Supplementary Table 1. Characteristics of the study population, baseline comparison with excluded cases

Characteristics	N	Included (n=230)	Excluded (n=98)	p-value
Males	328	139 (60%)	56 (57%)	0.58
Age (years)	328	53.8 (11.0)	57.4 (10.1)	0.005
Etiology of cirrhosis	328			
Chronic HCV infection		112 (49%)	39 (40%)	0.14
Alcoholic liver disease		110 (48%)	44 (45%)	0.63
NASH		23 (10%)	10 (10%)	0.96
Primary biliary cholangitis		10 (4%)	5 (5%)	0.78[a]
Autoimmune hepatitis		8 (4%)	2 (2%)	0.73[a]
Budd-Chiari syndrome		7 (3%)	2 (2%)	>0.99[a]
Chronic HBV infection		6 (3%)	3 (3%)	>0.99[a]
Others		21 (9%)	13 (13%)	0.26
PVT	328	14 (6%)	6 (6%)	0.99
Concurrent HCC	328	20 (9%)	6 (6%)	0.43
Liver transplantation	328	16 (7%)	7 (7%)	0.95
Indication	328			
Variceal Bleeding		160 (70%)	27 (28%)	<0.0001
Ascites		77 (34%)	76 (78%)	<0.0001
Variceal Bleeding with Ascites		20 (9%)	8 (8%)	0.88
Child-Pugh Class	314			0.07[#]
Child-Pugh A		25 (12%)	3 (3%)	
Child-Pugh B		129 (59%)	59 (62%)	
Child-Pugh C		64 (29%)	34 (35%)	
MELD score	268			0.65
MELD<19		162 (85%)	67 (87%)	
MELD≥19		29 (15%)	10 (13%)	
Emergent TIPS		45 (20%)	5 (5%)	0.001
Diameter of Viatorr stent-graft	270			0.24[a]
10mm		196 (98%)	65 (94%)	
12mm		5 (3%)	4 (6%)	
Shunt location P-RPV	307	66 (29%)	27 (35%)	0.29
Variceal embolization	285	75 (37%)	9 (11%)	<0.0001
SPSS	312	70 (30%)	15 (18%)	0.03
PSG	322			
Pre-PSG (mmHg)		17.4 (6.7)	15.8 (4.8)	0.02
Post-PSG (mmHg)		6.9 (3.3)	7.4 (2.8)	0.22
PSG decreased (mmHg)		10.5 (5.2)	8.5 (3.7)	0.001
PSG decrease degree (%)		59.1 (15.5)	52.6 (14.6)	0.001
HE	328			
De novo HE after TIPS		93 (40%)	40 (41%)	0.95
Overt HE after TIPS		137 (60%)	63 (64%)	0.42

Significant ΔHE after TIPS[+]		36 (16%)	17 (17%)	0.70
Patency	328	210 (91%)	77 (79%)	0.001
Median Survival (IQR) (days)	328	1216.0 (189.8-2356.0)	757.0 (208.0-1427.0)	<0.0001

Data are mean (SD) or n (%). HCV=Hepatitis C virus. NASH=Non-alcoholic fatty hepatitis. HBV=Hepatitis B virus. PVT=Portal Venous Thrombosis. HCC=Hepatocellular carcinoma. MELD=Model for End-Stage Liver Disease. TIPS=transjugular intrahepatic portosystemic shunt. P-RPV= Peripheral Right Portal Vein Access. SPSS=Spontaneous Portal-Systemic Shunt. PSG= Portosystemic Pressure Gradient. HE=Hepatic Encephalopathy. [a]Fisher's Exact Test. [#]Rank-sum Test. [+]Significant ΔHE after TIPS is defined as either ≥2 grade increase in HE or any onset of grade 3 HE after TIPS.

Supplementary Table 2. Results of univariate and multivariable logistics regression analysis for assessment of clinical and technical risk factors of significant ΔHE after TIPS

	Univariate Model		Multivariable Model	
	OR (95%CI)	p-value	OR (95%CI)	p-value
During 30 days after TIPS				
Indication of Variceal Bleeding	0.49 (0.20-1.19)	0.11		
Shunt location P-RPV	2.78 (1.14-6.78)	0.02	2.78 (1.14-6.78)	**0.02**
During 90 days after TIPS				
Indication of Variceal Bleeding	0.50 (0.22-1.13)	0.10		
Shunt location P-RPV	3.13 (1.38-7.09)	0.006	3.13 (1.38-7.09)	**0.006**
During 180 days after TIPS				
Indication of Variceal Bleeding	0.49 (0.22-1.08)	0.08		
Shunt location P-RPV	2.67 (1.21-5.92)	0.02	2.67 (1.21-5.92)	**0.02**
During 365 days after TIPS				
Indication of Variceal Bleeding	0.44 (0.20-0.97)	0.04	0.44 (0.20-0.98)	**0.04**
Shunt location P-RPV	2.92 (1.34-6.39)	0.007	2.94 (1.33-6.49)	**0.008**

Only variables with a p-value < 0.05 in the univariate analysis are shown. Variables included in the univariate analysis were male sex, age, etiology of cirrhosis (chronic HCV infection, alcoholic liver disease, NASH, primary biliary cholangitis, autoimmune hepatitis, Budd-Chiari syndrome, chronic HBV infection and others), PVT, concurrent HCC, liver transplantation, TIPS indication (variceal bleeding, ascites and variceal bleeding with ascites), MELD score, emergent TIPS, P-RPV shunt location, the diameter of Viatorr stent-graft, variceal embolization, SPSS, and PSG (Pre-PSG, Post-PSG, PSG decreased and PSG decrease degree). HE=Hepatic Encephalopathy. TIPS=transjugular intrahepatic portosystemic shunt. P-RPV= Peripheral Right Portal Vein Access. HCV=Hepatitis C virus. NASH=Non-alcoholic fatty hepatitis. HBV=Hepatitis B virus. PVT=Portal Venous Thrombosis. HCC=Hepatocellular carcinoma. MELD=Model for End-Stage Liver Disease. SPSS=Spontaneous Portal-Systemic Shunt. PSG=Portoystemic Pressure Gradient. *Significant Differences. *Variables introduced in multivariable analysis.

Supplementary Table 3. PSG differences between the two groups after TIPS

	N	Pre-PSG (mmHg)	Post-PSG (mmHg)	p-value
O-PV group	159	17.7 (7.0)	6.8 (3.2)	<0.0001
P-RPV group	66	16.7 (6.0)	7.2 (3.6)	<0.0001

Data are mean (SD), PSG=Portosystemic Pressure Gradient. TIPS=transjugular intrahepatic portosystemic shunt. O-PV= Other Portal Vein Access. P-RPV= Peripheral Right Portal Vein Access.

Supplementary Table 4. Survival differences by MELD score

		MELD score <19	MELD score ≥19	p-value
	N	162	29	
Overall (days)	191	1437.0 (357.5-2225.8)	484.0 (14.0-1576.0)	0.001
O-PV group	136	1520.0 (299.3-2339.3)	77.5 (6.0-1289.3)	0.008
P-RPV group	55	1163.5 (278.8-1987.3)	149.0 (15.0-924.0)	0.002

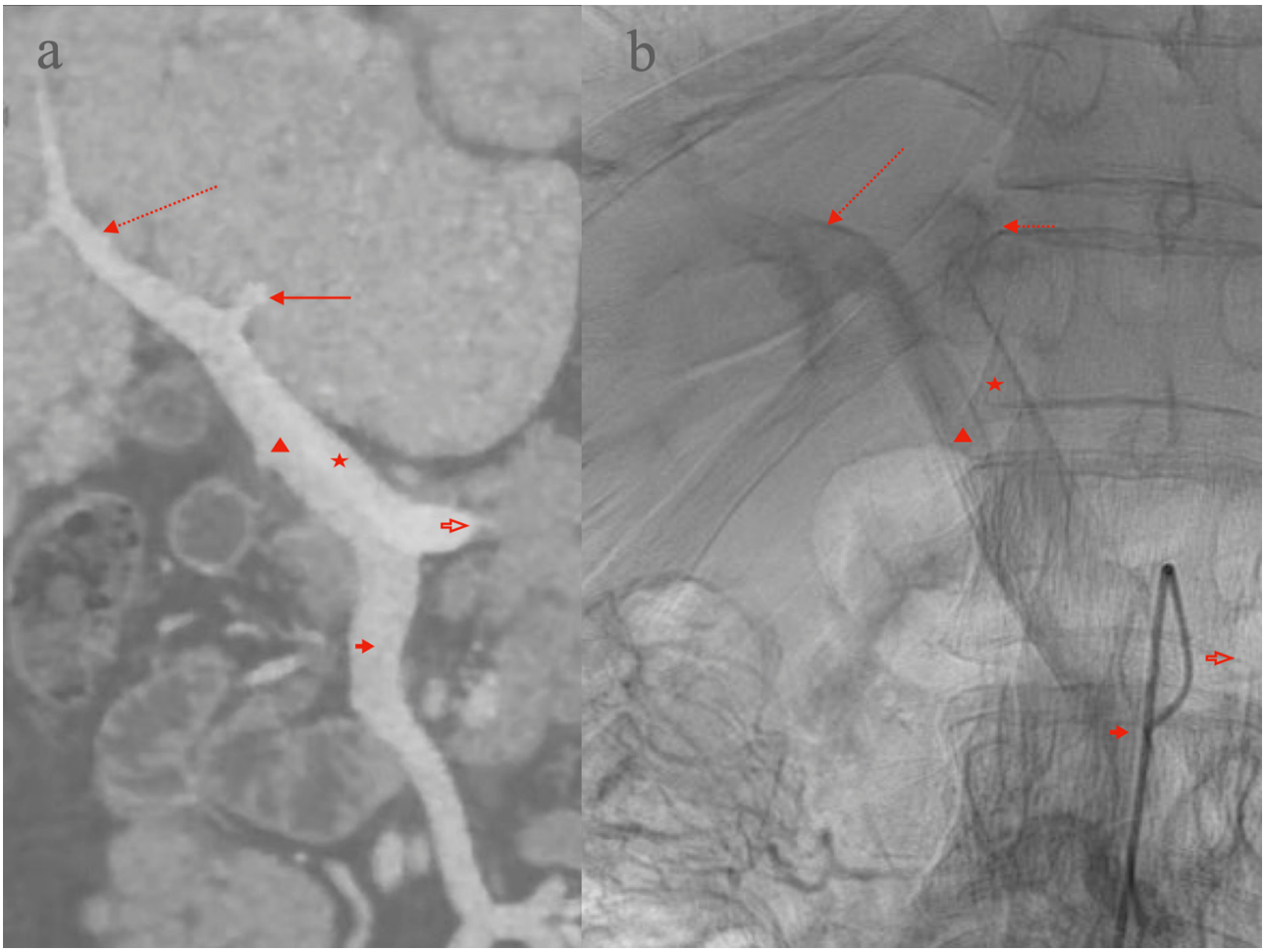
Data are median (IQR), O-PV= Other Portal Vein Access. P-RPV= Peripheral Right Portal Vein Access. MELD= Model for End-Stage Liver Disease.

Supplementary Table 5: A post-hoc sensitivity analysis based on a competing risk approach (Fine and Gray method) analyzing the effect of liver transplantation and death on significant Δ HE after TIPS

	Univariate Model	
Significant ΔHE after TIPS[+]	HR (95%CI)	p-value
Liver transplantation	0.62 (0.15-2.62)	0.52
Death	1.33 (0.68-2.59)	0.40

[+]Significant ΔHE after TIPS is defined as either ⩾2 grade increase in HE or any onset of grade 3 HE after TIPS.

Supplementary Figure 1.



Imaging evidence of laminar flow in the main portal vein. a. Coronal reconstruction image from an abdominal contrast-enhanced CT scan in the portal venous phase. The flow of iodinated contrast was different in the splenic vein and superior mesenteric vein, noted by differential density (greater from the splenic vein) and consistent with laminar flow to the main portal vein. b. Fluoroscopy image of indirect portal venography from superior mesenteric artery injection. Note higher density blood flow from the superior mesenteric vein with laminar flow combined with unopacified blood flow from the splenic vein seen in the main portal vein. Dashed arrow indicates the right portal vein; Solid arrow indicates the left portal vein; Solid short arow indicates superior mesenteric vein; Open arrowhead indicates splenic vein; Triangle indicates the blood flow from the superior mesenteric vein, and star indicates the blood flow the splenic vein.