



شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكرو فيلم

بسم الله الرحمن الرحيم



MONA MAGHRABY



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شبكة المعلومات الجامعية التوثيق الإلكتروني والميكروفيلم



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جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

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Role of ADC mapping in assessment of therapeutic response of hepatocellular carcinoma post trans-catheter arterial chemoembolization

Thesis

Submitted for partial fulfillment of master degree in diagnostic
and interventional radiology

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2021**

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قالوا

لسبب انك لا تعلم لنا
إلا ما علمتنا إنك أنت
العليم العظيم

صدق الله العظيم

سورة البقرة الآية: ٣٢



Acknowledgement

First of all, thanks to Allah whose magnificent help was the mainfactor in completing this work.

I would like to express my deepest gratitude and thanks to Prof. Dr.Zenat Ahmed El Sabbagh, Professor of Radiodiagnosis, Faculty of Medicine, Ain Shams University, For giving me the honor of being her candidate, working under her supervision, guided by her experience and precious advices and true concern, I could not ask for a better mentor and role model.

Words could not express my appreciation, thanks and respect to Dr. Mohamed Mamdouh Mohamed Abdel Aziz, Lecturer of Radiology, Faculty of Medicine, Ain Shams University, for his kindness, patience, consideration, precious assistance throughout this work.

I would like to express my appreciation and thanks to my husband, without his endless support and encouragement I would have never completed this work .To my beloved father I wish you were here with me to witness this moment, hope you are proud of me, last, but not least, Many thanks to the light of my life my mother, for indulging my studies and late night working .



Mona Ahmed Saad Abo Elenin

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List of Abbreviations

Abb.	Full Term
\pm SD	Standard deviation
AASLD	: American Association for the Study of Liver Diseases
ADC	: Apparent diffusion coefficient
AUC	Area under curve
BB-EPI	: Black-blood echo planar
BCLC	: Barcelona Clinic Liver Cancer
CA	: contrast agents
CBD	: common bile duct
CE	: Contrast enhanced
CE-CT	: contrast- enhanced CT
CT	: Computed tomography
DCE MRI	: Dynamic contrast-enhanced MRI
DCE -MRI	: Dynamic contrast-enhanced MRI
DEB	: Drug-eluting bead
DN	: Dysplastic nodule
DWI	: Diffusion weighted imaging
DWI	: Diffusion-weighted imaging
Gd	: gadolinium
Gd	: gadolinium
Gd-EOB-DTPA	: gadolinium ethoxybenzyl diethylene-triamine pentaacetic acid
GRE	: Gradient-echo
HA	: Hepatic artery
HCC	: Hepatocellular carcinoma
HV	: Hepatic vein
IQR	Inter-quartile range
IVC	: inferior vena cava
IVIM	: intravoxel incoherent motion
LN	: lymph node
MR	: Magnetic resonance
MR	: magnetic resonance
MRI	: Magnetic resonance imaging
NPV	Negative predictive value
PPV	Positive predictive value

List of Abbreviations

Abb.	Full Term
PV	: Portal vein
RARE	: Rapid acquisition with relaxation enhancement
RCT	: Randomized controlled trial
RFA	: Radiofrequency ablation
RN	: Regenerative nodule
ROC	: Receiver operating characteristic
SC	: subcutaneous
SE	: Standard Error
SGE	: spoiled gradient-echo
SGE	: spoiled gradient-echo
SI	: Signal intensity
SPAIR	: Spectrally adiabatic inversion recovery
SPIO	: Super paramagnetic iron oxide
SSTSE	: Single-shot turbo spin-echo
STIR	: Short-tau inversion recovery
TACE	: Trans catheter arterial chemoembolization
TNR	: true negative rate
TPR	: true positive rate
WI	: Weighted images

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Abstract

Background: Trans-arterial chemoembolization (TACE) is widely used as an interventional procedure in treatment of hepatocellular carcinomas (HCCs). Apparent diffusion coefficient (ADC) value can be used in evaluating its efficacy in order to rule out or in residual tumor tissue.

Aim of the work: To assess the role of Diffusion weighted images (DWI) and ADC value in evaluating HCCs post TACE

Patients and methods: a retrospective analytical study on 25 patients with HCC; to assess therapeutic response of HCC cases after TACE by ADC mapping MRI technique in comparison to dynamic contrast enhanced study (DCE-MRI), to evaluate its accuracy, sensitivity and specificity in detecting treatment response and or residual tumor.

Results: Comparative study between the 2 groups revealed; highly significant increase in ADC value, in active group; compared to inactive group; with highly significant statistical difference ($p < 0.01$). Comparative study between DCE-MRI and DWI/ADC assessments revealed; non-significant difference in sensitivity, specificity, PPV and NPV in HCC patients; with non-significant difference ($p > 0.05$). Spearman's correlation analysis shows that; AFP level had a highly significant negative correlation with ADC value; with highly significant statistical difference ($p < 0.01$). By using ROC-curve analysis, DWI/ADC value at a cutoff point (≤ 1.33) detected patients with residual active lesions, with good accuracy (84%), sensitivity 84% and specificity 83% ($p = 0.0001$).

Conclusion: Finally we conclude that, DCE-MRI is a powerful tool in detection of tumor viability and complications after TACE yet Imaging protocol should include DWI/ADC images with ADC mapping and value for better tissue characterization.

Introduction

HCC is now the third leading cause of cancer deaths worldwide, with over 500,000 people affected. **(Llovet et al., 2018).**

Hepatocellular carcinoma (HCC) occurs predominantly in patients with underlying chronic liver disease and cirrhosis **(Machida 2018).**

Liver Transplantation remains the best option for patients with HCC according to Milan criteria (single tumors ≤ 5 cm in diameter or no more than three tumors ≤ 3 cm in diameter). Unfortunately, there is a limited supply of good-quality deceased donor organs. Thus, alternative treatments, including resection, radiofrequency ablation (RFA), and, potentially, systemic therapy are needed **(Imura et al., 2018), (Sugawara et al., 2018).**

Patients who have advanced disease may benefit from palliative care interventions rather than be subjected to often ineffective therapies **(Ferri et al., 2017).** The most commonly offered therapy is TACE. TACE is performed by an interventional radiologist who selectively cannulates the feeding artery to the tumor and delivers high local doses of chemotherapy, including doxorubicin, cisplatin, or mitomycin C. To prevent systemic toxicity, the feeding artery is occluded with gel foam or coils to prevent flow **(Liu et al., 2018).**

Unenhanced computed tomography (CT) confirms successful introduction of the chemoembolization mixture into the targeted lesions. However, it can be difficult to evaluate contrast enhancement in a tumor with partial retention of iodized oil on contrast-enhanced CT (CE-
