World Journal of Gastroenterology

Submit a Manuscript: https://www.f6publishing.com

World J Gastroenterol 2022 August 21; 28(31): 4467-4470

DOI: 10.3748/wjg.v28.i31.4467

ISSN 1007-9327 (print) ISSN 2219-2840 (online)

LETTER TO THE EDITOR

Influence of different portal vein branches on hepatic encephalopathy during intrahepatic portal shunt *via* jugular vein

Xin Yao, Sheng He, Meng Wei, Jian-Ping Qin

Specialty type: Gastroenterology and hepatology

Provenance and peer review: Unsolicited article; Externally peer reviewed.

Peer-review model: Single blind

Peer-review report's scientific quality classification

Grade A (Excellent): A
Grade B (Very good): B
Grade C (Good): C
Grade D (Fair): 0
Grade E (Poor): 0

P-Reviewer: De Gregorio MA, Spain; Kordzaia D, Georgia; Wondmagegn H, Ethiopia

Received: February 11, 2022
Peer-review started: February 11, 2022
First decision: April 5, 2022
Revised: April 7, 2022
Accepted: July 22, 2022
Article in press: July 22, 2022
Published online: August 21, 2022

Xin Yao, Sheng He, Meng Wei, Jian-Ping Qin, Department of Gastroenterology, General Hospital of Western Theater Command, Chengdu 610083, Sichuan Province, China

Corresponding author: Jian-Ping Qin, MD, Chief Doctor, Doctor, Department of Gastroenterology, General Hospital of Western Theater Command, No. 270 Rongdu Road, Chengdu 610083, Sichuan Province, China. jpqqing@163.com

Abstract

This letter is regarding the study titled 'Targeted puncture of left branch of intrahepatic portal vein in transjugular intrahepatic portosystemic shunt (TIPS) to reduce hepatic encephalopathy'. Prior to the approval of TIPS dedicated stents (Viatorr stents) in China in October 2015, Fluency covered stents were typically used. As Fluency covered stents have a strong support force and axial elastic tension, a 'cap' may form if the stent is located too low at the end of the hepatic vein or too short at the end of the portal vein during surgery, leading to stent dysfunction. Since the blood shunted by the stent is from the main trunk of the portal vein, the correlation between the incidence of postoperative hepatic encephalopathy and the location of the puncture target (left or right portal vein branch) is worth discussion. Notably, no studies in China or foreign countries have proven the occurrence of left and right blood stratification after the accumulation of splenic vein and mesenteric blood flow in the main trunk of the portal vein in patients with cirrhotic portal hypertension.

Key Words: Viatorr stent; Portosystemic shunt; Transjugular intrahepatic; Hypertension; portal; Left and right portal vein branches

Core Tip: This Letter to the Editor aims to analyse the effect of establishing a shunt in the left or right portal vein branch in transjugular intrahepatic portosystemic shunt on the incidence of postoperative hepatic encephalopathy in patients with cirrhotic portal hypertension. Based on preliminary clinical experience, it is thought that there is no difference in the incidence of hepatic encephalopathy among patients regardless of the use of a COOK bare stent or Viatorr stent with an inner diameter of 8 mm if a shunt is established in the left or right portal vein branch.

Citation: Yao X, He S, Wei M, Qin JP. Influence of different portal vein branches on hepatic encephalopathy during intrahepatic portal shunt *via* jugular vein. *World J Gastroenterol* 2022; 28(31): 4467-4470
URL: https://www.wjgnet.com/1007-9327/full/v28/i31/4467.htm
DOI: https://dx.doi.org/10.3748/wjg.v28.i31.4467

TO THE EDITOR

We read the article of Luo *et al*[1] titled "Targeted puncture of left branch of intrahepatic portal vein in transjugular intrahepatic portosystemic shunt (TIPS) to reduce hepatic encephalopathy" and are very interested in its conclusions. We think that therapy by "targeted puncture of the left branch of the intrahepatic portal vein in TIPS to reduce hepatic encephalopathy" is worthy of discussion.

First, Luo *et al*[1] performed a retrospective analysis of portal hypertension patients receiving TIPS from January 2000 to January 2013. During this period, a shunt was established using a Fluency stent (BARD, Voisins le Bretonneux, France) or Viatorr stent (W.L. Gore & Associates, Flagstaff, AZ, United States). However, the shunts were established in TIPS mainly using Fluency covered stents in China before the approval of TIPS dedicated stents (Viatorr stents) in China in October 2015. As Fluency covered stents have a strong support force and axial elastic tension, a 'cap' may form if the stent is located too low at the end of the hepatic vein or too short at the end of the portal vein during the operation, thereby leading to stent dysfunction. Since the blood shunted by the stent is from the main trunk of the portal vein, as shown in Figure 2 of Luo *et al*'s paper (the stent is inserted into the main trunk of the portal vein at the end of the portal vein for shunts in both the left and right portal vein branches), the correlation between the incidence of postoperative hepatic encephalopathy and the location of the puncture target (left or right portal vein branch) is worthy of discussion.

As pointed out by Luo *et al*[1], prior studies have reported that the backflow blood from the splenic and superior mesenteric veins is not thoroughly mixed but rather enters the left and right portal vein branches separately, *i.e.*, the blood from the superior mesenteric vein mainly flows into the right branch, while the blood from the splenic vein mainly flows into the left branch[2-3]. In a study on corrosion casting of the portal vein and hepatic artery ramifications in dogs, this study focused on explaining the anatomical features of the hepatic portal vein and hepatic artery in animals instead of the blood flow features of the portal vein system[2]. The author team believes that a substantial difference between animals and humans. In a study using carbon dioxide angiography, iodinated contrast medium was used to replace traditional angiography[3]. This study included chronic liver disease patients receiving percutaneous transhepatic puncture of the portal vein with the tube inserted into the splenic vein; a mechanical injection system was used to inject a total volume of 30 mL of contrast medium at a speed of 5 mL/s. Notably, a difference was observed in blood mixing at the left and right sides of the main trunk of the portal vein. An early study conducted in United States of America found that an increase in the pressure in the portal vein was followed by a decrease in hepatic blood inflow and blood flow rate and grading of liver function due to hepatic sinusoidal obstruction, perisinusoidal fibrosis and portal vein obstruction in cirrhosis was related to the portal blood flow rate; furthermore, portal hypertensive liver function damage was obvious, and the portal blood flow rate was low[4]. In the hyperdynamic splanchnic circulatory state, the progressive decrease in the portal blood flow rate suggests aggravation of hepatic parenchymal lesions and increased portal blood flow resistance. The author team believes that the blood flow rate decreased after splenic vein and mesenteric blood flows accumulated in the main trunk of the portal vein in cirrhotic portal hypertension patients, and so it was necessary to define the presence of different blood flow rates after the blood flows accumulated in the main trunk of the portal vein so as to achieve left and right blood stratification in the natural state. However, it is controversial at home and abroad whether there is difference between splenic vein blood flow velocity and mesenteric blood flow velocity in cirrhotic patients with portal hypertension after the accumulation of the main portal vein in the natural state. In a study conducted in 2020 in China, 15 patients with liver cirrhosis and upper gastrointestinal haemorrhage received TIPS, and blood samples were collected from the left branch, right branch and main trunk of the portal vein during the operation[5]. In these patients, the plasma ammonia concentration (μmol/L) was 96.4 ± 17.6 for the left branch *vs* 113.5 ± 18.4 for the right branch *vs* 106.9 ± 38.7 for the main trunk, without any statistically significant differences ($P > 0.05$). This study provides important evidence for the comparison of blood bacterial metabolites in the left and right branches of the cirrhotic portal vein.

TIPS dedicated stents (Viatorr stents) have been adopted for surgery at the Center since March 2016. In previous studies, COOK bare stents with an inner diameter of 8 mm were used to establish a shunt[6-7]. Although such a stent should be long enough at the end of the portal vein, the shunted blood was from the portal vein branches, so whether a shunt was established in the left or right portal vein branch had no significant effect on the incidence of hepatic encephalopathy. In a study conducted in China in 2020, 120 cirrhotic portal hypertension patients received TIPS using Viatorr stents. Intraoperative portal vein angiography showed that a shunt was established in the left portal vein branch for 52 patients and in the right portal vein branch for 68 patients[8]. There was no statistically significant difference in the

incidence of postoperative hepatic encephalopathy (χ^2 = 0.159, P = 0.69) between the left portal vein and right portal vein branch shunting groups. A recent study reported that the incidence of hepatic encephalopathy decreased significantly by controlling the inner diameter of the stent, *i.e.*, using a Viatorr stent with an inner diameter of 8 mm[9]. The bare area of a Viatorr stent may guarantee a smooth blood flow in the portal vein and prevent more blood not metabolised by the liver from directly entering the systemic circulation.

There is no information in the TIPS guidelines circulated in North America regarding differences in the incidence of postoperative hepatic encephalopathy when shunts are established in different portal vein branches[10-11]. We believe that there are no differences in the incidence of hepatic encephalopathy among postoperative patients when using a Viatorr stent with an inner diameter of 8 mm when the shunt is established in the left or right portal vein branch. As the postoperative medium and long-term efficacy of TIPS are related to clinical procedures, postoperative management of patients and other factors, future studies with larger sample sizes and multicentre randomised controlled trials are warranted.

FOOTNOTES

Author contributions: All authors wrote and edited the manuscript.

Conflict-of-interest statement: The authors declare no competing interests for this manuscript.

Country/Territory of origin: China

ORCID number: Xin Yao 0000-0002-9977-6153; Sheng He 0000-0002-4468-0728; Meng Wei 0000-0001-6197-9812; Jian-Ping Qin 0000-0001-7834-8830.

S-Editor: Chang KL
L-Editor: A
P-Editor: Chang KL

REFERENCES

1 **Luo SH**, Chu JG, Huang H, Zhao GR, Yao KC. Targeted puncture of left branch of intrahepatic portal vein in transjugular intrahepatic portosystemic shunt to reduce hepatic encephalopathy. *World J Gastroenterol* 2019; **25**: 1088-1099 [PMID: 30862997 DOI: 10.3748/wjg.v25.i9.1088]

2 **Ursic M**, Ravnik D, Hribernik M, Pecar J, Butinar J, Fazarinc G. Gross anatomy of the portal vein and hepatic artery ramifications in dogs: corrosion cast study. *Anat Histol Embryol* 2007; **36**: 83-87 [PMID: 17371378 DOI: 10.1111/j.1439-0264.2006.00719.x]

3 **Maruyama H**, Okugawa H, Ishibashi H, Takahashi M, Kobayashi S, Yoshizumi H, Yokosuka O. Carbon dioxide-based portography: an alternative to conventional imaging with the use of iodinated contrast medium. *J Gastroenterol Hepatol* 2010; **25**: 1111-1116 [PMID: 20594227 DOI: 10.1111/j.1440-1746.2010.06248.x]

4 **Ljubicić N**, Duvnjak M, Rotkvić I, Kopjar B. Influence of the degree of liver failure on portal blood flow in patients with liver cirrhosis. *Scand J Gastroenterol* 1990; **25**: 395-400 [PMID: 2186474 DOI: 10.3109/00365529009095505]

5 **Deng LYY**, Chen Y, Ye P, Liao HF, Zhen QL, Xie ZG, Zhao GR, Yao KC. Preliminary analysis of liver-related blood components in portal system *via* TIPS approach. *J Intervent Radiol* 2020; **29**: 608-661 [DOI: 10.3969/j.issn.1008-794X.2020.06.018]

6 **Qin JP**, Jiang MD, Tang W, Wu XL, Yao X, Zeng WZ, Xu H, He QW, Gu M. Clinical effects and complications of TIPS for portal hypertension due to cirrhosis: a single center. *World J Gastroenterol* 2013; **19**: 8085-8092 [PMID: 24307804 DOI: 10.3748/wjg.v19.i44.8085]

7 **Qin JP**, Tang SH, Jiang MD, He QW, Chen HB, Yao X, Zeng WZ, Gu M. Contrast enhanced computed tomography and reconstruction of hepatic vascular system for transjugular intrahepatic portal systemic shunt puncture path planning. *World J Gastroenterol* 2015; **21**: 9623-9629 [PMID: 26327770 DOI: 10.3748/wjg.v21.i32.9623]

8 **Yao X**, Zhou H, Tang SH, Huang S, Chen XL, Qin JP. Effect of intraoperative Viatorr stent implantation for shunting of blood flow in the left or right branch of the portal vein and its effect on clinical outcome in patients with cirrhotic portal hypertension undergoing transjugular intrahepatic portosystemic shunt. *J Clin Hepatol* 2020; **36**: 1970-1974 [DOI: 10.3969/j.issn.1001-5256.2020.09.012]

9 **Yao X**, Zhou H, Huang S, Tang SH, Qin JP. Effects of transjugular intrahepatic portosystemic shunt using the Viatorr stent on hepatic reserve function in patients with cirrhosis. *World J Clin Cases* 2021; **9**: 1532-1542 [PMID: 33728297 DOI:

10.12998/wjcc.v9.i7.1532]

10 **Boyer TD**, Haskal ZJ; American Association for the Study of Liver Diseases. The Role of Transjugular Intrahepatic Portosystemic Shunt (TIPS) in the Management of Portal Hypertension: update 2009. *Hepatology* 2010; **51**: 306 [PMID: 19902484 DOI: 10.1002/hep.23383]

11 **Boike JR**, Thornburg BG, Asrani SK, Fallon MB, Fortune BE, Izzy MJ, Verna EC, Abraldes JG, Allegretti AS, Bajaj JS, Biggins SW, Darcy MD, Farr MA, Farsad K, Garcia-Tsao G, Hall SA, Jadlowiec CC, Krowka MJ, Laberge J, Lee EW, Mulligan DC, Nadim MK, Northup PG, Salem R, Shatzel JJ, Shaw CJ, Simonetto DA, Susman J, Kolli KP, VanWagner LB; Advancing Liver Therapeutic Approaches (ALTA) Consortium. North American Practice-Based Recommendations for Transjugular Intrahepatic Portosystemic Shunts in Portal Hypertension. *Clin Gastroenterol Hepatol* 2021 [PMID: 34274511 DOI: 10.1016/j.cgh.2021.07.018]

Published by **Baishideng Publishing Group Inc**
7041 Koll Center Parkway, Suite 160, Pleasanton, CA 94566, USA
Telephone: +1-925-3991568
E-mail: bpgoffice@wjgnet.com
Help Desk: https://www.f6publishing.com/helpdesk
https://www.wjgnet.com