Role of Diffusion Weighted MRI in assessment of Cervical Cancer

Thesis

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By

Sura Abdul Ameer Jasim
M.B.Ch.B
Faculty of Medicine
Al Basrah University

Supervised by

Prof. Dr. Dalia Zaki Zidan
Professor of Radiodiagnosis
Faculty of Medicine
Ain Shams University

Dr. Susan Adil Ali Abdul Rahim
Lecturer of Radiodiagnosis
Faculty of Medicine
Ain shams University

Faculty of Medicine
Ain Shams University
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"وأنزل الله عليك الكتاب
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Sura Abdul Ameer Jasim

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ADC ..... Apparent diffusion coefficient

AP ..... Anteroposterior

CC ..... Craniocaudal

CIN ..... Cervical intraepithelial neoplasia

CIS ..... Cervical carcinoma insitu

CT ..... Computed tomography

DNA ..... Deoxyribonucleic acid

DWI ..... Diffusion weighted image

FIGO ..... International federation of gynecology and obstetrics

HASTE ..... Half-Fourier acquisition single shot turbo spin echo

HIV ..... Human immunodeficiency virus

HPV ..... Human papilloma virus

HSIL ..... High grade squamous intraepithelial lesion

IV ..... Intra venous

LELC ..... Lymphoepithelioma like carcinomas

LN ..... Lymph node

LSIL ..... Low grade squamous intraepithelial lesion

MICA ..... Micro invasive squamous cell carcinoma

MRI ..... Magnetic resonance imaging

RF ..... Radiofrequency

ROC ..... Receiver operating characteristic

ROI ..... Region of intrest

SCJ ..... Squamous-columnar junction

SIL ..... Squamous intraepithelial lesion

List of Abbreviations

T ..... Tesla
T1W ..... T1 weighted MR image
T2W ..... T2 weighted MR image
TE ..... Time echo
TNM ..... Classification of Malignant Tumours
TR ..... Time repetition
Ts ..... Transverse
TSE ..... Turbo spin echo
TVUS ..... Transvaginal ultrasound

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Abstract

Background: MRI examination is a useful modality for staging and evaluation of gynecologic malignancy. The DW-MRI method has been introduced to cancer diagnostics in the recent years, and this has widened the diagnostic capabilities of MRI. **Aim of the Work:** The aim of this study is to highlight the value and assess the efficacy of diffusion weighted imaging in the assessment of cervical cancer. **Patients and Methods:** This is a prospective study that included 30 patients in whom cervical cancer had been suspected clinically or by Trans vaginal U/S and the control group consisted of 20 patients in whom cervical cancer had been not suspected and MRI was performed because of other Pelvic diseases. The study was conducted in El-Demerdash hospital. The patients was referred from the gynecology department to the radiology department (Women's imaging unit) for further MRI assessment with DWIs. **Results:** Lesions in all cases show restricted diffusion, however on ADC map only one case show high signal proved to be chronic cervicitis on histopathology. Also, the mean ADC values for malignant lesions were ($0.83x10^{-3}$ mm^2/sec), while the mean ADC value in the control group is ($1.56x10^{-3}$ mm^2/sec). Therefore ADC value of ($1.07 x10^{-3}$ mm^2/sec) is a cut off between normal cervical tissue & malignant cervical lesion by sensitivity 97% and specificity 95.5%. DWIs had elicited the same accuracy to DCE sequences (96.7%) when added to the non-contrast MRI in the estimation of cancer cervix. **Conclusion:** Diffusion-weighted MR imaging (DWI) serves as a functional technique, which provides information about water mobility, tissue cellularity, and stability of membrane integrity that can discriminate cervical carcinoma from healthy tissue, and increasing the radiologist's confidence in image interpretation. So it implies a non-invasive technique which can be used especially if contrast intake is avoided as in pregnancy. **Recommendations:** ADC values were reliable for differentiating cervical cancer from normal cervix with higher diagnostic accuracy when added to DWI interpretation. The ADCs can be used to indicate the degree and histological type of cervical cancer, with large scale studies are recommended in the future.

Key words: MRI, DW-MRI, cervical cancer

INTRODUCTION

Cervical cancer is the fourth most common cancer in women worldwide, and it has a high mortality rate. Most women with cervical cancer are diagnosed before the age of 50. However; older women remain at risk. Cervical cancer is both preventable and, if identified early, treatable ***(Ferlay et al., 2013).***

Cervical cancer is usually staged and managed on the basis of criteria proposed by the International Federation of Gynecology and Obstetrics (FIGO) which is based on clinical examination, rather than surgical findings**.** Early diagnosis and accurate staging of the disease is crucial in planning the optimal treatment strategy ***(Shweel et al, 2012).***

Advances in magnetic resonance imaging (MRI) technology provide excellent soft tissue contrast resolution with multiplanar capabilities when evaluating the female pelvis ***(Peungjesada et al., 2009).***

Diffusion-weighted magnetic resonance imaging (DW-MRI) is a functional, non-invasive imaging technique which generates tissue contrast from differences in mobility of water molecules that occurs during an MR pulse sequence. Information regarding the integrity of cellular membranes and tissue cellularity can be obtained, so that DW-MRI can now be included in routine patient assessment ***(Kuang et al., 2013).***