Comparison of the Sensitivity and Specificity of DWIBS and Contrast Enhanced T1Wi Sequences in Characterization of Suspicious Mammography Lesions

Thesis

Submitted for partial fulfillment of Master Degree ***in Radiodiagnosis***

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2017

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سورة طه الآيـه رقم 114

Acknowledgement

First of all, all gratitude is due to **God** *almighty for blessing this work, until it has reached its end, as a part of his generous help, throughout my life.*

Really I can hardly find the words to express my gratitude to **Prof. Dr. Sherine Kadry Amin,** Professor of Radiology, Faculty of Medicine, Ain Shams University, *for her supervision, continuous help, encouragement throughout this work and tremendous effort he has done in the meticulous revision of the whole work. It is a great honor to work under his guidance and supervision.*

Really I can hardly find the words to express my gratitude to **Dr. Haytham Mohamed Nasser,** *Lecturer of Radiology, Faculty of Medicine, Ain Shams University for her continuous directions and meticulous revision throughout the whole work. I really appreciate their patience and support.*

Last but not least, I dedicate this work to my family, whom without their sincere emotional support, pushing me forward this work would not have ever been completed.

May Adel Abdel-Monem El-Samahy

Contents

List of Abbreviations

ACR	:	American college of radiology
ADC	:	Apparent Diffusion Coefficient
BI-RADS	:	Breast Imaging and Reporting Data Systems
CC	:	Cranio caudal
DCE-MRI	:	Dynamic Contrast Enhanced Magnetic Resonance Imaging
DCIS	:	Ductal Carcinoma Insitu
DWI	:	Diffusion Weighted Imaging
DWIBS	:	Diffusion Weighted Imaging with Back-ground Suppression
ERT	:	Estrogen Replacement Therapy
IDC	:	Infiltrative Ductal Carcinoma
IDC-NOS	:	Infiltrative Ductal Carcinoma Not Otherwise Specified
IDC-NST	:	Infiltrative Ductal Carcinoma of no special type
ILC	:	Infilrative Lobular Carcinoma
LCIS	:	Lobular Carcinoma Insitu
MIP	:	Maximum Intensity Projection
MLO	:	Medio-lateral Oblique

List of Abbreviations (Cont.)

MRI	:	Magnetic Resonance Imaging
NMLE	:	Non-mass like enhancement
SA	:	Sclerosing adenosis
STIR	:	Short T1 Inversion Recovery
T1Wi's	:	T1 Weighted Images
T2Wi's	:	T2 Weighted Images
TDLU	:	Terminal Ductal Lobular Unit
TNM	:	Tumor, Nodes, metastasis

List of tables

List of Figures

List of Figures (Cont.)

List of Figures (Cont.)

Introduction

Being the most common invasive cancer to affect females worldwide, screening aiming at early detection and thereby improving outcomes of breast cancer has always been an issue of concern[1].

For decades conventional X-ray mammograms have been widely used for this purpose. This however resulted in many unnecessary biopsies, since almost 50% of the biopsies following suspicious mammograms were found to be negative. The anticipation associated with waiting for unnecessary biopsies after query mammography findings has created a real need for more informative imaging techniques [2, 3,6].

To meet this growing need, MR imaging of the breast has become a region of interest for researchers worldwide.

Diffusion weighted MR imaging, which depends on the micro structural diffusivity of water between the cells, has been employed to help characterize different breast lesions. Diffusion weighted imaging has proved high sensitivity and specificity in this insight, yet it must be combined with administration of contrast enhanced imaging and the acquisition of dynamic contrast enhanced MR images for proper characterization [2,4,5].

DCE-MR imaging of the breast helps depict malignant lesions by showing their pathological vascularization. The kinetics of contrast enhancement

depends upon the capillary permeability, micro vascular density and diffusivity. These factors affect the rate of initial contrast uptake, wash-out as well as the heterogeneity of the lesion.

Combining the pattern of contrast enhancement with the morphologic features allows high sensitivity and specificity [7,8].

The long examination time as well as the need for intravenous contrast were found to be practical limitations of the DCE-MRI of the breast. This is especially appreciated in patients with contra-indications to MR contrast material injection [2,4,5].

A newly introduced MRI sequence DWIBS, which is the abbreviation of Diffusion Weighted Imaging with Background Suppression, allows the acquisition of volumetric diffusion weighted images with high lesion-to-background contrast, hence making the use of contrast material unnecessary. DWIBS is said to outweigh the conventional DW imaging due to its short time of acquisition as well[2,4].

The use of DWIBS approach is thought to decrease the rate of unnecessary biopsies from false mammography results without the need for a lengthy MRI procedure or the need for IV contrast administration[2].

Aim of the Work

The purpose of this study was to determine the accuracy of DWIBS MR imaging in comparison to the DEC MR imaging in characterizing suspicious mammography lesions.