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Transjugular Intrahepatic Portosystemic Shunt for the Management of Medically Refractory Chylous Ascites in Cirrhosis: A Single-Institution Retrospective Analysis

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Abstract

We report our experience with using transjugular intrahepatic portosystemic shunt (TIPS) for the management of chylous ascites in cirrhotic patients. A total of eight patients were included in the final analysis. The primary outcome assessed was the resolution of ascites. Secondary outcomes, including hepatic encephalopathy (HE), sepsis, worsening of liver function, and transplant-free survival, were also evaluated. Three-month follow-up imaging showed resolution of ascites in all patients, except for one who had concurrent renal dysfunction. Two patients died 3 and 5 months after TIPS due to sepsis and multi-organ failure. The incidence of HE during the follow-up period was 25%. No patient experienced significant worsening of liver function in the early post-procedure phase. One patient received a transplant 9 months after TIPS. Mean transplant-free survival for the remaining patients was 19 months. In conclusion, TIPS is an effective treatment for managing chylous ascites in cirrhosis that is refractory to medical therapy.

Keywords
- chylous
- lymphatic
- paracentesis

Introduction

Chylous ascites occurs in approximately 0.5 to 1% of patients with ascites secondary to cirrhosis.[1] Diagnosis is typically made based on the characteristic milky appearance of the ascitic fluid, along with a fluid triglyceride level greater than 110 mg/dL. The proposed mechanism for the formation of chylous ascites in cirrhosis is an excessive lymphatic flow and pressure in the hepatic and gastrointestinal systems secondary to portal hypertension, leading to the rupture of serosal lymphatics.[1] In addition to cirrhosis, chylous ascites may also result from traumatic, infectious, inflammatory, or congenital causes.[1]

Medical management of chylous ascites in cirrhosis follows a multifaceted, supportive approach aimed at reducing chyle production, alleviating portal hypertension, and preserving nutritional and immunologic integrity. Initial management includes dietary modifications such as a high-protein, low-fat diet enriched with medium-chain triglycerides, which bypass intestinal lymphatics and reduce chyle flow. Sodium restriction and diuretics (typically spironolactone and furosemide) are continued to manage volume overload. Somatostatin analogs like octreotide are frequently employed to reduce splanchnic circulation and lymphatic output, with doses typically ranging from 100 to 200 µg

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subcutaneously thrice daily.[2] For patients whose symptoms are refractory to these treatments, paracentesis is typically required. However, repeated fluid aspirations can significantly impact the patient's quality of life and may lead to malnutrition, fluid and electrolyte imbalances, and an increased risk of bleeding and infections. In such cases, a more definitive and long-lasting solution is often necessary.

Transjugular intrahepatic portosystemic shunt (TIPS) is a well-established procedure used to alleviate symptoms of portal hypertension. While some sporadic case reports and small case series have suggested that TIPS can resolve medically refractory chylous ascites and chylothorax in cirrhotic patients, the available literature is limited, with few long-term follow-up studies.[3–6] In this report, we share our experience with TIPS in such patients.

Materials and Methods

This retrospective analysis was approved by the institutional ethics committee. Adult patients (>18 years old) with cirrhosis (diagnosed based on clinical and imaging criteria, with or without histopathological confirmation) and chylous ascites (defined as ascitic fluid triglyceride levels >110 mg/dL) who were refractory to standard dietary modifications and pharmacological therapies and underwent TIPS at the authors' institution were included in the study. Patients without cirrhosis or those whose ascitic fluid triglyceride levels were <110 mg/dL despite a turbid or milky appearance on gross examination were excluded. Additionally, patients with a recent history of trauma, malignancy, infection, or cardiovascular dysfunction were also excluded.

All TIPS procedures were performed using a standard technique under transabdominal ultrasound guidance (as described elsewhere) by a single interventional radiologist (R.S.) with 14 years of experience in hepatobiliary interventions. A 10-mm hybrid stent (Niti-S; Taewoong Medical Co, Ltd, Seoul, Korea) was used in all cases. Patients were maintained on their pre-TIPS diuretic dosage for 4 weeks following the procedure. Thereafter, the dose was gradually reduced or the medication was discontinued, depending on the patient's clinical response to TIPS. Follow-up ultrasound with Doppler was conducted at 1 month, 3 months, and 6 months after the procedure, and then every 6 months thereafter.

TIPS was considered technically successful if the stent was optimally placed, and the portosystemic gradient was reduced to below 12 mm Hg or decreased by at least 50% from baseline. The primary outcome measured was the resolution of ascites on follow-up imaging. Secondary outcomes included clinically significant worsening of liver function, incidence of hepatic encephalopathy (HE), sepsis, stent patency rates, and overall transplant-free survival of the patients. Adverse events were documented according to the Society of Interventional Radiology guidelines.[7]

Results

Between September 2017 and January 2024, a total of 568 TIPS procedures were performed at the authors' institution. Of these, 14 were done for patients with medically refractory chylous ascites. Among them, two had concomitant hepatocellular carcinoma, one had a history of treated abdominal tuberculosis, one had biopsy-confirmed porto-sinusoidal vascular disease, and two patients were lost to follow-up. These cases were excluded from the study, and the final analysis included a cohort of eight patients (►**Fig. 1**). All patients were males, with a mean age of 62 years. The most

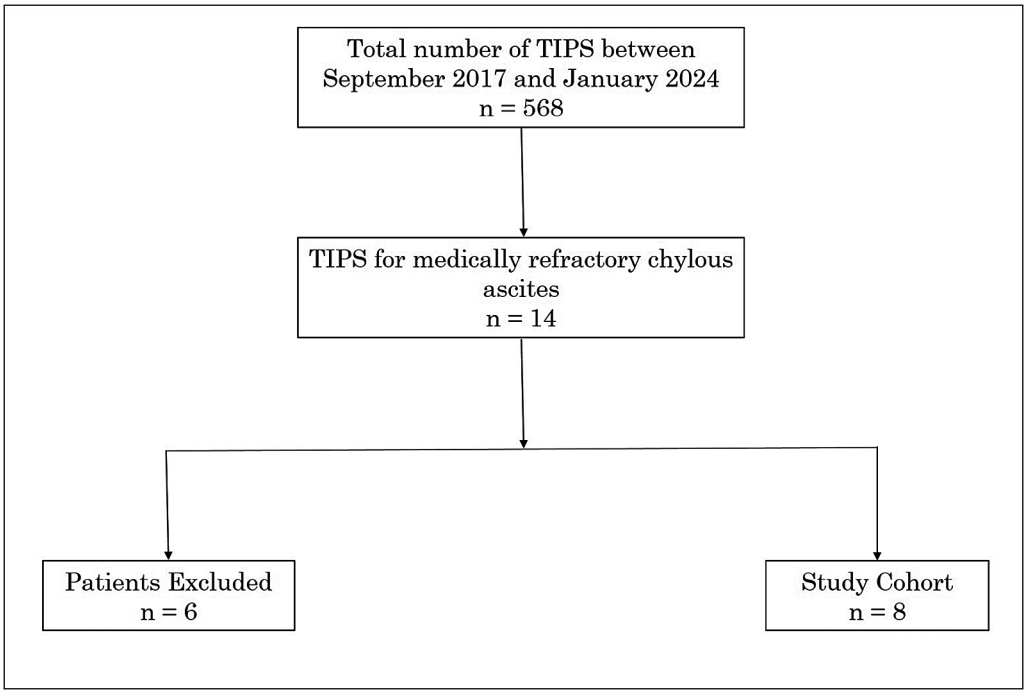

Fig. 1 Flow diagram of the study selection process.

Table 1 Clinical and demographic characteristics of the patient cohort

No.	Age/sex	Etiology	CTP	MELD Na	HVPG/PPG		Ascites control	Complications	Follow-up
					Pre	Post			
1	56/M	MASLD	11	18	26	10	Complete	None	9 mo
2	61/M	HBV	8	16	22	9	Partial	Sepsis	3 mo
3	69/M	MASLD	8	14	14	4	Complete	None	24 mo
4	73/M	MASLD	7	9	16	3	Complete	HE; grade 2	18 mo
5	62/M	MASLD	9	12	18	7	Complete	None	28 mo
6	68/M	MASLD	7	14	21	8	Complete	HE; grade 1	26 mo
7	49/M	ALD	10	17	24	5	Complete	None	32 mo
8	58/M	MASLD	9	10	21	6	Complete	Sepsis	5 mo

Abbreviations: ALD, alcohol-use related liver disease; CTP, Child–Turcotte–Pugh Score; HBV, hepatitis-B virus; HE, hepatic encephalopathy; HVPG, hepatic venous pressure gradient; MASLD, metabolic dysfunction–associated steatotic liver disease; MELD Na, model for end-stage liver disease score; PPG, portal pressure gradient.

common cause of cirrhosis was metabolic-dysfunction–associated steatotic liver disease ($n = 5$, 62.5%). Six patients were classified as Child–Pugh class B and two as class C. The mean model for end-stage liver disease (MELD Na) score was 14, and the average ascitic fluid triglyceride level was 240 mg/dL. The demographic and clinical details of the patients are provided in ►**Table 1**.

The TIPS procedure was technically successful in all patients, with the portosystemic gradient decreasing from a mean of 20 mm Hg (range 14–26 mm Hg) to 6.5 mm Hg (range 3–10 mm Hg). The mean follow-up period was 18 months (range 3–32 months). Complete resolution of ascites occurred after a follow-up of 3 months in all patients (►**Fig. 2**), except for one who had concomitant renal dysfunction in the form of hepatorenal syndrome-chronic kidney disease. None of the patients experienced recurrence of symptoms during the follow-up period.

Two patients, including the one with renal dysfunction, died 3 and 5 months after the TIPS procedure due to sepsis and multi-organ failure. The incidence of overt unprovoked HE (West Haven grade 1–2) during follow-up was 25% (2/8 patients). However, these episodes of HE responded well to medical treatment and did not require prolonged hospitalization. No patients developed West Haven grade 3 or 4 HE. Additionally, none of the patients experienced clinically significant worsening of liver function in the first month after the TIPS procedure. One patient underwent a live donor liver transplant 9 months post-TIPS and had an uneventful postoperative course. The mean transplant-free survival for the remaining patients was 19 months. There were no instances of stent dysfunction or occlusion during the follow-up period.

Discussion

Portal hypertension caused by cirrhosis leads to an increased pressure gradient between the capillaries and the interstitial compartment within the liver parenchyma, resulting in enhanced hepatic lymphatic flow. The elevated portal pressure also induces splanchnic vasodilation and congestion, which increases gastrointestinal lymphatic flow. This

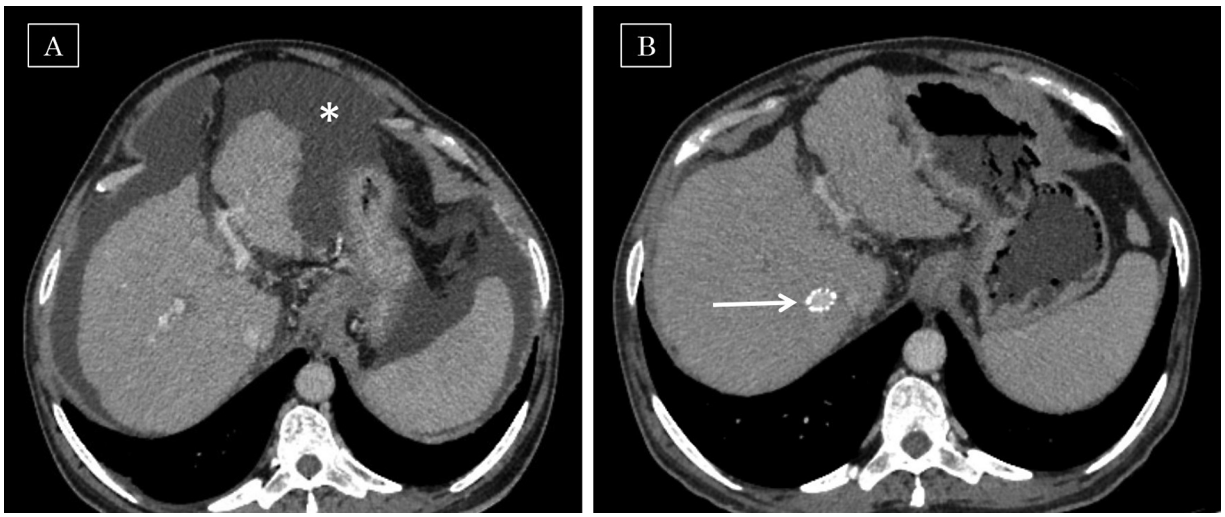

Fig. 2 (A) Axial images from the contrast-enhanced computed tomographic scan of a patient from the study cohort showing features of liver cirrhosis with ascites (asterisk) prior to the transjugular intrahepatic portosystemic shunt (TIPS) procedure. (**B**) Three months after the TIPS procedure, there was complete resolution of ascites. White arrow denotes the TIPS stent in situ.

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excessive lymphatic flow may lead to the spontaneous rupture of serosal lymphatic channels, which is believed to be the underlying mechanism for the development of chylous ascites in cirrhosis.[1]

Similar to the management of ascites in cirrhosis, the treatment of chylous ascites typically follows a stepwise approach. The first-line therapy generally includes diuretics, sodium restriction, a low-fat and medium-chain triglyceride diet, bowel rest, and total parenteral nutrition. Long-term octreotide therapy has also been successfully used in some case studies.[2] For patients who do not respond to this initial plan, repeated paracentesis is often performed.

Since portal hypertension is believed to play a key role in the development of chylous ascites in cirrhosis, a few studies have explored the role of TIPS and splenic artery embolization in managing chylous ascites, showing positive results in terms of symptomatic control of ascites.[3–6,8]

In line with other studies, complete resolution of chylous ascites was observed in all patients in our cohort, except for one who had concurrent renal dysfunction and showed only a partial response. The incidence of TIPS-related complications, such as HE, liver dysfunction, and sepsis, was consistent with the rates reported in other studies where TIPS was used for different indications.[9]

Some limitations of our study include its small sample size, retrospective design, and lack of long-term follow-up. However, this report contributes to the growing body of literature on this topic and adds valuable evidence.

Conclusion

TIPS should be considered as a potential first-line option for providing symptomatic relief in patients with medically refractory chylous ascites secondary to cirrhosis.

Conflict of Interest
None declared.

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