



PURPOSE

Transjugular intrahepatic portosystemic shunts (TIPS) closure is performed when TIPS-related complications are refractory to more conservative measures such as TIPS reduction. As TIPS closure is uncommonly undertaken, only limited information is available regarding its safety, feasibility, and outcome.

MATERIALS AND METHODS

A single-center retrospective review of all patients who underwent TIPS placement at our institution between August 2011 to August 2019 was undertaken, yielding 360 patients. Of these, 6 patients underwent TIPS closure.

RESULTS

All patients had documented portal patency prior to closure. Indications for TIPS closure were refractory hepatic encephalopathy (HE, n = 3), TIPS precipitated right heart failure (RHF, n = 2), and post TIPS acute liver injury (ALI, n = 1). For the 3 patients who had TIPS reduction prior to closure (2 HE, 1 ALI), their reduction indication improved only after closure. They were all alive 6 months post closure. Among the 3 patients who had TIPS closure without TIPS reduction trial (2 RHF, 1 HE), the 2 RHF patients were advanced in age at 78 and 83 years-old and had right hydrothorax for TIPS indication. They both expired 6 months post closure. The 1 HE patient had sepsis induced electrolyte abnormality confounding the clinical evaluation and died 1 day post closure. The average pre-TIPS MELD score was lower among survivors than among non-survivors in the 6 month period (11 vs 19).

TABLE 1. TIPS CLOSURE PATIENT INFORMATION

Patient Demographics			TIPS					TIPS Reduction			TIPS Closure					Follow-Up		
Age	Gender	Race	TIPS Indication	Pre-TIPS MELD Score	TIPS Device	Constrained	TIPS Dilatation	TIPS Reduction Indication	TIPS to Reduction Duration (Days)	Reason for TIPS Reduction Not Being Performed Prior to TIPS Closure	TIPS to Closure Duration (Days)	TIPS Closure Indication	Closure Method	Access Site	Closure Technique	Complications Post Closure	Survival Duration Post Closure (Days)	Cause of Death
66	Male	Caucasian, Non-Hispanic	Ascites	10	12 mm x 6 cm Viatorr	Palmaz PG297	9 mm	Acute Liver Injury	1	NA	29	Acute Liver Injury	14 AVP-2	Right Internal Jugular Vein	14mm AVP-2	Ascites Requiring Paracentesis	Alive	NA
41	Female	Caucasian, Non-Hispanic	Chylous Ascites	23	12 mm x 8cm Viatorr	Palmaz PG297	7 mm	NA	NA	Unstable Refractory Hepatic Encephalopathy Secondary to TIPS	25	Unstable Refractory Hepatic Encephalopathy Secondary to TIPS	10 AVP-2	Right Common Femoral Vein	10mm AVP-2	Expired	1	Sepsis with Multiorgan Failure
51	Female	Caucasian, Non-Hispanic	Ascites	12	10 mm x 10 cm Viatorr	NA	8 mm	Refractory Hepatic Encephalopathy	288	NA	358	Unstable Refractory Hepatic Encephalopathy Secondary to TIPS	18 AVP-2	Right Internal Jugular Vein	18mm AVP-2	Ascites Requiring Paracentesis	Alive	NA
78	Male	Caucasian, Non-Hispanic	Right Hydrothorax	20	10 mm x 8 cm Viatorr	Self	7 mm	NA	NA	Unstable Right Heart Failure Secondary to TIPS	71	Unstable Right Heart Failure Secondary to TIPS	14 AVP-2	Right Internal Jugular Vein	14mm AVP-2	Expired	29	Right Heart Failure
83	Female	Caucasian, Non-Hispanic	Right Hydrothorax	15	12mm x 6 cm Viatorr	Palmaz PG397	7 mm	NA	NA	Unstable Right Heart Failure Secondary to TIPS	21	Unstable Right Heart Failure Secondary to TIPS	12 AVP-2	Right Internal Jugular Vein	12mm AVP-2	Expired	2	Right Heart Failure
45	Female	Caucasian, Non-Hispanic	Ascites	10	10mm x 6 cm Viatorr	NA	10 mm	Refractory Hepatic Encephalopathy	2304 (1 st) and 2328 (2 nd)	NA	2342	Unstable Refractory Hepatic Encephalopathy Secondary to TIPS	12 AVP-2	Right Internal Jugular Vein	12mm AVP-2	Ascites Requiring Paracentesis	497	End Stage Liver Disease

FIGURES



Figure 1. Angiogram showing pre-closure appearance of the TIPS.



Figure 2. Angiogram performed after TIPS closure with an Amplatzer Vascular Plug.

CONCLUSIONS

The most frequent indications for TIPS closure are HE, RHF, and ALI. In our case series, TIPS closure appears to be a safe bail-out for TIPS induced, reduction refractory complications. The 3 patients with TIPS induced, reduction refractory complications improved after closure. However, for the unstable patients suspected to be due to TIPS and could not first undergo TIPS reduction trial, TIPS closure did not prevent their deaths. The 2 RHF patients with right hydrothorax and advanced age died due to their initial TIPS closure indication. Higher pre-TIPS MELD was also found to be predictive of worse post-occlusion survival.

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