ROLE OF ADVANCED MRI TECHNIQUES IN EVALUATING THE RESPONSE OF BREAST CANCER TO NEOADJUVANT CHEMOTHERAPY

Essay

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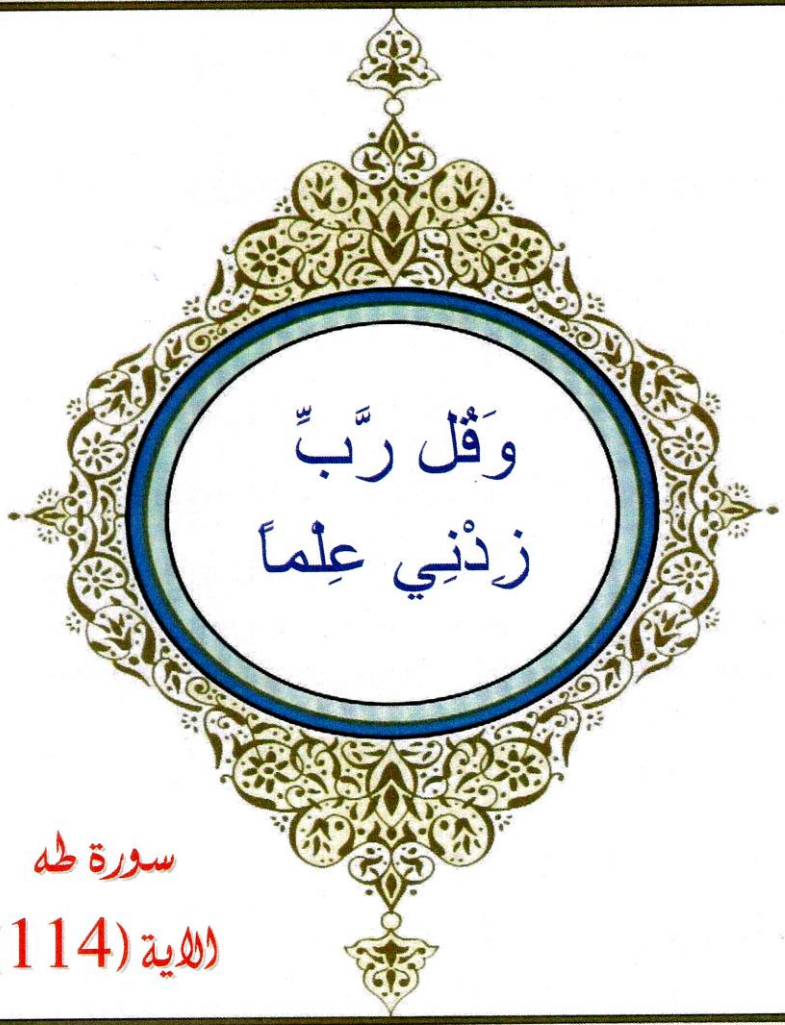

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LIST OF ABBREVIATIONS

2D	Two –dimensional
3D	Three-dimensional
ACR	American College of Radiology
ADC	Apparent diffusion coefficient
AIF	Arterial Input Function
BI-RADS	Breast Imaging Reporting and Data System
CAD	Computer Aided Detection
DCE-MRI	Dynamic Contrast Enhanced- MRI
DCIS	Ductal carcinoma in situ
DTPA	Diethylene-triamine-penta acetic acid
DW-MRI	Diffusion Weighted- MRI
ERT	Estrogen replacement therapy
FID	Free induction decay
FOV	Field of vision
GRE	Gradient
IDC	Invasive Ductal Carcinoma
ILC	Invasive Lobular Carcinoma
LCIS	Lobular carcinoma in situ
MD	Mean diffusity
MIP	Maximum intensity projection
MRI	Magnetic resonance imaging
MRS	Magnetic resonance spectroscopy
MRS	MR spectroscopy
MVD	Microvessel density
NAC	Neoadjuvant chemotherapy
NCI	National Cancer Institute
pCR	Pathological complete response

PR	Partial response
PRESS	Point-resolved spatially localized spectroscopy
PVR	Percentage of tumour volume reduction
Ratio-in	Inflow slope ratio
Ratio-out	Washout slope ratio
RECIST	Response Evaluation Criteria in Solid Tumors
ROI	Region of interest
SI-Time	Signal intensity- time curve
Slope C	Inflow slope at the cold spot
Slope H	Inflow slope at the hot spot
Slope in	Inflow slope
SNR	Signal to noise ratio
STEAM	Stimulated echo acquisition mode
STIR	Short TI Inversion Recovery
SVS	Single voxel spectroscopy
TDLU	Terminal duct lobular unit
TE	Time of echo
TNM	Tumour, nodes, metastases
TR	Time of recovery
Washout C	Washout slope at the cold spot
Washout H	Washout slope at the hot spot

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INTRODUCTION

Breast cancer constituted 22% of all cancers in women ***(Kharboush et al., 2011).*** In Egypt, breast cancer is the most frequently occurring cancer among women which represents 18.9% of the total cancer cases among female (***Salem et al., 2010).***

Diagnostic imaging has proven to be a beneficial tool in the screening, diagnosis and prognosis of breast cancer. Most cancers are found early with breast screening methods such as mammography ***(Berg et al., 2012)***. Although mammography is considered the most effective screening and diagnostic tool for early detection of breast cancer but many cases could be missed because the dense tissue interferes with identification of tumors ***(Pisano et al., 2005)***.

In the past decade breast cancer screening programs have helped to reduce mortality of breast cancer patient by 20 percent but still determined to find new technologies that have potential to even further improve breast cancer statistics ***(Saslow et al., 2007).***

Magnetic resonance imaging (MRI) is highly sensitive for cancer staging, problem-solving, post treatment surveillance and other indications. Continued improvements in technology and studies to assess outcomes will help to better define MRI's role in breast cancer. This is especially important in locally advanced

breast cancer which remains a challenging clinical problem. ***(Whitman and Strom, 2009)***.

Neoadjuvant chemotherapy (NAC) followed by surgery was introduced about 2 decades ago to treat patients with locally advanced breast cancer as it represents approximately 20% of all women who receive a diagnosis of breast cancer ***(Delille et al,. 2003).***

Following NAC, accurate assessment of early tumor response or size of post therapy residual tumor burden and location is necessary for planning the future medical or surgical roadmap of the patient (***Loo et al., 2011).***

Advanced MRI imaging techniques have shown to be of great importance in monitoring patient's response to chemotherapy and in differentiating responders from non-responders early during therapy ***(Rosen et al., 2006).***

AIM OF THE WORK

Is to highlight the role of advanced MRI imaging techniques in evaluating the response of neoadjuvant chemotherapy in breast cancer.