The Role of PET CT In Comparison To Triphasic CT in Early Follow Up of Hepatocellular Carcinoma after Transarterial Chemoemoblization

Thesis

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Hany Rafat Atyia EL-Malah

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List of Abbreviation

AFP	Alpha-fetoprotein
BGO	Bismuth germanate
CBD	Common bile duct
CECT	Contrast enhanced computed tomography
CHA	Common hepatic artery
CHD	Common hepatic duct
CT	Computed tomography.
CTAC	Computed tomography attenuation correction
EASL	European Association for the Study of the Liver
FDG	Fluorodeoxyglucose
GB	Gall bladder.
GDA	Gastroduodenal artery
GLUT	Glucose transporter
GSO	Gadolinium oxyorthosilicate
HCC	Hepatocellular carcinoma
HCV	Hepatitis C virus
HK enzyme	Hexokinase enzyme
IMV	Inferior mesenteric vein
IVC	Inferior vena cava
kBq	Kolobecquerel

Kev	Kiloelectron volt
Kg	Kilogram
LGA	Left gastric artery
LHA	Left hepatic artery
LHV	Left hepatic vein
LPV	Left portal vein
LSECs	Liver sinusoidal endothelial cells
LSO	Lutetium oxyorthosilicate
mCi	Millicurie
MHV	Middle hepatic vein
MIP	Maximum intensity projection
MPV	Main portal vein
mRECIST	Modified Response Evaluation Criteria in Solid Tumors
MRI	Magnetic Resonance imaging
N/C ratio	Nuclear/cytoplasmic ratio
Nal	Sodium iodide
NASH	Nonalcoholic steatohepatitis
PET	Positron Emission Tomography
PMT	Photomultiplier tube
PV	Portal vein
PVTT	Portal vein tumoral thrombosis
RAPV	Right anterior portal vein
RECIST	Response Evaluation Criteria in Solid

	Tumors
RFA	Radiofrequency ablation
RHA	Right hepatic artery
ROI	Region of interest
RPPV	Right posterior portal vein
RPV	Right portal vein
RRA	Right renal artery.
SA	Splenic artery
SMA	Superior mesenteric artery
SMV	Superior mesenteric vein
SPD	Sum of the product diameters
SUV	Standardized uptake value
TACE	Transarterial chemoembolization
WHO	World Health Organization
18- FDG	18- fluorodeoxyglucose

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Introduction

Hepatocellular carcinoma (HCC) represents the commonest primary hepatic tumor of adults. It is the 6th most common tumor in the world and the third commonest cause of cancer related deaths ***(Dai et al., 2014)***.

Liver cancer represents about 11.85% of the malignancies of all GIT organs and 1.78% of the total malignancies among Egyptians ***(Holah et al., 2015).***

HCC is caused by malignant transformation in hepatocytes due to chronic liver diseases resulting in cirrhosis ***(Tsurusaki et al., 2014).***

From the selective treatment options of liver tumors, interventional procedures such as Trans arterial chemo-embolization (TACE), has been widely used. The powerful cytotoxic effect of TACE by combined action of ischemia followed by chemoembolization of the tumor's feeding artery has been proved to result in therapeutic efficacy ***(Song et al., 2013).***

Despite good results, this interventional procedure needs close monitoring to effectiveness of treatment because the rate of residual viable malignancy in tumors larger than 3 cm can reach 48% ***(Tsurusaki et al., 2014).***

Follow up of tumor response after TACE is important to determine whether the tumor is completely eradicated or additional treatment is required. Magnetic resonance imaging or computed tomography has been widely used for the assessment of treatment response after TACE. The determination of treatment response using size criteria, based on the Response Evaluation Criteria in Solid Tumors (RECIST), does not necessarily apply well to interventional therapy in such patients, so most radiologists have relied on the presence or absence of local contrast enhancement at the treated tumor in addition to changes in tumor size ***(Kim et al., 2011).***

The methods which are used to detect tumor viability depend on showing arterial enhancement for reporting treatment responses. However, this concept does not adequately consider the biological activity of HCC ***(Song et al., 2013).***

Positron Emission Tomography (PET) is a non-invasive imaging tool that uses 18- fluoro-deoxy-glucose (18- FDG) as radioactive material showing difference in metabolism between tissues thus demonstrates the functional status of suspicious lesions ***(Saif et al., 2010)***.

After interventional procedures, CT or MRI at one month are routinely performed to assess for residual tumors but there has been increasing evidence that PET can detect residual tumors earlier than CT and MRI ***(Tsurusaki et al., 2014).***

PET/CT is a new imaging tool, whose advantages are useful in clinical oncology. The combination of anatomical and functional image has been the true evolution in diagnosis ***(Saif et al., 2010).***

So, PET/CT can be used in the assessment of hepatocelluar biological activity as an additional predictive tool ***(Song et al., 2013).***

Aim of the Work

The aim of this study is to emphasize the role of PET/CT in early follow up of HCC after transarterial chemoembolization in comparison to triphasic CT.