بسم الله الرحمن الرحيم

MONA MAGHRABY

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

MONA MAGHRABY

شبكة المعلومات الجامعية

التوثيق الإلكتروني والميكروفيلم

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

Relation of FDG uptake of breast cancer and the histologic and the biologic characteristics of the tumor

Thesis

Submitted for Partial Fulfillment of Master Degree of Radiology

By

Mirette Rafik Helmy Thabet

(M.B.B.CH.)

Under supervision of

Prof. Dr. Faten Mohammed Mahmoud Kamel

Professor of Radiology

Faculty of Medicine

Ain Shams University

Dr. Wafaa Raafat Ali

Lecturer of Radiology

Faculty of Medicine

Ain Shams University

Faculty of Medicine

Ain Shams University

2020

Acknowledgment

*First, I thank **God** for blessing me more than I deserve and for this uncountable gifts which are exceeding abundantly above all what we ask or think.*

*I would like to express my deepest appreciation and gratitude to **Prof. Dr. Faten Mohammed Mahmoud Kamel** for her sincere encouragement, constant advice and gentle dealing with me, it is a real honor for me to work under her supervision.*

*I owe special thanks, gratitude and appreciation to **Lecturer Dr. Wafaa Raafat Ali** for her close supervision, continuous advice and support which gave me the best guidance during different stages of this work.*

Finally, I would like to thank my family, my friends, and my colleagues, for their support and moral encouragement.

INDEX

List of Figures

List of Tables

List of Abbreviations

ACR	American College of Radiology
ACS	American Cancer Society
A_{inj}	Injected activity
A_{mea}	Measured activity
ANS	axillary nodal status
BGO	Bismuth germinate
BI-RADS	Breast imaging-Reporting and Data System
BRCA	Breast cancer gene
Bsa	Body surface area
BSGI	Breast-specific gamma imaging
Bw	Body weight
CC	Cranio-caudal
ceCT	Contrast-enhanced Computed Tomography
cLCIS	Classic LCIS
CT	Computed Tomography
DCIS	Ductal carcinoma insitu
ER	Estrogen receptor
^{18}FDG	^{18}F-fluorodeoxyglucose
^{18}F-FLT	^{18}F-fluorothymidine
^{18}F-MISO	^{18}F-misonidazole
GLUT	Glucose transporters
GSO	Gadolinium silicate

HER2	Human epidermal growth factor receptor 2
HRT	Hormone replacement therapy
IBC	Inflammatory breast cancer
IDC	Invasive ducal carcinoma
ILC	Invasive lobular carcinoma
Ki-67	Ki-67 labelling index
Lbm	Lean body mass
LCIS	Lobular carcinoma insitu
LM	Latero-medial
LSO	Lutetium oxyorthosilicate
Max	Maximum
MIP	Maximum intensity projection
ML	Medio-lateral
MLO	Medio-lateral-oblique
MM	Mammography
MRI	Magnetic Resonance Imaging
NOS	Not otherwise specified
NST	No special type
P53	Tumor protein p 53
PEM	Positron emission mammography
PERCIST	Positron Emission tomography Response Criteria In Solid Tumors
PET	Positron Emission Tomography
pLCIS	Pleomorphic LCIS
PR	Progesteron receptor
pTS	Pathologic tumor size

ROI	Region of Interest
SLNB	Sentinel lymph node biopsy
SUV	Standardized Uptake Value
Tc-99m	Technetium
TDLU	Terminal duct lobular units
TNM	Tumor-node-metastasis
TNR	Tumor to normal background ratio
US	Ultrasonography
W	Weight
WHO	World Health organization
Γ	Photons

INTRODUCTION

Breast cancer is considered the most common type of cancer and the second leading cause of cancer-related death among women. It affects more than 1 million women worldwide. The significant increase in number of cases worldwide could be attributed to modern lifestyle. **(Abdulrahman and Rahman, 2012). (Taghipour et al., 2016).**

The wide clinical success of PET/CT imaging in cancer relies mainly on the accumulation kinetics of 18F-fluorodeoxyglucose (FDG) that allows evaluation of the whole body without the need for complex mathematical analysis of tracer blood-tissue exchange (**Scussolini et al.,2019**)

Knowledge of the factors affecting the uptake is important when interpreting FDG PET/CT scans.(**Groheux et al., 2011)**

The incidence of breast cancer is increasing recently, yet the mortality rates are decreasing because of earlier diagnosis and new treatment strategies that include the molecular impact of breast cancer **(Ekmekcioglu et al., 2013).**

Outcomes for breast cancer vary according to the histological type, degree of disease, and patient's age. Approximately 30% of patients have recurrence within 15 years after initial treatment if later stage at the time of diagnosis (stage III) and hormone-receptor-positive. **(Ferlay et al., 2012).**

The prognostic factors include histological type, tumor nuclear grade, tumor size, and preoperative tumor-nodes-metastasis (TNM), hormone receptor and immunohistochemical molecular markers in the specimens **(Choi et al., 2012).**

Early diagnosis and accurate follow-up of these patients affect the management plan. Also early diagnosis of recurrence is important for planning future therapeutic strategies which, if initiated immediately, target either to cure or to prolong disease-free survival and to improve the quality of life **(Israel and Kuten, 2007)**.Conventional imaging techniques include X-ray mammography, ultrasonography (US), computed tomography (CT) and magnetic resonance imaging (MRI). Nuclear medicine techniques also have an increasing role in diagnosing and staging of breast cancer. Previously, only bone scintigraphy was used for detection and follow-up of bone metastases. Other non-radiographic methods included clinical and physical examination,