

TIPS (Transjugular intrahepatic portosys-
 temic shunt) 가
 : 1994 1 1999 6
 TIPS 42
 22 TIPS
 가 TIPS
 , TIPS mean portosystemic gradi-
 ent, TIPS mean portosystemic gradient (MPSG)
 TIPS
 : Type I 10 , Type II 9 , Type III 3
 Type I (14.95±1.79 mm), Type II (13.35±1.59 mm) TIPS
 Type I (31.40±6.79 mmHg), Type II (22.80±4.26 mmHg) mean portosystemic
 gradient Type I (16.10±7.0 mmHg), Type II (11.20±5.36 mmHg) TIPS
 Type I (25.70±7.60 mmHg), Type II (17.80±6.52 mmHg) mean por-
 tosystemic gradient Type I (10.80±4.94 mmHg), Type II (5.25±3.67 mmH)
 TIPS MPSG Type I (6.04±2.98 mmHg), Type II (5.91±3.98 mmHg)
 Type I 10 1 (10%), Type II 9 7 (77%), Type III 3
 1 (33%) TIPS 8 , Type I (3), Type II (3), Type III (2)
 : 가 가 가 가
 TIPS mean portosystemic gradient (p
 < 0.05). 가 TIPS

가 가 (Trans-
 jugular intrahepatic portosystemic shunt, TIPS)
 가 , TIPS
 가 (1-3). mean portosystemic gradient, TIPS mean portosys-
 temic gradient (MPSG),
 가 TIPS

(4-6).

가 17, 가 5 29
 73 (:45.3)
 16, 6 Child-Pugh
 Class A가 3, B가 8, C가 11
 "Japanese Re-
 search Society for Portal hypertension" Yamamoto
 F1 (straight), F2 (winding), F3 (nodule-bead-ed)
 (7, 8). TIPS

sheath
 Sheath
 10 F sheath (Cook,
 16 G Colapino (Cook,
 Bloomington, U.S.A.)
 Bloomington, U.S.A.)

가 (type I),
 가 (type II),
 가 (type III)
 TIPS
 Multistar T.O.P (Siemens,
 Erlangen, Germany) . TIPS

10 mm
 (Cook, Bloomington, U.S.A.)
 12 - 14 10 mm
 7 cm Wallstent (Schneider, Buelach, Switzerland)
 Mean portosystemic gra-
 dient

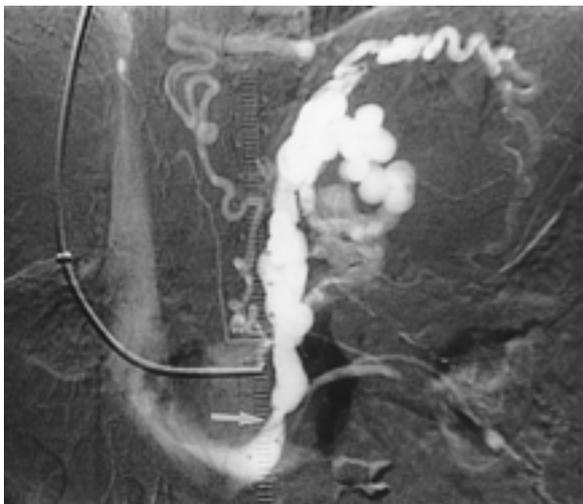


Fig. 1. Gastrorenal shunt. On splenoportogram, gastric varices drain into the left renal vein via gastrorenal shunt (arrow).

TIPS
 , TIPS mean por-
 tosystemic gradient, TIPS MPSPG
 TIPS
 가
 Mann-Whitney test

22 Type I 10 (45%),
 Type II 9 (41%), Type III 3 (14%) . Type
 I 가 3, Type II

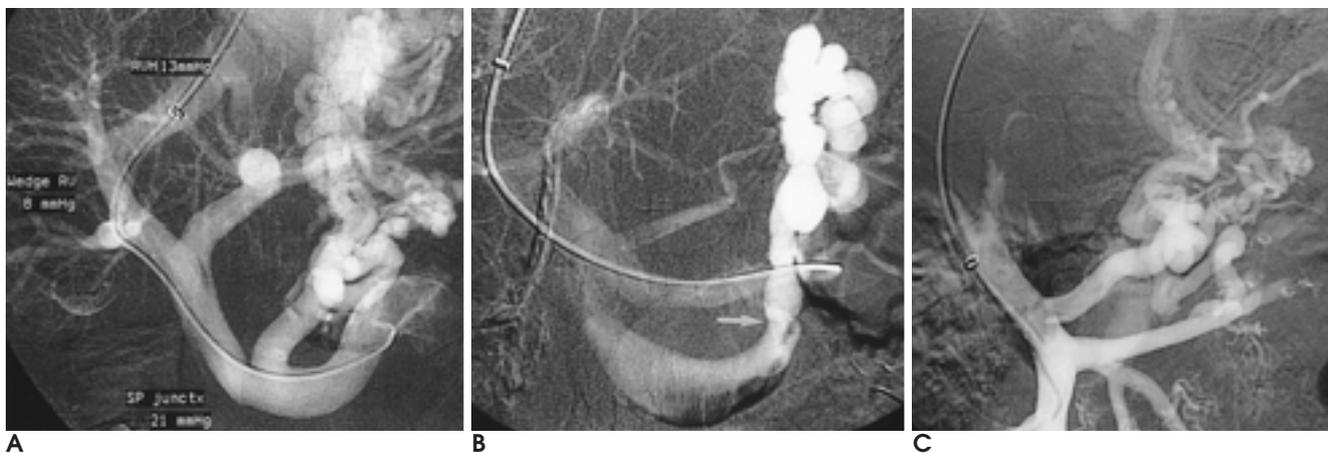


Fig. 2. Angiographic features according to grading of esophageal and gastric varices before TIPS. Splenoportogram or mesoportogram shows large esophageal varices supplied by coronary vein in Type I (A), large gastric varices supplied by posterior gastric vein with gastrorenal shunt (arrow) in Type II (B), medium sized gastric & esophageal varices in Type III (C).

Table 1. Main Portal Vein Diameter in Relation to Grading of Esophageal and Gastric Varix Prior to TIPS

Type of Varices	Main Portal Vein Diameter (mm)
Type I (EV > GV)	14.95 ± 1.79
Type II (EV < GV)	13.35 ± 1.59
Type III (EV = GV)	11.80 ± 1.61

p < 0.05

EV: esophageal varix
GV: gastric varix

Table 2. Hemodynamic Value in Relation to Grading of Esophageal and Gastric Varix Prior to TIPS

Type of varices	Portal venous pressure (mmHg)	Mean portosystemic gradient (mmHg)
Type I (EV > GV)	31.40 ± 6.79	16.10 ± 7.01
Type II (EV < GV)	22.80 ± 4.26	11.20 ± 5.36
Type III (EV = GV)	26.00 ± 1.73	11.00 ± 6.03

p < 0.05

Table 3. Hemodynamic Value in Relation to Grading of Esophageal and Gastric Varix after TIPS

Type of varices	Portal venous pressure (mmHg)	Mean portosystemic gradient (mmHg)
Type I (EV > GV)	25.70 ± 7.60	10.80 ± 4.94
Type II (EV < GV)	17.80 ± 6.52	5.25 ± 3.67
Type III (EV = GV)	15.30 ± 8.14	6.67 ± 2.08

p < 0.05

Table 4. The Change of Mean Portosystemic Gradient before and after TIPS in Relation to Grading of Esophageal and Gastric Varix

Type of varices	Mean portosystemic gradient (mmHg)
Type I (EV > GV)	6.04 ± 2.98
Type II (EV < GV)	5.91 ± 3.98
Type III (EV = GV)	4.75 ± 2.54

p > 0.05

가 4 . Type I Child A (1), Child B (6), Child C (3), Type II Child A (2), Child B (1), Child C (6), Type III Child B (1), Child C (2)

Type I 14.95 ± 1.79 mm, Type II가 13.35 ± 1.59 mm (Table 1). 가 가 가 (*p* < 0.05).

TIPS Type I 31.40 ± 6.79 mmHg, Type II가 22.80 ± 4.26 mmHg mean portosystemic gradient Type I 16.10 ± 7.0 mmHg, Type II가 11.20 ± 5.36 mmHg (Table 2). 가 가 가 mean portosystemic gradient (*p* < 0.05).

TIPS Type I 25.70 ± 7.60 mmHg, Type II가 17.80 ± 6.52 mmHg mean portosystemic gradient Type I 10.80 ± 4.94 mmHg, Type II가 5.25 ± 3.67 mmHg (Table 3). TIPS TIPS 가 가 가 mean portosystemic gradient가

TIPS MPSPG Type I 6.04 ± 2.98 mmHg, Type II가 5.91 ± 3.98 mmHg (Table 4). TIPS MPSPG 가 가 가 Type I 1/10 (10%), Type II 7/9 (77%), Type III 1/3 (33%) 가

TIPS 8 , Type I (3), Type II (3), Type III (2) Chid B가 3 , Child C 가 5

Hashizume (9) 가 가 가 가 가 가 (10). 가 가 가 (4). 가 (venous drainage) 가 (5).

가

가 Watanabe (5)
 가 52% 가
 6% 가
 가
 . Onihni (6) 가 53

TISP

가 가

mean portosystemic gradient

. TIPS

. Yee Chao (11)

가

가
 가 가 가
 mean portosystemic gradient가
 가

Yee Chao (11)

가

가

TIPS

TIPS

TIPS

5 - 15%

가

5 - 67%

(13)

TIPS

(12). Arthur

25%

TIPS

가

10%

TIPS

가

가

가

가

가

(14). Yee chao

(11)

가

(4.1%)

(11.8%)

TIPS

가

가

가

TIPS

TIPS

가

TIPS

1. Feldman M, Feldman M Jr. Gastric varices. *Gastroenterology* 1956; 30:318-21
2. Evans JA, Delany F. Gastric varices. *Radiology* 1953; 60:46-50
3. Karr S, Whol GT. Clinical importance of gastric varices. *N Engl J Med* 1960;263:665-69
4. Sarin SK, Sachdev G, Nanda R, Misra SP, Broor SL. Endoscopic sclerotherapy in the treatment of gastric varices. *Br J Surg* 1988; 75:747-50
5. Watanabe K, Kimura K, Matsutani S, Ohto M, Okuda K. Portal hemodynamics in patients with gastric varices. *Gastroenterology* 1988; 95:434-40
6. Ohnishi K, Nakamura T, Koen H, et al. Interrelationship between type of spontaneous portal systemic shunt and portal vein pressure in patients with liver disease. *Am J Gastroenterol* 1985;80:561-64
7. Japanese Society for Portal Hypertension. The general rules for recording endoscopic findings on esophageal varices. *Jpn J Surg* 1980;10:84-87
8. Yamamoto M. Clinical observation on 100 cases of gastric varices. *Jpn J Gastroenterol* 1971;68:721-39
9. Hashizume M, Kitano S, Sugimachi K, Sueishi K. Three dimensional view of the vascular structure of the lower esophagus in clinical portal hypertension. *Hepatology* 1988;8:1482-87
10. Sherlock S. *The portal venous system and portal hypertension*. In : Sherlock S, ed. *Disease of the liver and biliary system*. Oxford: Black Scientific Publication, 1989;151-208
11. Yee Chao, Han-chieh Lin, Fa-Yauh Lee, et al. Hepatic hemodynamic features in patients with esophageal or gastric varices. *Hepatology* 1993;19:85-89
12. Zakim D, Boyer TD, eds. *Hepatology: a textbook of liver disease*. Philadelphia, Pa: Saunders, 1990;599-601
13. Malt RA, Szczerban J, Malt RB. Risks in therapeutic portocaval and splenorenal shunt. *Ann Surg* 1976;184:279-88
14. Arthur M, Freedman M, Tisnado J. Complication of transjugular intrahepatic portosystemic shunt. *Radiographics* 1993;13:1185-1210

The Change of Portal Hemodynamics before and after Transjugular Intrahepatic Portosystemic Shunt according to Variceal Type: Gastric and Esophageal varix¹

Hee Sang Lee, M.D., Jae Kyu Kim, M.D., Eun Hae Koe, M.D., Hyo Son Lim, M.D., Yong Ho Cho, M.D., Jin Gyoon Park, M.D., Heoung Keun Kang, M.D., Sei Jong Kim, M.D.²

¹Department of Diagnostic Radiology, Chonnam Univeristy Medical School

²Department of Internal Medicine, Chonnam Univeristy Medical School

Purpose: To investigate the changes occurring in portal hemodynamics in patients with esophageal and gastric varices, according to variceal type, before and after TIPS.

Materials and Methods: Between January 1994 and June 1999, we evaluated 22 of 44 patients who had undergone TIPS and endoscopy on admission. In these 22, hepatic venous and main portal venous pressure were measured. On the basis of endoscopic findings, the esophageal and gastric varices were classified as one of three types. Changes in portal hemodynamics in relation to the diameter of the portal vein, mean portosystemic gradient before and after TIPS, MPSG, and the presence of hepatic encephalopathy and gastroduodenal shunt were all evaluated.

Results: Endoscopy indicated that there were ten Type-I cases, nine Type-II, and three Type-III. The diameter of the main portal vein was 14.95 ± 1.79 mm in Type I cases, and 13.35 ± 1.59 mm in Type II. Before TIPS, main portal venous pressure was 31.40 ± 6.79 mmHg (Type I) and 22.80 ± 4.26 mmHg (Type II), and the mean portosystemic gradient was 16.10 ± 7.0 mmHg (Type I), and 11.20 ± 5.36 mmHg (Type II). After TIPS, the pressure readings were 25.70 ± 7.60 mmHg (Type I) and 17.80 ± 6.52 mmHg (Type II), while those relating to were 10.80 ± 4.94 mmHg (Type I) and 5.25 ± 3.67 mmHg (Type II). MPSG was 6.04 ± 2.98 mmHg (Type I) and 5.91 ± 3.98 mmHg (Type II). Angiography revealed that the gastroduodenal shunt was Type I in 10% of cases, Type II in 77%, and Type III in 33%. Hepatic encephalopathy after TIPS occurred in three Type-I cases, three Type-II, and two Type-III.

Conclusion: The diameter of the main portal vein was significantly smaller, and portal venous pressure and mean portosystemic gradient before and after TIPS significantly lower in patients with dominant gastric varices than in those with dominant esophageal varices ($p < 0.05$). Gastroduodenal shunt was more frequent among patients with dominant gastric varices. No difference in the incidence of hepatic encephalopathy after TIPS was noted between those with dominant gastric varices and those with the esophageal variety.

Index words : Transjugular intrahepatic portosystemic shunt,
Shunts, portacaval
Esophagus, varices
Stomach, varices
Portal vein, flow dynamics

Address reprint requests to : Hee Sang Lee, M.D., Department of Diagnostic Radiology,
Chonnam University Hospital Research Institute of Medical Imaging
8 Hak-dong, Dong-ku, Kwangju 501-757, Korea.
Tel. 82-62-220-5751-3 Fax. 82-62-226-4380

1945 10

가

가

1. :

2. :

1) - 100,000

2) - 50,000

3. 1)

2) (12)

3)

4)

5)

4. :

5. : 1) (310page)

2)

6. :