



بسم الله الرحمن الرحيم

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

Thesis

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قَالَ

سَبَّحَانَكَ لَا إِلَهَ إِلَّا مَا عَلَّمْتَنَا إِنَّكَ أَنْتَ
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List of Abbreviations

Abbreviations	Full term
^{18}F	18 -fluorine
$^{18}\text{-FDG}$	18 -fluorodeoxyglucose
$^{18}\text{-FDG-PET/CT}$	18 -fluorodeoxyglucose-Positron emission tomography-Computed tomography
$^{18}\text{F-NaF}$	^{18}F -Sodium Fluoride
$^{18}\text{F-NaF PET/CT}$	^{18}F -Sodium Fluoride-Positron emission tomography-Computed tomography
$^{99\text{m}}\text{Tc}$	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

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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