Table of Contents

List of Abbreviations

CT	Computed tomography
RHA	Right hepatic artery
LHA	Left hepatic artery
MRA	Magnetic resonance angiography
CA	Celiac axis
CHA	Common hepatic artery
SPA	Splenic artery
PV	Portal vein
LPV	Left Portal vein
RPV	Right Portal vein
LGA	Left gastric artery
IVC	Inferior vena cava
MIP	Maximum intensity projection
MHV	Middle hepatic vein
3 D	Three dimension
CBD	Common bile duct
GB	Gall bladder
cm	Centimeter
ml	milliliter
mm	Millimeter

List of Abbreviations (Cont.)

OLT	Orthotopic liver transplantation
LDLT	Living donor liver transplantation
AIDS	Acquired Immumo deficiency syndrome
HIV	Human immuno deficiency virus
MRI	Magnetic resonance imaging
SMV	Superior mesenteric vein
Kg	Kilogram
RST	Reduced size transplantation
MPV	Main portal vein
HATh	Hepatic artery thrombosis
HASt	Hepatic artery stenosis
US	Ultrasound
MRC	Magnetic resonance cholangiography
RI	Resistive index
SAT	Systolic acceleration time
cm/s	Centimeter per second
TE	Echo time
TR	Repetition time
PVS	Portal vein stenosis
PVT	Portal vein thrombosis
MRV	Magnetic resonance venography
DSA	Digital subtraction angiography
HCV	Hepatitis C Virus
HBV	Hepatitis B Virus
HCC	Hepatocellular carcinoma.
SAS	Splenic artery steal

List of tables

List of figures

Introduction

Liver transplantation is a successful therapeutic option for patients with multiple irreversible acute and chronic liver diseases. The surgical techniques for this procedure have been improved considerably, nevertheless, there are still significant complications following the operation particularly those of vascular origin which can lead to graft failure. These complications include hepatic artery stenosis and thrombosis, portal vein stenosis and thrombosis, caval and hepatic veins obstructions and arterial pseudo-aneurysm***.(Consme et al, 2012).***

In the past, repeated transplantations had to be undertaken, as these patients are medically and surgically complex and are often poor surgical candidates ***(Denys et al, 2013)*.**

Diagnostic imaging and interventional radiology play key roles in the evaluation and management of patients who are being evaluated for potential liver transplantation (LTX) and of those who have received a transplanted liver. Technical advances in imaging equipment and technique allow more accurate assessment ***(Almusa et al, 2012).***

*In this sense, diagnosis and therapeutic management of vascular complications constitute a major challenge in terms of increasing the success rate of liver transplantation. This explains why, currently, many transplant teams perform close surveillance of all vascular anastomoses using Doppler ultrasonography, which allows prompt detection and treatment before ineluctable graft failure.****((Karani et al, 2008).***

Although there is a reliance on ultrasound (US) for assessing vascular and nonvascular complications, there is an important role for computed tomography (CT). CT imaging in the peri- and postoperative phase is used in the evaluation and diagnosis of vascular complications and hematomas. Postoperative disease recurrence and post-transplant lymphoproliferative disease (PTLD) may be readily detected with CT. ***(Amesur et al, 2016).***

MDCT angiography is the best option for confirmation the ultrasonographic suspicion of early and late vascular complications (HAT, main portal vein or inferior vena cava (IVC) stenosis or thrombosis). **(smith,2002)**

It is suggested that if any vascular complication is suspected with Doppler ultrasound, MDCTA must be performed for diagnosis, and after that, only if severe /moderate stenosis is detected, the patients must undergo DSA for PTA and/or stent placement therapy due to the high accuracy of the MDCTA examination. **(flucher,2001)**

3DCTA provides sufficient information not only on patency or stenosis of smaller vessels but also on other abnormalities in the liver parenchyma, biliary, and extra-hepatic sites, which forms the major decision for the treatment of the detected vascular complication. **(flucher,2001)**

Aim of work

Aim of work

The aim of this study is to evaluate the sensitivity and specificity of Duplex ultrasound in detection most of vascular complication after liver transplantation in correlation with CTA.

Review of literature

Normal anatomy of the liver

Gross Morphology:

The liver is the largest gland in the body. It is considerable individual variations in size and shape. It is situated in the cranial and right part of the abdominal cavity occupying most of the right hypochondrium, epigastrium and is not uncommonly extending to the left hypochondrium. It has two surfaces: diaphragmatic and visceral surfaces. The diaphragmatic surface is dome shaped and conforms to the diaphragm. It is divided into superior, anterior, right and posterior portions or surfaces ***(Lencioni and Bratolozzi, 2013).***

A- <u>Diaphragmatic surface</u>:

1-The superior portion: It is completely covered by peritoneum except for small triangular area where the two layers of the falciform ligament diverge. The major landmark of the superior surface is the sagittal groove which is a deep notch providing access for the ligamentum-teres which runs in the free edge of the falciform ligament. This portion is related through the diaphragm to the base of the right lung, pericardium and the heart on its extreme left side.

2-The anterior portion: It is completely covered by peritoneum except along the line of attachment of the falciform ligament. It lies against the diaphragm, the costal margin, the xiphoid process and the abdominal wall.

3-The right portion: It is covered by the peritoneum and merges with the other three parts of the diaphragmatic surface

and continues down to the right margin that separates it from the visceral surface. ***(Bismuth and Chiche, 2009).***

4-The posterior portion: A large part of this portion of the diaphragmatic surface is not covered by the peritoneum and this uncovered area is frequently called the bare area, which is bounded by the superior and inferior reflections of the coronary ligament. This surface is broad and rounded on the right but narrow on the left. To the right of vena cava and partially on the visceral is a small triangular depressed area ,named supra-renal impression for the suprarenal gland and to the left of the ductus venosus fossa there is the esophageal groove for the antrum cardium of the esophagus ***(Blumgartr and Hamm, 2010).***

B- <u>The visceral or inferior surface</u>:

It is facing downward, backward and to the left, and is covered by visceral peritoneum except at the porta hepatis, fissure for ligamentum teres and fossa for the gall bladder. This surface bears the imprint of the adjacent viscera and this surface is closely related to the pylorus, the duodenum, the gall bladder, the right colon, the hepatic flexure, the right third of the transverse colon, the right kidney and the right supra-renal gland. ***(Blumgartr and Hamm, 2010).***