

RECENT ADVANCES IN PORTAL VEIN IMAGING AND EMBOLIZATION

Essay

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CONTENTS

	PAGE
LIST OF ABBREVIATIONS	I
LIST OF TABLES	III
LIST OF FIGURES	IV
INTRODUCTION	1
AIM OF THE WORK	3
Anatomy of liver and portal vein	4
Pathology of liver and portal vein	38
Technique of portal vein imaging and embolization	83
Discussion	187
Summary & Conclusion	191
REFERENCES	194
ARABIC SUMMARY	١

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 magnetic resonance venography
DH	Degree of hypertrophy
EASL	European association for the study of the liver
FSE	Fast spin echo
FLR	Future liver remnant
FLC	Fibrolamellar carcinoma
FNA	Fine needle aspiration
FLRV	Future liver remnant volume
FLR/TELV	Future liver remnant estimated /total liver volume
GRE	Gradient echo
HCC	Hepatocellular carcinoma
HGF	Hepatocyte growth factor
LPV	Left portal vein
MDCT	Multi-detector 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	Pulsatility index

List of Abbreviation

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

LIST OF TABLES

NO	Title	Page
1	<i>Showing Classification of Portal Vein Variations</i>	22
2	<i>Showing Common sites of occurrence of porto-systemic shunts, and associated clinical implications</i>	31
3	<i>Histopathologic classification of the most common benign and malignant</i>	38
4	<i>Staging systems in hepatocellular carcinoma</i>	49
5	<i>Okuda staging system (Okuda et al.,1985) (Okuda K et al cancer 1985;56:918-928)</i>	50
6	<i>TNM staging system (Vauthey et al.,2002</i>	50
7	<i>Barcelona clinic liver cancer (BCLC) staging for HCC, liver function test (LFT) (Llovet et al.,1999).</i>	51
8	<i>Etiological classification of portal hypertension</i>	71
9	<i>Showing Ultrasound findings in portal hypertension</i>	147
10	<i>showing Parameters for MDCT Portal Venography</i>	158

LIST OF FIGURES

NO	Title	Page
1	The 'bed' of the liver. The outline of the liver is shaded green. The central bare area is unshaded	5
2	Peritoneal attachments and ligaments of the liver	9
3	The surfaces and external features of the liver	10
4	Relations of the liver	11
5	Segments of the liver	13
6	Segments of the liver based on couined calssification	13
7	Segments of the liver seen on axial CT scan	14
8	The hepatic artery. (A) Branches. (B) Relations of the hepatic artery,	16
9	Drawings illustrate the embryologic development of the portal venous system	20
10): showing the most common main portal vein	23
11	Maxium intensity projection view portal vein bifurcation	24
12	Showing PV Quadrification demonstrated on an anteroinferior volume rendered CT image	25
13	The portal vein and its tributaries	27
14	Sagittal ultrasound of the middle hepatic vein	33
15	Arrangement of the hepatic venous territories	34
16	Typical HCC. A Macroscopic view	45

List of Figures

17	Large HCC with mosaic pattern	45
18	Macroinfiltrative form of HCC	46
19	HCC with portal invasion	46
20	Peripheral cholangiocarcinoma	58
21	Large intrahepatic cholangiocarcinoma with satellite nodules	58
22	Secondary tumor in the liver	61
23	Embryonic origin of preduodenal portal vein	64
24	preduodenal portal vein and other congenital anomalies	67
25	Schematic demonstration of different types of Abernethy abnormality.	93
26	2D CT View of a Standard Resection Planning with the Resection Surface to the Right of the Middle Hepatic Vein.	96
27	Complication rate stratified by standardized FLR volume	97
28	Divisions of embolic agents	99
29	Photographs of Gelfoam preparation steps	100
30	Various coil shapes	109
31	The triple-lumen balloon catheter	115
32	Schematic representation of the ipsilateral approach for right PVE and segment IV	117
33	Schematic representation of the contralateral approach	118
34	Showing Transhepaticipsilateral right PVE using tris-acryl particles and coils performed in a 49-year-old with colon cancer metastatic to the liver.	122

List of Figures

35	Showing Transhepatic ipsilateral right portal vein embolization (PVE) extended to segment IV using tris-acryl particles and coils in a 59-year-old woman with a history of gallbladder carcinoma.	123
35	(Continued):(E) Selective left portogram(F) Selective venogram(G) Final portal venogram(H) CT scan obtained 1 month after right PVE	124
36	Showing Transhepatic ipsilateral right PVE extended to segment 4 by the use of tris-acryl particles and coils	125
36	(A) A transverse CT scan obtained in a 48-year-old man with an HCC shows a large tumor in the right lobe(B) A transverse CT scan obtained 4 weeks after PVE demonstrates hypertrophy of the liver volume	126
37	72-year-old man with colorectal liver metastases	127
38	73-year-old woman with colorectal liver metastases. IV contrast enhanced CT scan of liver done 4 weeks after PVE	129
39	Portal vein thrombosis in a 50-year-old man with cholangiocarcinoma who had undergone successful PVE	131
40	70-year-old man with cholangiocarcinoma, scheduled for extended right hepatectomy	132
41	71-year-old man with hepatocellular carcinoma. IV contrast-enhanced CT scan of liver performed 1 week after portal vein embolization	134
42	Schematic cross-section of the splenic vein along its course from left to right to the neck of the pancreas, where it forms the portal vein	135

List of Figures

	together with the superior mesenteric vein	
43	Showing Doppler ultrasound of the portal vein with a continuous hepatopetal flow	136
44	Showing Normal and abnormal portal venous phasicity	140
45	Spectral Doppler US image shows a pulsatile waveform with flow reversal in the right portal vein	142
46	Spectral Doppler US image shows retrograde (hepatofugal) flow in the main portal vein.	144
47	Duplex Doppler image and waveform show reversed pulsatile flow in the right portal vein because of arterioportal shunts	146
48	Portal vein thrombosis (acute bland thrombus), The spectral waveform is aphasic.	148
49	Oblique gray-scale sonogram shows a hyperechoic thrombus expanding the left portal vein (arrows) {Malignant pylethrombosis}	149
50	Showing Liver metastases with tumor thrombus in the portal vein	150
51	Showing portal vein thrombosis with cavernous transformation.	150
52	Color Doppler ultrasound in a patient with cavernous transformation of the portal vein	151
53	The normal anatomy of the portal vein in a 46-year-old man in an MDCT scan obtained during the portal venous phase	152
54	showing (a) The volume-rendered CT angiogram reconstructed from the early arterial phase images (CT arteriography) are useful for accurate visualization of	153

	arterial detail without overlapping vessels. (d) The peripheral branches of the portal vein without the hepatic venous enhancement.	
55	showing (b) CT arteriogram with maximum-intensity projection technique (MIP) can show small branches of the hepatic arteries without portal venous enhancement. (c) Target-MIP CT arteriography can eliminate overlapping vessels(e) A CT portogram with MIP rendering	160
56	showing Maximum intensity projection (MIP) of portal venous system shows trifurcation of the main portal vein	161
57	showing MIP (a), SSD (b), and volume-rendered (c) CT portal venograms show the portal vein and the dilated left gastric varix	164
58	showing Coronal reconstruction of contrast enhanced helical CT image during the portal venous phase	166
59	showing Cavernous transformation of the portal vein in a 57-year-old man with a history of recurrent acute pancreatitis and benign portal vein thrombosis	168
60	showing Malignant pylethrombosis in a 37-year-old man with multifocal hepatocellular carcinoma and viral hepatitis-induced cirrhosis.	169
61	Extrahepatic portosystemic shunts in a 55-year-old man with alcohol-induced cirrhosis and portal hypertension	170
62	showing Splenorenal varices in a 68-year-old man with cirrhosis and portal hypertension	171

List of Figures

63	showing Malignant arterioportal shunt in a 70-year-old man with hepatocellular carcinoma in the right lobe of the liver and viral hepatitis–induced cirrhosis	173
64	a, b Axial arterial-phase MDCT images in a 46-year-old woman with hereditary hemorrhagic telangiectasia of liver.	173
65	A 52-year-old man with gallbladder carcinoma	176
66	: Differences in image quality between two sequence MR portography	183
67	Placement of two oblique T-SLIPs for selective visualization of the intrahepatic portal venous system.	185
68	Examples of time-SLIP flow-in techniques	186

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 usually 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 identifying 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) .preoperative 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**).