RECENT ADVANCES IN PORTAL VEIN IMAGING AND EMBOLIZATION

Essay

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LIST OF ABBREVIATIONS

ALT	**Aspartate aminotransferase**
ALP	**Alanine aminotransferase**
BCLC	**Bercelona clinic liver cancer**
CLD	**Chronic Liver disease**
CE	**Contrast enhanced**
CTA	**CT angiography**
CEPS	**Congenital extra hepatic portosystemic shunt**
CEMRV	**Contrast enhanced magnatic resonance venography**
DH	**Degree of hypertrophy**
EASL	**European association for the study of the liver**
FSE	**Fast spin echo**
FLR	**Future liver remnant**
FLC	**Fibrolameller carcinoma**
FNA	**Fine needle aspiration**
FLRV	**Future liver remnant volume**
FLR/TELV	**Future liver remenant estimated /total liver volume**
GRE	**Gradient echo**
HCC	**Hepatocellular carcinoma**
HGF	**Hepatocyte growth factor**
LPV	**Left portal vein**
MDCT	**Multi-detecter computed tomography**
MIP	**Maximum intensity projection**
MPV	**Main portal vein**
MRA	**Magnetic resonance arteriography**
MRV	**Magnetic resonance venography**
NEC	**Non enhanced contrast**
PVA	**Polyvinyl alcohol**
PI	**Pulsatilty index**

PDPV	**Preduodenal portal vein**
PV	**Portal vein**
PVT	**Portal vein thrombosis**
PT	**Prothrombin time**
PVE	**Portal vein embolization**
RPV	**Right portal vein**
RAPV	**Right anterior portal vein**
RPPV	**Right posterior portal vein**
RPVE	**Right portal vein embolisation**
RF	**Radio frequency**
SSD	**Shaded surface display**
SSFP	**Steady state free precession sequence**
SPGR	**Spoiled gradient recalled**
SPLV	**Splenic vein**
SMV	**Superior mesenteric vein**
SNR	**Signal to noise ratio**
TOF	**Time of light**
TLV	**Total liver volume**
T SLIP	**Time space labeling inversion pulse**
TGF	**Epidermal growth factor**
TE	**Time echo**
TI	**Time inversion**
TR	**Time repetitive**
US	**Ultrasound**
WBC	**White blood cell**

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INTRODUCTION

The portal venous system comprises all of the veins draining the abdominal part of the digestive tract, including the lower esophagus. The portal vein conveys blood from viscera and ramifies at the liver ending at the sinusoids. Tributaries of the portal vein, which make up the portal venous system are the splenic, superior mesenteric, left gastric, right gastric, paraumbilical, cystic and inferior mesenteric veins**.(Gray H., 2004).**

Radiologic evaluation of the portal vein and its anomalies is usual1y performed with color Doppler ultrasonography (CDUS), Multi-detector CT and MR Portography. Arterial portography, direct portography, and splenoportography, may also be used. **(Bolondi et al., 2001).**

Color Doppler ultrasonography (CDUS) provides rapid, comprehensive, and accurate evaluation of the portal vein and flow direction.also used to confirm that portal blood flow had been occluded in ligated lobe and it had been sustained in future liver remenant**.(hiropelida et al.,2012)**.

Multi–detector row CT is the latest advancement in CT technology and is now more readily available than in the past. The increased speed and narrower collimation of multi–detector row CT,together with the use of intravenously administered contrast material, improves visualization of the portal vein. **(Kang et al., 2002).**

MR venography after administration of gadolinium contrast material is highly accurate in mapping the portal vein anatomy and identifing its anomalies .The accuracy of delineating the anatomy is increased by using multiplanar reconstruction .MR venography can be considered an alternative to invasive portography. **(Prince et al., 2003).**

Proper imaging of the portal vein is an important step which allows further interventions in the portal venous system. These interventions include, the portal vein embolization (PVE). **(Madoff et al., 2003).**

Portal vein embolisation (PVE) was introduced by **Kinoshita et al** .,and **Makuuchi et al**,. to induce hypertrophy and prevent postoperative liver insufficiency among patients undergoing major hepatectomy. AS

originally described ,PVE encompassed occlusion of either a left or right second –order portal venous branch.

The procedure is now established as a technique to permit hepatectomy in many patients with an otherwise inadequate future liver remenant(FLR) .preoerative PVE is utilized when the FLR is estimated to comprise<20-30% of the total liver volume in a patient with normal hepatic parenchyma or<30-40% in a patient with underlying liver disease.**(Kinoshita**, **Makuuchi et al,2011**).

Nagino et al. introduced the concept of PVE with extension to segment IV (PVE+IV)in patients undergoing extend right hepatectomy **Nagino et al**. introduced the concept of PVE with extension to segment IV (PVE+IV)in patients undergoing extend right hepatectomy,but its safety and efficacy are controversial.A single-institution study indicated that it improves the hypertrophy compared with PVE alone without increasing complications. However other have failed to detect any significant increase in hypertrophy of segments II and III with addition of segment IV embolisation. (**kinoshita, Nagino, et al 2011).**