بسم الله الرحمن الرحيم

∞∞∞

تم رفع هذه الرسالة بواسطة / سلوي محمود عقل

بقسم التوثيق الإلكتروني بمركز الشبكات وتكنولوجيا المعلومات دون أدنى مسئولية عن محتوى هذه الرسالة.

ملاحظات: لا يوجد

ROLE OF FDG PET/CT IN EVALUATION OF PATIENTS WITH METASTATIC CANCER BREAST

Thesis

Submitted for partial fulfillment of The MD degree in radio-diagnosis

By

Dina Abdallah Abbas Hamed

(M.B.B.Ch.)
Faculty of medicine
Cairo University
(MSc Radiodiagnosis)
Faculty of Medicine - Ain Shams University

Under Supervision of

Prof. Dr. Aida Mohamed El-Shibiny

Professor of Radiodiagnosis
Faculty of Medicine - Ain Shams University

Dr. Khalid Muhammad Taalab

Consultant of Nuclear Medicine
Armed Forces Hospitals

Dr. Merhan Ahmed Nasr

Assistant Professor of Radiodiagnosis
Faculty of Medicine - Ain Shams University

Faculty of Medicine
Ain Shams University
2022

سورة البقرة الآية: ٣٢

Acknowledgement

First and foremost, I feel always indebted to **ALLAH,** *the Most Kind and Most Merciful.*

I'd like to express my respectful thanks and profound gratitude to **Prof. Dr. Aida Mohamed El-Shibiny,** *Professor of Radiodiagnosis - Faculty of Medicine- Ain Shams University for her keen guidance, kind supervision, valuable advice, and continuous encouragement, which made possible the completion of this work.*

I am also delighted to express my deepest gratitude and thanks to **Dr. Khalid Muhammad Taalab,** *Consultant of Nuclear Medicine Armed Forces Hospitals, for his kind care, continuous supervision, valuable instructions, constant help, and great assistance throughout this work.*

I am deeply thankful to **Dr. Merhan Ahmed Nasr,** *Assistant Professor of Radiodiagnosis Faculty of Medicine - Ain Shams University, for her great help, active participation and guidance.*

Dina Abdallah

List of Contents

List of Abbreviations

Abbreviations	Full term
^{18}F	^{18}-fluorine
^{18}-FDG	^{18}-fluorodeoxyglucose
^{18}-FDG-PET/CT	^{18}-fluorodeoxyglucose-Positron emission tomography-Computed tomography
^{18}F-NaF	^{18}F-Sodium Fluoride
^{18}F-NaF PET/CT	^{18}F-Sodium Fluoride-Positron emission tomography-Computed tomography
99mTc	Technetium-99m
ADP	Adenosine diphosphate
AJCC	American Joint Committee on Cancer
ALN	Axillary lymph node
BC	Breast cancer
BRCA1	Breast cancer antigen 1
BRCA2	Breast cancer antigen 2
CT	Computed tomography
DCIS	Ductal carcinoma in situ
DICOM	Digital imaging and Communications in medicine
DNA	Deoxy-riboneuclic-acid
EGFR	Epidermal growth factor receptor
ER	Estrogen receptors
ESMO	European Society for Medical Oncology
GLUT	Glucose transporters
HER2	Human epidermal growth factor receptor 2
HR-	Human receptor negative
HR-/HER2-	Hormonal receptor negative/ Human epidermal growth factor receptor 2 negative
HR-/HER2+	Hormonal receptor-negative / Human epidermal growth factor receptor 2 positive
HR+	Human receptor positive
IDC	Invasive ductal carcinoma
ILC	Invasive lobular carcinoma
IUCC	International Union for Cancer Control

Abbreviations	Full term
Kvp	Killo-voltage
LABC	Locally advanced breast cancer
LCIS	Lobular carcinoma in situ
mA	Milli-ampere
MBC	Metastatic breast cancer
MBq	Milli-becquerel
mCi	Milli-curie
mGy	Milligray
MRI	Magnetic resonance imaging
mSv	Milli-sievert
MTV	Metabolic tumor volume
NCCN	National Comprehensive Cancer Network
pCR	Complete pathological response
PET	Positron emission tomography
PET/CT	Positron emission tomography-Computed tomography
PET/MRI	Positron emission tomography-magnetic resonance imaging
PHT	Post-menopausal hormone therapy
PR	Progesterone receptors
SEER	Surveillance, Epidemiology, and End Results
SNB	Sentinel node biopsy
SPSS	Statistical package for the social science
SUV	Standardized uptake value
SUVmax	Maximum-Standardized uptake value
TLG	Tumor lesion glycolysis
TN	Triple negative
TNBC	Triple negative breast cancer
TNF	Tumor necrosis factor
TNM	Tumor, Node, and Metastasis
US	Ultrasound
WB-MRI	Whole-body Magnetic resonance imaging
WB-MTV	Whole-body Metabolic tumor volume
WB-TLG	Whole-body Tumor lesion glycolysis

List of Tables

List of Tables Cont...

List of Figures

List of Figures Cont...

List of Figures Cont...

List of Figures Cont...

List of Figures Cont...

INTRODUCTION

Worldwide, Breast cancer is considered the most common cancer type and the most common cause of cancer deaths in women ***(Shawky et al., 2020).***

Breast cancer is a heterogeneous disease, which is classified currently into different subtypes ***(Piva et al., 2017).*** Approximately 30% of breast cancer patients are at the risk of developing loco-regional recurrence or distant metastasis ***(Dong et al., 2015).***

Stage IV disease (stage IV at first diagnosis or recurrent from previous breast cancer) showed a 5-year survival rate of approximately 22%, However, this rate varies according to several factors, one of the most important is the hormone receptor status ***(Pesapane et al., 2020).***

The hormone receptor (HR+) positive subtype is the most common subtype and is subdivided into luminal A and luminal B. Human epidermal growth factor receptor 2 (HER2)-overexpressing (HR− /HER2+) and triple-negative (HR− /HER2−) subtypes are known to be more aggressive, compared with the luminal A and luminal B, and have poorer outcomes ***(Dong et al., 2015).***

Fusion of Positron emission tomography with the CT provides the ability to combine functional and morphological information into a single study ***(Borgatti et al., 2017).*** ^{18}F-fluorodeoxyglucose (^{18}F-FDG) PET/CT has been introduced as