatic	42	60%
Non-metastatic	28	40%
Total	70	100%

On histopathological examination of MRM specimen of 70 patients, 42(60%) had metastatic axillary nodes and rest 28(40%) cases had non-metastatic axillary lymph nodes.

Table 8
Doppler ultrasound finding in 70 patients

Color Doppler Parameter	Mean±SD	Range
L/S Ratio	1.98±0.66	1.12 to 4.00
H/L Ratio	0.34±0.19	0 to 0.96
Resistivity Index	0.82±0.19	0.34 to 1.23
Pulsatility Index	2.18±0.63	1.25 to 4.25

Table 8 shows, Mean and Standard Deviation of all Doppler USG parameters i.e. L/S ratio, H/L ratio, Resistivity Index (RI), Pulsatility Index (PI). The L/H ratio ranged from 1.12 to 4, the H/L ratio ranged from 0 to 0.96, RI from 0.34 to 1.23 and PI from 1.25 to 4.25.

Discussion

In this study, 70 patients having carcinoma breast were included for evaluation. These patients were having clinically insignificant axillary lymph nodes. All patients were female. The incidence of breast malignancy showed a rising trend from the 4th decade onwards and percentage of malignant lesions increasing in each decade thereafter. But in the 2nd decade there was sudden fall in the percentage of malignancy. This might be due to very small number of cases studied in the early decade. A slight bimodal trend in the age distribution had been observed with an increase in incidence at the time of menopause. It is not only infrequent in Indian women, but also it occurs in them a decade earlier then in western women. The mean age of occurrence is about 45.6 years in the present study. All patients of carcinoma breast presented with lump in the breast (100%). Some of them presented as lump with nipple discharge (7.14%) and lump with nipple retraction (8.57%). Most breast lumps are found in right breast (60%). Out of four quadrants, upper outer quadrant involvement is seen in maximum number of cases (38.57%). This is followed by upper inner quadrant in 25.71%, lower outer in 20%, central (11.42%) and lowest in lower inner quadrant i.e. 4.29% of cases. Bell et al found almost equal distribution in right (51%) and left

(49%) breast, with commonest quadrant involve being upper outer followed by upper inner, lower outer and lower inner etc. So the present study is consistent with the observation made by Bell et al. [11]

In this study most of the patients presented in clinically T1(34.29%) and least common is T2 (65.71%). The histological diagnosis of carcinoma breast. Most of the cases are infiltrating ductal carcinoma (78.58%). Infiltrating lobular carcinoma is only 21.42%. In this study all patients were undergone Modified Radical Mastectomy and histopathological status of axillary lymph nodes were recorded. Out of 70 patients, 42 (60.0%) had metastatic axillary lymph node and rest 28 (40.0%) patients had nonmetastatic lymph node. In this study, L/S ratio of metastatic lymph nodes was 1.6849(0.39387) while that of non-metastatic nodes was 2.6096(0.69491) (p value=0.001). From the ROC curve the cut off value for L/S ratio was 1.98. A L/S ratio of < 1.98 had a sensitivity of 97.2%, specificity of 82.6% and diagnostic accuracy of 84.23%. This observation is similar to the study by Khanna R et al. [12] H/L ratio of metastatic lymph nodes was 0.2913(0.18354) and those of benign nodes was 0.4491(0.16440) (p value=0.002).

Conclusion

Axillary dissection can only be therapeutic in patients who are node positive. Therefore axillary dissection in all patients of operable cancer would lead to overtreatment in 60% of Early Breast Cancer who are node negative. Considering morbidity in the form of lymphedema associated with ALNB. The new standard which gained momentum in SLNB using dual tracer method.(Blue dye+Radio colloid) but availability of SLNB facility at all corners of the country seems impossible at present . So high frequency usg can exclude / include cases for SLNB. In our study we have found high specificity of axillary ultrasound in detecting metastatic axillary nodes. So it can be concluded that targeted axillary dissection (TAD) is a better option. Only those with USG negative patients who are having Early breast cancer (size<5cms. T1/T2) and planning for breast conservative surgery must be offered SLNB and referred to centre having such facility.

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