

# DIAGNOSTIC VALUE OF ULTRASONOGRAPHY IN DETECTION OF METASTATIC INTERNAL MAMMARY LYMPHADENOPATHY IN BREAST CANCER PATIENTS

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## INTRODUCTION

Lymphatic drainage of breast to which breast cancer can metastasize includes the axillary (ALN), internal mammary (IMLN), infraclavicular, or supraclavicular nodes. 3-12% of breast lymphatics drain to IM chain.

Evaluation of regional lymph node status (N) is crucial for breast cancer disease staging, treatment planning, and prognosis. It is crucial to identify IMLN metastases; as if present it not only changes the nodal stage (it upstages the patient to clinical stage III disease at minimum) and prognosis of the patient but also affects the planning of radiation therapy.

The independent risk factors that increase likelihood of IMLN metastasis include medial tumor location, large tumor size, more involved ALNs, age < 35 years, higher tumor grade, tumor with calcification, nipple inversion, triple-negative hormone receptor status, lymphovascular invasion and negative HER2 status.

Evaluation of the internal mammary nodes with parasternal real-time handheld US is a cost effective and convenient way to detect and upstage nodal metastases.

## AIM OF THE WORK

The aim of this study was to assess the diagnostic value of parasternal US in detection of IMLN in breast cancer patients.

## PATIENTS AND METHODS

This study was conducted on 50 female patients with proven imaging diagnosis of breast cancer referred to breast diagnostic imaging units of Shark El-Madina Hospital and Alexandria Main University Hospital, for parasternal ultrasonography of IMLN

**All patients were subjected to the following scheme upon referral to diagnostic breast imaging unit:** A focused history, breast physical examination, Laboratory assessment.

Imaging evaluation including: Breast mammography, whole breast Ultrasound with extended parasternal Ultrasound of parasternal region bilaterally, computed tomography of chest, histopathological assessment of primary breast lesion and IMLN whenever achievable.

Revision of other confirmatory imaging techniques (MRI, PET/CT) and Follow up imaging data after therapy whenever available.

## RESULTS

**Table 1:** Distribution of the studied patients according to final diagnosis (n=50)

Findings	No.	%
Patients with IMLN	15	30
Patients without IMLN	35	60
Total	50	100

**Table 2:** Site of breast lesion in correlation with presence or absence of internal mammary lymphadenopathy

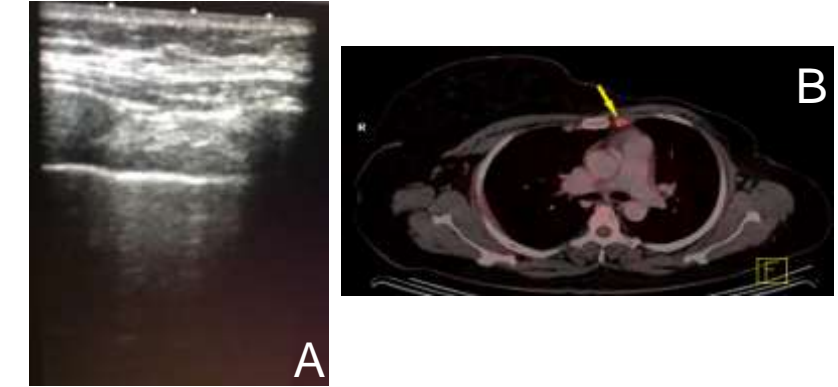
Site of Breast lesion	Cases without internal mammary LNs (n = 35)		Cases with internal mammary LNs (n = 15)		$\chi^2$	P value
	No.	%	No.	%		
Upper / lower lateral	24	68.6	6	40.0	3.571	0.059
Upper /lower medial	4	11.4	6	40.0	5.357*	FEp=0.048*
Central	7	20.0	3	20.0	0.000	FEp=1.000

**Table 3:** Presence of concomitant malignant axillary lymphadenopathy in correlation to presence or absence of internal mammary lymphadenopathy.

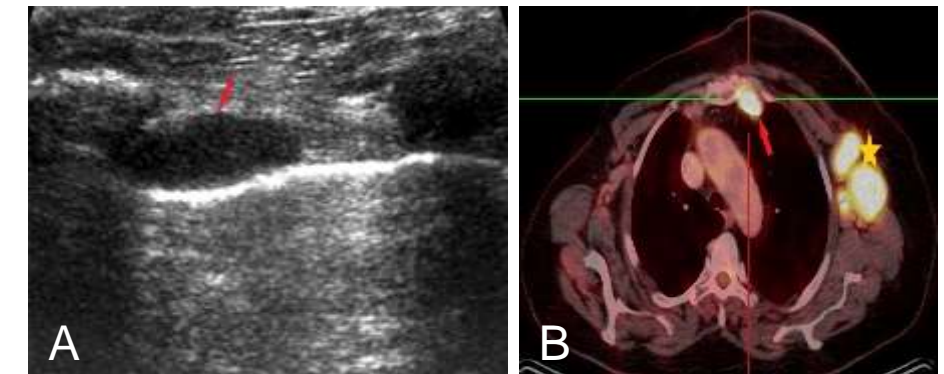
	Cases without IMLNs (n=35)		Cases with IMLNs (n=15)		$\chi^2$	FEp value
	No.	%	No.	%		
Concomitant malignant axillary nodal affection						
Not present	14	40.0	2	13.3	3.431	0.099
Present	21	60.0	13	86.7		

**Table 4:** Diagnostic yield of ultrasonography in detection of IMLN in 50 patients correlated to (CT), the gold standard in detectability.

Ultrasound diagnosis of internal mammary LNS in 50 patients	TP	TN	FP	FN	Sensitivity	Specificity	PPV	NPV	Accuracy
	12	35	0	3	80.0	100.0	100.0	92.11	94.0
	80.0	100.0	0.0	20.0					



**Figure 1:** False negative US diagnosis of Left IMLN in a patient treated for left breast cancer with positive metastatic left IMLN by PET/CT.  
**A)** US image :no IMLN **B)** PET/CT fusion image: left IMLN (yellow arrow).



**Figure 2:** True positive US diagnosis of left IMLN in a patient treated for right breast cancer diagnosed as metastatic left axillary and left IMLN by PET/CT.  
**A)** US image: IMLN (red arrow) **B)** PET/CT fusion image: left IMLN (red arrow).

## CONCLUSION

- Ultrasonography (US) is a cost effective, convenient and easily accessible method in detection of IMLN with high accuracy (94%) with no risk of radiation as compared to CT. so parasternal US should be performed as a part of routine breast ultrasound examination for screening for breast cancer.