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## Case Report

# Percutaneous transhepatic sclerotherapy for ascending colonic varices due to left-sided portal hypertension <sup>☆</sup>

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## ABSTRACT

Left-sided portal hypertension (LSPH) causes varices and splenomegaly due to splenic vein issues. Colonic varices are rare and lack standardized treatment. We report the successful treatment of colonic varices caused by LSPH, by addressing both the afferent and efferent veins. A 70-year-old man with distal cholangiocarcinoma had surgery without splenic vein resection, leading to proximal splenic vein stenosis and varices at multiple locations. Percutaneous transhepatic splenic venography revealed that collateral veins flowed into the ascending colonic varices and returned to the portal vein. Complete thrombosis of the varices was achieved by injecting sclerosants and placing coils in both the afferent and efferent veins. The procedure was safe and effective, with no variceal recurrence. This approach provides a minimally invasive option for treating colonic varices associated with LSPH.

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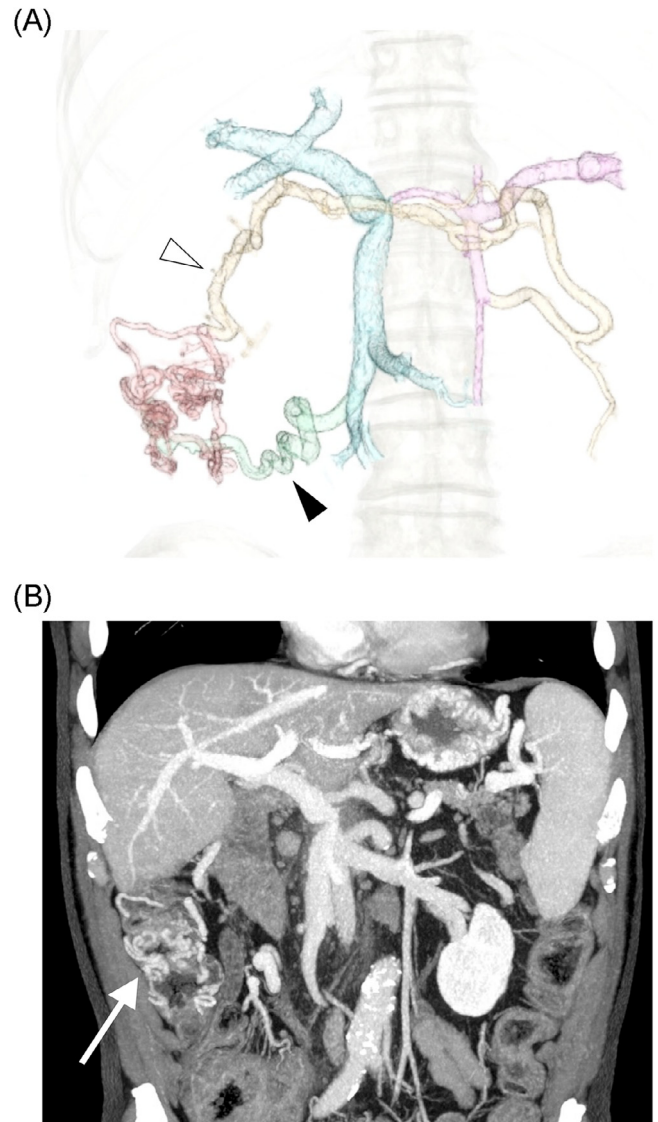
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## Introduction

Left-sided portal hypertension (LSPH) is thought to cause gastrointestinal varices and splenomegaly due to stenosis or obstruction of the splenic vein by various factors despite normal liver function and portal blood flow [1,2]. Colonic varices are rare and their treatment has not been standardized [3], although cases of rupture and fatal hemorrhage have been reported [4,5]. As most colonic varices are caused by portal hypertension due to cirrhosis, there are few reports of colonic varices associated with LSPH. Herein, we report a case of colonic varices caused by LSPH that was successfully treated by approaching both the afferent and efferent veins via transhepatic approach.

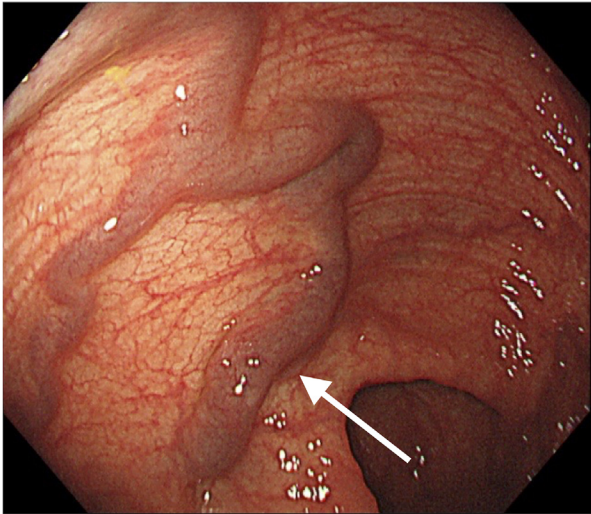
## Case report

A 70-year-old man with previously diagnosed distal cholangiocarcinoma had a history of subtotal stomach-preserving pancreatoduodenectomy (SSPPD) without splenic vein resection 3 years ago. Three months after the surgery, contrast-enhanced computed tomography (CT) revealed proximal splenic vein stenosis and splenomegaly. Three years after the surgery, varices had developed at various sites, including the ascending colon, and gastric, pancreatojejunostomy (Figs. 1A and B). LSPH was assumed to be caused by stenosis of the splenic vein, resulting in splenomegaly and varices at multiple sites. Upper gastrointestinal endoscopy revealed gastric varices, whereas lower gastrointestinal endoscopy revealed ascending colonic varices (Fig. 2). The varices increased in size, and interventional radiology procedures were selected as treatment. Percutaneous transhepatic sclerotherapy for colonic varices was planned. Ultrasound-guided transhepatic portal venous puncture was performed to insert a 6-French (Fr) 60-cm sheath (Destination; Terumo, Tokyo, Japan) into the portal vein under local anesthesia. Although insertion of a 4-Fr catheter into the stenotic splenic vein was not difficult, splenic venography showed a stenotic point obstruction and ascending colonic varices via the inferior mesenteric vein, the colonic marginal vein, and the right colonic vein. The varices drained into the ileocolic vein, superior mesenteric vein, and back to the portal vein (Fig. 3A). Subsequently, a 2.7-Fr balloon catheter with a 10-mm balloon (Pinnacle Blue 27; Tokai Medical Products, Aichi, Japan) was inserted into the ileocolic vein (efferent vein) via the superior mesenteric vein. Then, a balloon-occluded retrograde venography of the ileocolic vein was performed. However, the varices were partially visible (Fig. 3B). A 3.2-Fr catheter (TACTICS; Technocrat Corporation, Aichi, Japan) was inserted into right colic vein (afferent vein) via the inferior mesenteric vein through the 6-Fr sheath in parallel with the microballoon catheter. Right colic venography under balloon occlusion of the ileocolic vein also did not show the varices completely. When the balloon catheter was deflated, afferent venography revealed the varices completely (Fig. 3C). This suggests that the varices had numerous minute afferent and efferent veins. First, with the efferent vein balloon deflated, the sclerosant, the scler-



**Fig. 1 – (A) Three-dimensional volume-rendered images were reconstructed using contrast-enhanced computed tomography. The image shows the ascending colonic varices through the colonic marginal vein and onto the right colonic vein (white arrowhead). The varices flow drained into the ileocolic vein (black arrowhead) and the superior mesenteric veins, and back into the portal vein. (B) Portal phase of contrast-enhanced computed tomography. Maximum intensity projection. The examination showed proximal splenic vein stenosis, splenomegaly, and ascending colon varices (white arrow).**

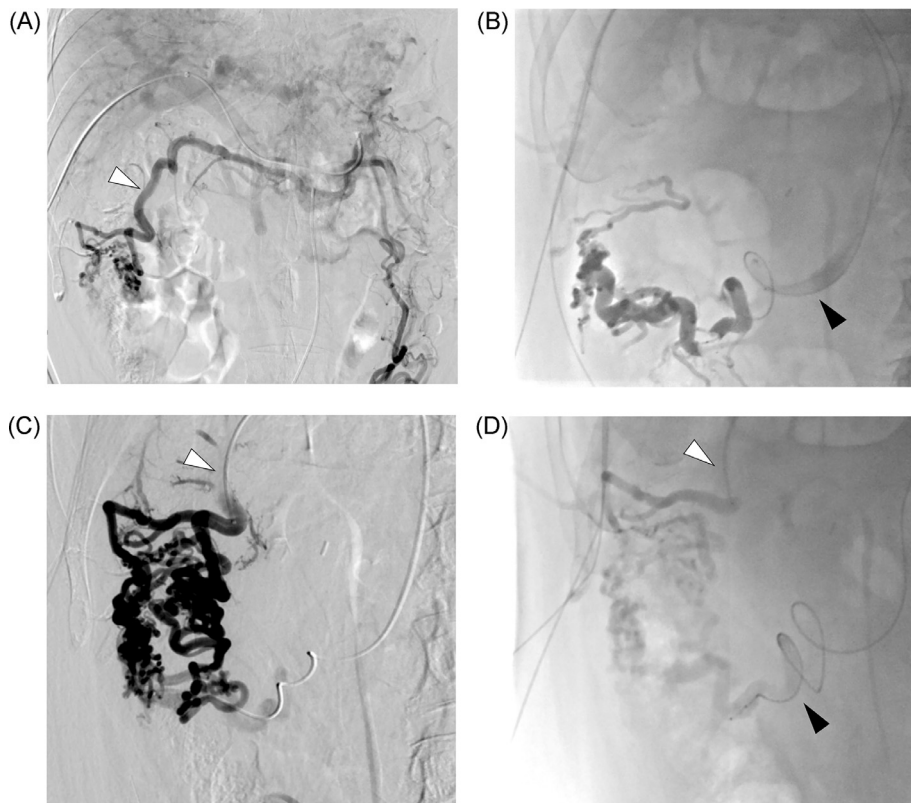
osing agent containing 5% ethanolamine oleate iopamidol (EOI) mixed with 10% ethanolamine oleate (Oldamin; ASKA Pharmaceutical, Osaka, Japan) and the equivalent volume of nonionic contrast medium (iohexol 300 mgI/mL, Omnipaque 300; GE Healthcare, Massachusetts, USA), was injected from the afferent vein (Fig. 3D). When the sclerosing agent injected from the afferent vein began to flow into the varices, the bal-



**Fig. 2 – Lower gastrointestinal endoscopy before embolization. Varices can be seen in the ascending colon (white arrow).**

loon was inflated to prevent the sclerosing agent from leaking out of the efferent vein, and an additional sclerosant was injected from both the afferent and efferent veins. The amount of 5% EOI was 4 mL. After the injection of the sclerosant, coils (Ruby Coil; Penumbra, California, USA; AZUR CX 35 coil; Terumo, Tokyo, Japan) were inserted into the efferent and afferent veins respectively, to prevent migration of the sclerosant. Finally, self-expandable stents (SMART™ stent; Cordis, Florida, USA; Epic™ stent; Boston Scientific Corp., Massachusetts, USA) were implanted to improve the splenic vein flow. To prevent bleeding from the puncture site, the tract was embolized using a gel-like radiopaque material comprising 2 sheets of gelatin sponge and 3 mL of contrast agent [6].

The procedure was completed without complications and contrast-enhanced CT obtained 4 days and 11 months (Fig. 4) after the procedure respectively revealed complete thrombosis of the varices. The varices have not recurred to date.



**Fig. 3 – (A) Percutaneous transhepatic venography from the splenic vein showed stagnation of splenic blood flow and the ascending colonic varices via the colonic marginal vein and right colic vein (white arrowhead). The varices outflowed to the ileocolic (black arrowhead) and the superior mesenteric veins and back to the portal vein. (B) Balloon-occluded retrograde venography of the ileocolic vein (black arrowhead) did not show the ascending varices completely. (C) The venography from the right colonic vein (white arrowhead) shows the varices completely. (D) Fluoroscopic image during injection of the sclerosant. The sclerosants were injected from the afferent vein (white arrowhead). When the varices were filled with it, the balloon was inflated to prevent the sclerosing agent from leaking out of the efferent vein, and the sclerosants were also added from the efferent vein (black arrowhead). The amount of 5% ethanolamine oleate iopamidol (EOI) was 4 mL.**



**Fig. 4 – Maximum intensity projection image of contrast-enhanced computed tomography at 11 months after embolization revealed complete disappearance of the ascending varices.**

## Discussion

Pancreatoduodenectomy (PD) is a surgical procedure performed for pancreatic head and distal bile duct cancers, and ampulla of Vater carcinomas. In this case, a patient with previously diagnosed distal cholangiocarcinoma had undergone SSPPD without splenic vein resection. PD represents a recent and increasingly recognized etiology of LSPH due to the improved long-term prognosis of targeted diseases such as pancreatic cancer, with advancements in multidisciplinary treatment combining chemotherapy, radiation therapy, and surgical treatment [1]. According to a systematic review, LSPH occurs in 7.7% of patients who underwent splenic vein reconstruction, and in 29.4% of patients who underwent splenic vein ligation [7]. Although no ligation or reconstruction of the splenic vein was performed in this case, the proximal splenic vein was stenosed by the scarring caused by the surgery, which may have resulted in the same outcome as that after splenic vein ligation. Varices due to LSPH associated with PD occur in the esophagus, stomach, jejunum, pancreas, colon, and multiple other sites [7].

Colonic varices are rare and their management has not been standardized [3], although cases of rupture and fatal hemorrhage have been reported [4,5]. Various therapies including colectomy, transjugular intrahepatic portosystemic shunt (TIPS), balloon-occluded retrograde transvenous obliteration (BRTO), percutaneous transhepatic obliteration/sclerotherapy (PTO/PTS), endoscopic variceal ligation, and endoscopic injection sclerotherapy have been reported for the treatment of colonic varices [8]. However, the ascending colonic varices in this case did not indicate BRTO or TIPS, because they were not portal-systemic venous shunts or portal hypertension. In previous case reports, following treatments were used for colonic varices caused by LSPH: PTO/PTS, splenectomy, and partial splenic embolization [1,7,9]. Recent

report showed successful outcomes with splenic vein stenting for splenic vein stenosis [10]. While preventive treatment remains controversial, considering the risk of rupture and fatal hemorrhage, as well as the favorable outcomes demonstrated with preventive treatment prior to rupture, led to the decision to proceed with this treatment. Splenectomy is more invasive than interventional radiology, and results in a longer postoperative hospital stay. Additionally, there are several postoperative complications, including bleeding and infection [11].

## Conclusion

Thrombolization of colonic varices case was successfully performed by approaching from both the afferent and efferent veins with transhepatic approach and by using balloon catheter, and no complications were occurred. Interventional radiology is minimally invasive, and thus, should be considered for the treatment.

## Patient consent

A written informed consent was obtained from the patient.

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