The Role of Diffusion Weighted MR Imaging in Assessment of Hepatic malignancy after Radiofrequency Ablation

Thesis

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in Radio diagnosis

By

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Murtada Jawad Hashim

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List of Abbreviations

Abbrev.		Full-term
ADC	**:**	Apparent diffusion coefficient.
AFP	**:**	Alpha feto-protein.
CHA	**:**	Common hepatic artery.
CT	**:**	Computed tomography.
DCE-MRI	**:**	Dynamic contrast enhanced- magnetic resonance imaging
DEL	**:**	Delayed
DW	**:**	Diffusion weighted.
DWI	**:**	Diffusion weighted imaging.
FOV	**:**	Field of view.
Gd-DTPA	**:**	Gadolinium-diethylenetriaminepentaacetic acid.
HA	**:**	Hepatic artery
HCC	**:**	Hepatocellular carcinoma
HCV	**:**	Hepatitis C virus
ICC	**:**	Intra-hepatic cholangiocarcinoma
IP	**:**	In-phase
IVC	**:**	Inferior vena cava
LI-RADS	**:**	Liver Imaging-Reporting And Data System
MRI	**:**	Magnetic resonance imaging.
ms	**:**	Millisecond
OP	**:**	Out-of-phase.
PV	**:**	Portal vein
RE	**:**	Relative enhancement
RFA	**:**	Radio-frequency ablation
ROI	**:**	Regions of interest
s/mm^2	**:**	Second per square millimeter.
Sat	**:**	Saturation.
SE	**:**	Spin echo.
SI	**:**	Signal intensity.
SNR	**:**	Signal to noise ratio.
T	**:**	Tesla.

TACE	**:**	Trans-arterial chemoembolization
TE	**:**	Echo Time
THRIVE	**:**	T1-weighted high resolution isotropic volume examination.
TR	**:**	Repetition time
TSE	**:**	Turbo spin echo.
US	**:**	Ultrasound
WI	**:**	Weighted images

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Abstract

Background: MRI is a sensitive modality in detection and characterization of hepatic focal lesion. MRI has traditionally been used to evaluate treatment response in malignant liver lesions. However, the assessment of tumor response after certain treatments, such as radiofrequency ablation (RFA) can be difficult. **Aim of the Work:** To assess role of diffusion weighted MRI in evaluation of treatment response after radiofrequency ablation for hepatic malignancy. **Patients and Methods:** Ethics committee of the Faculty of Medicine, Ain Shams University, approved this prospective analysis study and cases were supplied by Hospitals of Ain Shams University. 20 cases treated by Radiofrequency ablation for hepatic malignancy were involved in our study. Patients were recruited from Interventional Unit in Radiology Department, Ain Shams University Hospitals. **Results:** Regarding DWI, our study showed that sensitivity of 83.3% specificity of 85.7% positive predictive value of 71.4%, negative predictive value of 92.3% with diagnostic accuracy of 85%. Our present study showed that the mean ADC of the well ablated lesion was 1.4 X 10^{-3} mm^2/sec and of the residual lesion 0.8 X 10^{-3} mm^2/sec with significant statistical difference between the residual viable tumor and the well ablated lesions. Moreover, it has been shown in our study that the level of ADC may help us to recommend a cut-off value of 1.233×10−3mm2/s. **Conclusion:** periphery of the ablation zone, which is principally most at risk of tumor residue, should be analyzed separately. **Recommendations:** Further studies on larger scale of patients are needed to confirm the results obtained by this work.

Key words: Diffusion Weighted MRI, hepatic malignancy, radiofrequency ablation

Introduction

Hepatocellular carcinoma (HCC) and secondary liver metastases comprise a large proportion of malignancies diagnosed in the United States and worldwide.

Hepatocellular carcinoma (HCC) is the most common primary liver malignancy and is a leading cause of cancer-related death worldwide ***(Balogh et al., 2016).***

DWI can provide information about molecular tissue characteristics, thus it has an additional value in the evaluation & follow up of local ablative therapy in patients with malignant liver tumors.

Correct detection, classification, and characterization of focal hepatic lesions are of paramount importance as they may significantly affect the choice of therapeutic approach in many cases ***(Holzapfel et al., 2010).***

Surgical resection is currently the accepted standard treatment method for potential cure, demonstrating benefit in overall survival time in primary and secondary liver malignancies.

Although liver resection continues to be the standard for curative care in patients with hepatic malignancies, most patients are not candidates for surgical therapy. Therefore,