The Role of Magnetic Resonance Imaging in Early Diagnosis and Evaluation of Ductal Carcinoma in Situ

Essay

Submitted For Partial Fulfillment of Masters Degree
in Radio Diagnosis

By

Sara Mokhtar Youssif

M.B.B.CH
Cairo University

Supervisors

Prof. Dr. Ahmed Mohamed Monib

Professor of Radiodiagnosis
Faculty of Medicine
Ain Shams University

Dr. Aya Yassin Ahmed

Lecturer of Radiodiagnosis
Ain Shams University

Faculty of Medicine
Ain Shams University

2014

Acknowledgement

*First and above all, thanks to merciful **ALLAH** who enabled me to complete this work.*

*Grateful thanks, great appreciation and my deepest gratitudeto **Professor Dr. Ahmed Mohamed Monib** Professor of Radiodiagnosis, Faculty of Medicine, Ain Shams University for his great experience, kind heart, great help and assistance, and giving me the honour of being her candidate, working under her supervision, guided by her experience and precious advices and true concern. And I will always remain grateful for him.*

*I would like to express my deepest gratitude, thanks and respect to **Dr.Aya Yassin Ahmed** Lecturer of Radiodiagnosis, Faculty of Medicine, Ain Shams University, for her patience, care and concern throughout this work, providing this essay with her scientific experience and constructive supervision.*

*Words could not express my great appreciation, and my feeling of gratitude, thanks and respect to my **dears parents**, my **dear husband**, and my family for their grateful help and support.*

Finally, I would like to thank all members of the radiology department, Ain Shams University.

List of Figures

	irregular enhancing focus	
65	Irregular spiculated invasive carcinom	135
66	Low-grade focal DCIS showing circumscribed enhancing mass with lobulated margins	136
67	MIP image shows the vascularity of the normal right breast and high grade neovascularity of the left breast	138
68	High-grade DCIS shows an area of clumped NME with type 2 enhancement kinetics.	139
69	Intermediate-grade DCIS shows an area of clumped NME with washout kinetics	140
70	Low-grade DCIS in a background of atypical ductal hyperplasia shows an area of clumped NME with persistent (type 1) kinetics	140
71	Intermediate-grade pure DCIS mass lesion demonstrates a rapid initial enhancement followed by washout.	142
72	high-grade pure DCIS mass lesion demonstrates a rapid initial enhancement followed by washout	143
73	NME (DCIS) show senhancement kinetics curve with rapid wash-in and reaches a plateau.	144
74	High-grade DCIS with Dynamic contrast-enhanced MR image obtained in early phase, diffusion-weighted MR image and ADC map.	147
75	Malignant lesion with nonmas slike enhancement with dynamic contrast enhanced MRI for evaluation of extent of newly diagnosed invasive ductal	148

	carcinoma, diffusion-weighted MR image and ADC map	
76	Five different cases of breast cancer, examined with postcontrast and DW MR imaging: DCIS and invasive ductal carcinoma	149
77	DCIS with spectroscopy show a positive choline resonance peak	152
78	DCIS with a false-negative MR spectroscopy.	153
79	Non-homogenously enhanced focal soft tissue lesion in a women with previous BCT for small DCIS. MRS shows negative curve for choline	154
80	Biopsy coil device	155
81	MRI-guided biopsy using axial, contrast enhanced FLASH 3D T1W fat-suppressed images	157
82	MRI-guided biopsy confirmed low- to intermediate- grade DCIS in a previously treated patient from DCIS and a routine negative mammogram	159
83	The lower screen shows how to position the post and pillar device. The coordinates for optimal needle position can be read from the bottom of the screen	160

List of Tables

List of Abbreviations

ACR	American College of radiology
ACC	Adenoid cystic Carcinoma
2D	two dimensional
3D	three dimensional
AUC	Area under the enhancement curve.
BIRADS	Breast imaging reporting and data system.
CIS	carcinoma in situ
DCIS	ductal carcinoma in situ.
DTPA	diethyelene-triamine-penta-acetic acid
DES	diethylstilbestrol
DCE-MRI	Dynamic contrast enhanced MRI.
FOV	Field of view.
Gd	Gadolinium.
GRE	gradient –echo sequences.
HRT	hormone replacement therapy.
Gd-DTPA	Gadolinium diethylenetriaminepentaacetic acid.

IDC	Intraductal carcinoma.
NOS	Invasive duct carcinoma not otherwise specified.
NCI	National Cancer Institute
OCP	oral contraceptives
LCIS	Lobular carcinoma in situ.
LOQ	Lower Outer Quadrant
LIQ	Lower Inner Quadrant
MRA	Magnetic resonance angiography.
MRI	Magnetic resonance imaging
MTC	Mixed tubular carcinoma
MIP	Maximum intensity projection.
MPR	Multiplanar reformatted images
PTC	pure tubular carcinoma
STIR	Short inversion time inversion recovery.
SER	Signal enhancement ratio.
WHO	World Health Organization
TDLU	Terminal ductal lobular unit.
UOQ	Upper Outer Quadrant
UIQ	Upper Inner Quadrant

CBE	clinical breast examination
AJCC	American Joint Committee on Cancer
Cc	craniocaudal
TIC	time-signal intensity curve
E1	initial enhancement percentage
Epeak	peak enhancement percentage
Tpeak	time to peak enhancement
DWI	Diffusion weighted imaging
MLO	Medio lateral oblique
NOS	Not otherwise specified
IV	Intra venous
ADC	Apparent diffusion coofficient
VAB	Vacuum- assisted biopsy
LCNB	Large core-needle biopsy
BCT	Breast conservation therapy
P	peak
tCho	Total choline
Cho	choline
MRS	Magnetic resonance spectroscopy
NME	Non mass enhancement