Role of Triphasic CT in Prediction of Response to Transcatheter Arterial Chemoembolization in Unresectable Hepatocellular Carcinoma Patients

Thesis

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By

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Abstract

This study is to evaluate the role of triphasic CT in prediction of the prognosis of the irresectable HCC patients who had locally treated with transcatheter arterial chemo embolization by studying the enhancement (vascularity) pattern & the volume changes of the HCC after TACE.Our study included 25 HCC patients as diagnosed by triphasic CT study & serum AFP level. Patients were recruited from NHTMRI HCC clinic & radiology department for assessment of the target lesion after doing TACE as a loco regional therapy for HCC from September 2012 to July 2013.In our study, there is a highly significant relationship between the maximum initial diameter of the target lesion before TACE & the maximum diameter of the lesion after TACE as the initial maximum diameter of the target lesion is increased the maximum diameter of the lesion after TACE is also increased.

Keyword: AFP,TCC,TACE, Hepatocellular, Chemoembolization

Contents

List of Abbreviations

AASLD	American Association for the Study of Liver Diseases
Acc	Accessory
AFP	Alpha feto protein
AJCC	American Joint Commission for Cancers
Alb	Albumin
ALT	Alanine transferase enzyme.
AO	Aorta
AST	Aspartate transferase enzyme
BCLC	Barcelona Clinic of Liver Cancer
CA	Celiac artery
CBD	Common bile duct
CHA	Common hepatic artery
CHD	Common hepatic duct
CLIP	Cancer of the Liver Italian Program
Cm	Centimeter
CR	Complete response
CT	Computaed tomo graphy
DSA	Digital subtraction angiography
EASL	Europian association for the study of the liver
ECOG	Eastern Cooperative Oncology Group
EORTC	Europian organization for research and treatment of cancer
ESLC	Egyptian society of liver cancer
FCAT	Federative Committee on Anatomical Terminology
Fig	Figure
FU	Flurouracil

GDA	Gastroduodenal artery
GI	Gastro intestinal
HA	Hepatic artery.
Hb	Hemoglobin.
HBV	Hepatitis B virus
HCC	Hepatocellular carcinoma
HCV	Hepatitis C virus
HFL	Hepaticc focal lesion
HU	Hounsfield unit
HVs	Hepatic veins.
HVWP	Hepatic Venous Wedge Pressure
ISRN	International Scholarly Research network
IV	Intravenous
IVC	Inferior vena cava
JNCI	Ournal of the National Cancer Institute
Kg	Killogram
L	Lumbar
LGA	left gastric artery
LGA	Left gastric artery
LHA	Left hepatic artery
LHV	Left hepatic vein
LNs	Lymph nodes.
MDCT	Multi detector CT
MHV	Middle hepatic vein
MIP	Maximum intensity projection
mRECIST	Modified response evaluation criteria in solid tumors
MRI	Magnetic resonance imaging
MSCT	Multi slice computed tomography

NASH	Nonalcoholic steatohepatitis
NHTMRI	National Hepatology and Tropical Medicine Research Institute
PC	Prothrombin concentration
PD	Progressive disease
PHA	Proper hepatic artery
PR	Partial response
PT	Prothrombin time
PV	Portal vein.
RAPV	The right anterior portal vein
RECIST	Response evaluation criteria in solid tumors
RHA	Right hepatic artery
RHV	Right hepatic vein
RPPV	Right posterior portal vein
RRA	Right renal artery
SA	Splenic artery
SMA	Superior mesenteric artery
SMV	Superior mesenteric vein
ST	Stable disease
SV	Splenic vein
T.Bil	Total bilirubin
TACE	Trans arterial chemo embolization
TNM	Tumor, nodes, metastases staging
US	Ultrasound
WHO	World Health Organization

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Introduction

Hepatocellular carcinoma (HCC) is the most common primary liver cancer, the fifth most common cancer and the third most common global cause of cancer-related deaths. In 2000, there were 564,000 new cases and 549,000 deaths from HCC worldwide, indicating the devastating prognosis of this tumor ***(Shariff et al., 2009).***

The major risk factors for HCC are the presence of cirrhosis, and HBV/HCV coinfection. Other factors, such as aflatoxin and nonalcoholic steatohepatitis (NASH), are important and prevalent in certain areas of the world ***(Shariff et al., 2009).***

Unlike other forms of cancer, the diagnosis of HCC does not always require histological confirmation and HCC is usually diagnosed by tumor marker and radiology such as ultrasonography, C.T and MRI ***(Bolondi et al., 2005).***

Current effective treatments for HCC include liver resection, transplantation, various local ablative and trans-arterial therapies. Surgical resection and liver transplantation are the main curative treatments. Unfortunately, only around ٢٠% patients, mostly diagnosed by regular screening, may benefit from these surgical therapies ***(Yau et al., 2008)***.

Chemoembolization is the most commonly used treatment for HCC that cannot be submitted to surgery. It is based on the objective of tumor devascularization, in which the oxygen and nutrient supply to the tumor is blocked, resultng in tumor necrosis ***(Geschwind et al., 2003).***

Computed tomography (CT) is an attractive imaging modality for HCC screening because it can detect lesions in the cirrhotic liver, allow lesion characterization and also assist in clinical staging. Its sensitivity and specificity for HCC are variable. Sensitivity of CT for HCC detection can be enhanced with the use of new helical techniques and the dynamics of intravenous contrast agents ***(Arguedas, 2003).***

Aim of the Work

The aim of this study is to evaluate the role of triphasic CT in prediction of the response of the irresectable HCC patients who had locally treated with transcatheter arterial chemo embolisation by studying the enhancement (vascularity) pattern & the volume changes of the HCC after TACE.

Anatomy of the Liver

The word liver is derived from the Anglo-Saxon word for liver, *lifer*. It seems logical that the etymology of the word is somehow related to "life" but no one knows for certain. It is also interesting to note that the German word for liver is *die Leber*, and the German verb *leben* is "to live". *Hepar* is the Greek word for liver, and is the source of the combining form seen in words such as hepatic, hepatitis, and heparin (which was first isolated from the liver cells of dogs) ***(Carpenter, 2007).***

Gross morphology:

It is the largest organ in the body. It is situated in the upper and right quadrants of the abdominal cavity, occupying almost the whole of the right hypochondrium, the greater part of the epigastrium, and not uncommonly extending into the left hypochondrium as far as the mammillary line. In the male it weighs from 1.4 to 1.6 kilogm, in the female from 1.2 to 1.4 kilogm constituting about one-eighteenth of the entire body weight. Its greatest transverse measurement is from 20 to 22.5 cm. Vertically, near its lateral or right surface, it measures about 15 to 17.5 cm., while its greatest antero-posterior diameter is on a level with the upper end of the right kidney, and is from 10 to 12.5 cm. Opposite the vertebral column its measurement from before backward is reduced to about 7.5 cm ***(Grey, 2004).***

The liver has three surfaces, *superior, inferior and posterior***.** A sharp, well-defined margin divides the inferior from the superior in front; the other margins are rounded. The superior surface is attached to the

diaphragm and anterior abdominal wall by a triangular or falciform fold of peritoneum, the falciform ligament, in the free margin of which is a rounded cord, the ligamentum teres (*obliterated umbilical vein*). The line of attachment of the falciform ligament divides the liver into two parts, termed the right and left lobes, the right being much larger ***(Grey, 2004).***

The inferior and posterior surfaces are divided into four lobes by five fossae, which are arranged in the form of the letter H. The left limb of the H marks on these surfaces the division of the liver into right and left lobes; it is known as the left sagittal fossa, and consists of two parts, the fossa for the umbilical vein in front and the fossa for the ductus venosus behind. The right limb of the H is formed in front by the fossa for the gall-bladder, and behind by the fossa for the inferior vena cava; these two fossae are separated from one another by a band of liver substance, termed the caudate process. The bar connecting the two limbs of the H is the porta (*transverse fissure*); in front of it is the quadrate lobe, behind it the caudate lobe **(Fig 1-3)** ***(Grey, 2004).***

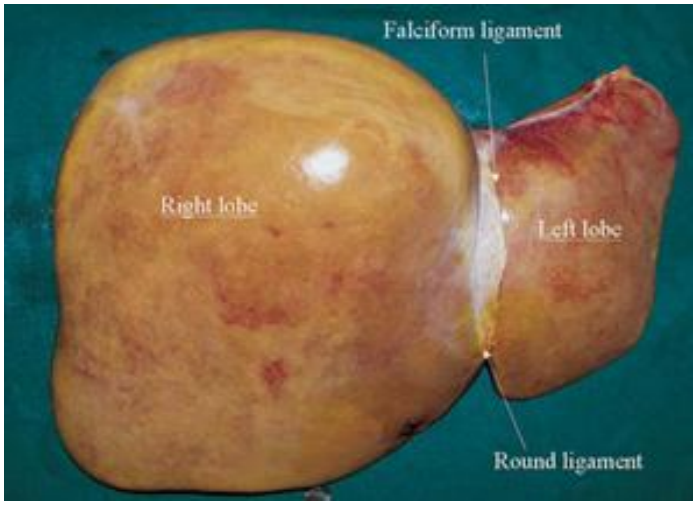

Fig. (1): Superior aspect of the liver (Majno et al., 2005).