Does the Diffusion Weighted Images and Subtraction MRI of Hepatocellular Carcinoma has a Role in Predicting Outcome of Transarterial Chemoembolization?

Thesis

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List of Abbreviations

Abb.	Full term
ADC	*Apparent diffusion coefficient.*
APF	*Arterio portal fistula*
CT	*Computed Tomography.*
DCE MRI	*Dynamic Contrast Enhanced Magnetic Resonance Imaging*
DN	*Dysplastic Nodule.*
DWI	*Diffusion Weighted Imaging.*
EASL	*European Association for the Study of the Liver*
ELT	*Echo length Train*
EPI	*Echoplaner Imaging.*
FFE	*Fast Field Echo.*
FN	*False Negative*
FP	*False Positive.*
FSE	*Fast Spin Echo*
GRE	*Gradient Echo.*
HBV	*Hepatitis B Virus.*
HCC	*Hepatocellular carcinoma.*
HCV	*Hepatitis C Virus*
mRECIST	*modified Response Evaluation Criteria in Solid Tumors.*
MRI	*Magnetic resonance imaging.*
NPV	*Negative predictive Value.*
OP	*Out of Phase.*

List of Abbreviations cont...

Abb.	Full term
PES	*Post Embolization Syndrome.*
PPV	*Positive Predictive Value.*
RECIST	*Response Evaluation Criteria In Solid Tumors*
ROC	*Receiver Operating Curve*
ROI	*Region of Interest.*
RT	*Respiratory Triggered.*
SE	*Spine Echo.*
SNR	*Signal to noise ratio.*
SPAIR	*Spectrally adiabatic inversion recovery.*
SPIO	*Superparamagnetic iron oxide particle.*
SSTSE	*Single shot turbo spin echo.*
STIR	*Short-tau inversion recovery*
TACE	*Transcatheter arterial chemoembolization.*
TE	*Time of Echo.*
TN	*True negative*
TP	*True positive*
TR	*Time of Repetition.*
TTP	*Time to peak aortic enhancement*
WI	*Weighted imaging.*

INTRODUCTION

Hepatocellular carcinoma (HCC) is one of the most common malignancies worldwide for its high incidence and mortality, which seriously threatens human health and life ***(Jemal et al., 2011)***.

Surgical resection remains the first option for HCC patients, but a number of patients are diagnosed after the optimal time for surgical resection has passed ***(Pascual et al., 2016).***

Transcatheter arterial chemoembolization (TACE) has been widely used in patients with unresectable HCC ***(Song et al., 2015).***

TACE involves the emulsification of a chemotherapeutic agent in a viscous drug carrier and embolic material into the tumor-feeding arteries, thereby inducing tumor necrosis and regression ***(Roccarina et al., 2015; Schutte et al., 2014).***

Thus, it is of paramount importance to assess the efficacy of TACE in the treatment of HCC accurately and timely.

Computed tomography (CT), magnetic resonance imaging (MRI), and digital subtraction angiography (DSA) are common imaging techniques in evaluating the efficacy of TACE of Hepatocellular carcinoma ***(Luypaert et al., 2001).***

Diffusion-weighted imaging (DWI) and perfusion-weighted imaging (PWI), as representatives of functional MRI techniques, play pivotal roles in the diagnosis of HCC and assessing the efficacy of TAC as a treatment modality ***(Li et al., 2012).***

DWI exploits the random motion of water molecules in tissues, which takes apparent diffusion coefficient (ADC) as a quantitative index in clinical practice ***(Schmiedeskamp et al., 2012).*** PWI provides information on microvascular distribution and blood perfusion with high temporal and spatial resolutions ***(Kamel et al., 2006).***

Compared with the commonly used methods such as CT, MRI, and DSA, in the follow-up of HCC after TACE, DWI is capable of detecting new lesions and distinguishing residual neoplastic tissue and necrotic neoplastic tissue timely and accurately ***(Chen et al., 2014).***

Additionally, PWI acts as a very sensitive imaging technique that could be used to monitor blood flow changes in HCC both before and after TACE as well as to evaluate the efficacy of TACE ***(Kasper et al., 2016).***

The combination of DWI and PWI could achieve a more accurate diagnosis of tumor residual or recurrence after TACE, which exerts a beneficial impact on assessing early clinical effects and making further therapeutic plan. However, few

studies report the quantitative parameters of DWI combined with PWI in evaluating the therapeutic efficacy of TACE in the treatment of HCC. In the present study, we aimed to explore the predictive values of DWI and PWI in evaluating the efficacy of TACE in the treatment of HCC patients.