بسم الله الرحمن الرحيم

MONA MAGHRABY

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

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جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

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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 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	Positon-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

Years 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 positon-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

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