



شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكرو فيلم

بسم الله الرحمن الرحيم



MONA MAGHRABY



شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكروفيلم



شبكة المعلومات الجامعية التوثيق الإلكتروني 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

Correlation Between Ultrasound Findings And Molecular Subtypes Of Breast Cancer

Thesis

*Thesis submitted for partial fulfillment of MS degree of Radiology,
Faculty of medicine, Ain Shams University*

By

Rahma Mohammed Abed Alghazal

M.B.B.Ch. El Mosul University- Iraq

Supervised by

Prof. Eman Soliman Metwally

Professor of radiology
Radiodiagnosis Department - Ain Shams University

Dr. Ali Haggaa Ali

Lecturer of radiology
Radiodiagnosis Department - Ain Shams University

*Faculty of Medicine
Ain Shams University
2021*

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قالوا

لَسْبَحَانَكَ لَا عِلْمَ لَنَا
إِلَّا مَا عَلَّمْتَنَا إِنَّكَ أَنْتَ
الْعَلِيمُ الْعَظِيمُ

صدقة الله العظيم

سورة البقرة الآية: ٣٢

Dedication

This work is dedicated to my Father and Mother they have genuinely encouraged and supported my educational endeavors and for that I will be grateful

I also dedicate this work to my lovely husband (Saud) who always encouraged me to do my best and follow my dreams.

Thanks to their love, encouragement, continuous help and support.



Acknowledgement

*First and foremost, I would like to thank **Allah**, the most kind and merciful.*

Words are too limited and will never be able to express my deep gratitude to all who helped me during the preparation of this study.

*I gratefully acknowledge the sincere advice and guidance of Professor **Eman Soliman Metwaly** for her kind supervision, unlimited support and patience.*

*I gratefully acknowledge the sincere advice and guidance of Dr. **Ali Haggaa** for his support.*

My acknowledgment will not be completed without expressing my gratitude and thanks to each member of my wonderful family for their continuous support; to whom I dedicate this work.

Finally, I wish to express my thanks to all the members of the Radiodiagnosis Department, Ain Shams Faculty of Medicine for their kind help and cooperation.

Rahma Mohammed abed Alghazal



List of Contents

<i>Title</i>	<i>Page No.</i>
List of Tables.....	i
List of Figures	ii
List of Abbreviations.....	v
Introduction	1
Aim of the work	3
Review of literature:.....	4
Breast Cancer	4
BI-RADS classification system	9
Breast U/S	18
Histopathological types of breast cancer and staging	21
Breast cancer management	29
Molecular subtypes of breast cancer	33
U/S finding to predict molecular subtypes	40
Clinical implications of molecular subtypes	51
Patients and methods.....	56
Results	63

List of Contents

Discussion	79
Summary	90
Conclusion.....	92
References	93
Arabic summary	--

List of Tables

<i>Table No.</i>	<i>Title</i>	<i>Page No.</i>
Table (1):	TNM staging system	27
Table (2):	Systemic treatment recommendations for subtypes	53
Table (3):	The mean age of each subtype:	63
Table (4):	The mean size of the lesion of each subtype:	63
Table (5):	Showing age, U/S criteria of LA subtype:	64
Table (6):	Showing age, U/S criteria of LB subtype :	65
Table (7):	Showing age, U/S criteria of TNBC subtype :	66
Table (8):	Showing age, U/S criteria of HER2 subtype :	67
Table (9):	Showing the histopathological results and grade in different molecular subtypes.	68

List of Figures

<i>Figure No.</i>	<i>Title</i>	<i>Page No.</i>
Figure (1):	Breast U/S showing oval shaped anechoic lesion with circumscribed margin.....	12
Figure (2):	U/S image showing well defined lobulated margin lesion with posterior enhancement and edge attenuation.	13
Figure (3):	The mammogram reveals a well-defined lobulated lesion in lower outer quadrant of the right breast.....	15
Figure (4):	U/S image showed irregular hypoechoic lesion with speculated margin.....	16
Figure (5):	Treatment options of non-metastatic breast cancer	29
Figure (6):	Surgical treatment of breast cancer	29
Figure (7):	U/S screening breast examination of 57 years old patient.....	42
Figure (8):	Luminal B IDC (HER2-) of 43 years old, self-palpation of a large right mass.	43
Figure (9):	U/S image shows: non circumscribed hypoechoic mass with indistinct margins and posterior acoustic shadowing in the right upper breast.	44
Figure (10):	IDC HER2+ (non-luminal) of 57 years old, palpable mass.....	45
Figure (11):	Two hard breast masses of IDC of 65 years old patient.....	47
Figure (12):	U/S breast of Triple-negative IDC.	49
Figure (13):	Triple-negative invasive ductal carcinoma (high grade) of 54-year-old patient.	49
Figure (14):	U/S showing hypoechoic lesion, irregular in shape with spiculated margin, measuring 1.6x1.1cm in its maximum dimensions surrounded by desmoplastic reaction and showing posterior acoustic shadowing.	69
Figure (15):	U/S showing: hypoechoic irregular lesion with speculated margin measuring 2.6x1.8cm in its maximum dimensions surrounded by desmoplastic reaction showing posterior acoustic shadowing. The	

	lesion was associated with few calcific foci with architectural distortion.....	70
Figure (16):	U/S of fibroglandular breast showing hypoechoic irregular lesion with speculated margin, measuring 2cm in its maximum dimension not surrounded by desmoplastic reaction with posterior acoustic shadowing. The parenchyma showed mild distortion.	71
Figure (17):	U/S breast showing irregular shaped lesion with speculated margin measuring 3.3 cm in its maximum dimension showing posterior acoustic shadowing.	72
Figure (18):	U/S of fibroglandular breast showing hypoechoic focal lesion, irregular in shape with speculated margin and not surrounded by desmoplastic reaction, mixed posterior acoustic shadowing and enhancement. The parenchyma showed distortion and few calcific foci.	73
Figure (19):	U/S of the breast showing irregular hypoechoic lesion with speculated margin, measuring 2.33cm in its maximum dimensions not surrounded by desmoplastic reaction showing posterior acoustic shadowing and enhancement. No associated architectural distortion or calcification.	74
Figure (20):	U/S showed fibroglandular breast with hypoechoic oval shaped lesion with circumscribed margin, measuring 4.3x3.6cm in its maximum dimensions showing posterior acoustic enhancement with edge attenuation. The lesion is not surrounded by desmoplastic reaction.....	75
Figure (21):	U/S breast showing hypoechoic oval shaped lesion with circumscribed margin, measuring 2.2x1.5cm in its maximum dimensions showing mixed posterior acoustic shadowing and enhancement. The lesion is not surrounded by desmoplastic reaction. No associated parenchymal distortion or calcification noted.	76
Figure (22):	U/S of breast showing hypoechoic irregular shaped lesion with speculated margin measuring 2x1.8cm in its maximum dimension showing mixed posterior acoustic shadowing and enhancement. The lesion is not surrounded by desmoplastic reaction. Another hypoechoic small satellite lesion was noted near the lesion.	77

List of Figures

- Figure (23):** U/S of breast showing hypoechoic irregular shaped lesion. The lesion was associated with parenchymal distortion and other satellite lesions. The largest measuring 1.2 x 2.1 cm in its maximum dimension.....78

List of Abbreviations

<i>Abbr.</i>	<i>Full term</i>
ACR:	American College of Radiology.
BCS:	Breast Conserving Surgery.
AJCC:	American Joint Committee for Cancer.
BIRADSUS:	Breast Imaging Reporting and Data System Ultrasound.
BIRADS:	Breast Imaging and Reporting Data System.
CI:	Confidence Interval.
DFI:	Disease Free Interval.
DSS:	Disease Specific Survival.
ER:	Estrogen Receptor.
FISH:	Fluorescence In Situ Hybridization.
FNA:	Fine-needle aspiration.
Gy:	Gray; The radiation therapy unite.
GE:	General Electric.
HER2:	Human Epidermal Growth Factor.
HR:	Hormonal Receptor.
IDC:	Invasive Ductal Breast Cancer.
IHC:	Immunohistochemistry stain.
ILC:	Invasive Lobular Carcinomas.

List of Abbreviations

IRB:	Institutional Review Board.
LA:	Luminal A.
LB:	Luminal B.
NCCN:	National Cancer Control Network.
NU:	Number.
OR:	Odds Ratio.
SBE:	Self Breast Exam.
PR:	Progesterone Receptor.
SS:	Sonographic Signs.
TNBC:	Triple Negative Breast Cancer.
TN:	Triple Negative.
TNM:	Tumor , Lymph nodes & Metastases.
U/S:	Ultrasound.
ET:	Endocrine Therapy
SPSS:	Statistical package for the social science
IMRT:	Intensity-modulated radiotherapy