



شبكة المعلومات الجامعية  
التوثيق الإلكتروني والميكروفيلم

# بسم الله الرحمن الرحيم



**MONA MAGHRABY**



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# شبكة المعلومات الجامعية التوثيق الإلكتروني والميكروفيلم



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# جامعة عين شمس

## التوثيق الإلكتروني والميكروفيلم

### قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها  
علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات



### يجب أن

تحفظ هذه الأقراص المدمجة بعيدا عن الغبار



**MONA MAGHRABY**



# **The role of ultrasound elastography in evaluation for axillary lymph nodes of patients with breast cancer**

## **Thesis**

Submitted for partial fulfillment of Master's degree in Radiodiagnosis

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# List of Contents

Title	Page No.
List of Tables .....	i
List of Figures .....	ii
List of Abbreviations.....	iv
Introduction .....	1
Aim of the Work.....	4
Review of Literature	
Anatomy of Axillary Lymph Nodes .....	5
Pathophysiology of Axillary Lymphadenopathy.....	12
Conventional Ultrasound and Ultrasound Elastography	22
Patients and Methods.....	37
Results .....	42
Illustrative Cases .....	54
Discussion .....	65
Summary & Conclusion .....	73
References .....	75

# List of Tables

Table No.	Title	Page No.
Table (1):	Elasticity Scoring System for Axillary Lymph Nodes.....	30
Table (2):	Final diagnosis by pathological examination. ....	42
Table (3):	Distribution of age in the examined patients .....	44
Table (4):	The mean age $\pm$ standard deviation of the benign and malignant groups of the examined patients.....	44
Table (5):	The mean $\pm$ standard deviation of transverse diameter, short axis, long axis/short diameter (L/S)diameter ,cortical thickness, focal thickening ,shape and state hilum in the examined lymph nodes .....	45
Table (6):	The mean $\pm$ standard deviation of longitudinal axis, short axis, longitudinal to transverse diameter ratio and cortical thickness.....	46
Table (7):	The focal thickening, shape and state of hilum in benign and malignant lymph nodes.....	47
Table (8):	Cutoffs of significant B mode criteria and their diagnostic performance .....	49
Table (9):	Diagnostic criteria of B mode criteria.....	49
Table (10):	Diagnostic performance of the B mode summation score (ROC curve analysis).....	49
Table (11):	Distribution of elasticity score in benign and malignant lymph nodes. (Chi-squared test).....	50
Table (12):	Cutoff value of Elasticity Score and its diagnostic performance. (ROC curve analysis).....	51
Table (13):	Median value, of strain ratio in benign and malignant nodes. (T test).....	52
Table (14):	Best Strain ratio cutoff value and its diagnostic performance (ROC curve analysis).....	53

# List of Figures

Fig. No.	Title	Page No.
<b>Figure (1):</b>	US of the normal anatomy at the medial and lateral margins of axillary level Transverse scan of the medial aspect of level I along the margin of the pectoralis muscles demonstrates the lateral thoracic artery (arrow) and a nearby normal level I lymph node.....	6
<b>Figure (2):</b>	The lymph nodes and vessels associated with the left axilla .....	7
<b>Figure (3):</b>	Lymph vessels of the breast and the draining axillary and supraclavicular nodal groups.....	10
<b>Figure (4):</b>	Algorithm for axillary assessment in patients with locally advanced invasive breast cancer .....	18
<b>Figure (5):</b>	Normal lymph node morphology.....	20
<b>Figure (6):</b>	Metastatic lymph node morphology .....	21
<b>Figure (7):</b>	Hallmark of Lymph Node Metastasis.....	24
<b>Figure (8):</b>	A metastatic axillary lymph node that is entirely hypoechoic, demonstrating complete replacement of the fatty hilum .....	25
<b>Figure (9):</b>	Elastography .....	28
<b>Figure (10):</b>	Elasticity scoring system for axillary lymph nodes.....	30
<b>Figure (11):</b>	Schematic RTE scoring of hypoechoic regions in the ALNs with hila (Pattern I).....	31
<b>Figure (12):</b>	Schematic RTE scoring of all ALNs without hila (Pattern II).....	33
<b>Figure (13):</b>	Effect of position of reference region on strain ratio .....	36



# List of Figures Cont...

Fig. No.	Title	Page No.
<b>Figure (14):</b>	Histogram histological types of lymph nodes of the study group. ....	43
<b>Figure (15):</b>	Pie chart representing percentage of benign and malignant lymph nodes in the study group. ....	43
<b>Figure (16):</b>	Bar chart representing L/S diameter distribution in benign and malignant lymph nodes.....	47
<b>Figure (17):</b>	Graph demonstrates mean and standard deviation of cortical thickness in benign and malignant lymph nodes.....	48
<b>Figure (18):</b>	Bar chart demonstrates the state of hilum in benign and malignant lymph nodes. ....	48
<b>Figure (19):</b>	Graph demonstrates the distribution of elasticity scores in benign and malignant lymph nodes.....	51
<b>Figure (20):</b>	Graph shows mean values and standard deviation of strain ratio in benign and malignant nodes .....	52
<b>Figure (21):</b>	Receiver operating characteristic (ROC) curve for L/S diameter, cortical thickness, ES and strain ratio. ....	53
<b>Figure (22):</b>	US of the RT. Axilla.....	54
<b>Figure (23):</b>	Strain Elastography of the RT. Axillary LN. ....	55
<b>Figure (24):</b>	US of the RT. Axilla.....	57
<b>Figure (25):</b>	Strain Elastography of the RT. Axillary LN. ....	58
<b>Figure (26):</b>	US of the LT. Axilla. ....	59
<b>Figure (27):</b>	Strain Elastography of the LT. Axillary LN. ....	61
<b>Figure (28):</b>	US of the LT. Axilla. ....	63
<b>Figure (29):</b>	Strain Elastography of the LT. Axillary LN. ....	64

# List of Abbreviations

Abb.	Full term
ALN .....	Axillary lymph nodes
BCSs .....	Breast cancer subtypes
CNB.....	Core needle biopsy
CT .....	Computed tomography
DCIS .....	Ductal carcinoma in situ
ER .....	Estrogen receptor
FNAC.....	Fine needle aspiration cytology
HER2 .....	Human epidermal growth factor receptor 2
HIV .....	Human immunodeficiency virus
IDC .....	Invasive duct carcinoma
ILC.....	Invasive lobular carcinoma
L.....	Longitudinal axis
L/S.....	Long axis/short axis
LCIS .....	Lobular carcinoma in situ
LN.....	Lymph node
MRI.....	Magnetic resonance imaging
N .....	Nodes
PET.....	Positron-emission tomography
PR .....	Progesterone receptor
RTE.....	Real-time elastography
S.....	Short axis
S/L.....	Short axis /long axis
SD .....	Standard deviation
SE .....	Sensitivity
SLE.....	Systemic lupus erythematosus
SLNB.....	Sentinel lymph node biopsy

## List of Abbreviations Cont...

Abb.	Full term
SP .....	Specifity
SR .....	Strain ratio
SWE.....	Shear wave elastography
TB .....	Tuberculosis
TNM .....	Tumor, nodes, and metastasis
UE.....	Ultrasound Elastography
US.....	Ultrasound

## INTRODUCTION

**Y**ears of cancer statistics have demonstrated that breast cancer is the most common cancer and the second leading cause of cancer-related death in women worldwide. Axillary lymph node status remains a major prognostic indicator for early breast cancer, affecting the clinical staging and patient selection for surgical procedure and adjuvant systemic therapy (*Tang et al., 2020*).

The status of the axillary lymph node is one of the independent factors influencing the prognosis of patients with breast cancer. The 5-year survival rate of breast cancer cases with axillary lymph node metastasis decreases by 40% compared to that of non-metastatic patients (*Riis, 2020*).

Currently, sentinel lymph node biopsy (SLNB), traditional ultrasound-guided core needle biopsy (CNB), and fine-needle aspiration cytology (FNAC) are the most common procedures for identifying axillary nodal metastasis in breast cancer patients; however, these methods are invasive, requiring additional time for pathological diagnosis, and false-negative results might affect the efficacy of biopsy, due to improper selection of the target lymph node. Therefore, the use of non-invasive imaging techniques to help predict nodal status before biopsy is of great value (*Tang et al., 2020*).

Ultrasonography, mammography, computed tomography (CT), magnetic resonance imaging (MRI), and combined positron-emission tomography (PET)/CT are common non-invasive preoperative methods used in the diagnosis of axillary lymph node. Oblique radiography of mammography can help to detect partial abnormal axillary lymph nodes and reveal if there is lymph node metastasis by evaluating morphology, size, and density (*Wu et al., 2016*).

But the evaluation of axillary lymph nodes using mammography is not applicable because mammography cannot cover the entire axillary. Breast MRI has excellent soft-tissue resolution; however, axillary lymph nodes cannot be included in their entirety because of the limited range of the breast coil (*Javid et al., 2010*).

Ultrasound, as a non-invasive technique, is often used to distinguish malignant from benign axillary lymph nodes based on morphological characteristics preoperatively. Ultrasound is a convenient tool as it provides real-time imaging, high soft-tissue resolution, feasibility and cost-efficiency; however, traditional ultrasound has moderate sensitivity for identifying malignant lymph nodes and false-positive results leading to unnecessary biopsy.

With advances in medical imaging, ultrasound elastography has received considerable attention in the last years for its non invasive ability to assess tissue stiffness in various organs (*Sigrist et al., 2017*).

Real-time (strain) elastography (RTE) and shear-wave elastography (SWE) are the two most widely used elastographic techniques. RTE demonstrates a colour map imposed on the 2D image, which is obtained through applying constant stress to the tissue. It can be used qualitatively (elasticity score) or semi-quantitatively (strain ratio) to access the stiffness of lesions (*Xu et al., 2018*).

*Our study will use real time elastography*

## AIM OF THE WORK

**T**o investigate the role of strain elastography in the diagnosis of axillary lymph nodes in patients with breast cancer.