Case Report

A Case of Esophagojejunal Variceal Rupture after Total Gastrectomy and Esophagojejunostomy Successfully Treated with Percutaneous Transhepatic Obliteration under Dual-balloon Occlusion of Feeding and Draining Veins

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Abstract

We present the case of a man in his 60s with bleeding esophagojejunal varices occurring after gastrectomy for gastric carcinoma. Percutaneous transhepatic portography depicted the esophagojejunal varices originated from the jejunal vein and drained into the azygos vein. A 5-French occlusion balloon catheter was wedged into the jejunal vein and a 3-French occlusion balloon catheter into one drainage channel of the esophagojejunal varices via the azygos vein. Selective antegrade jejunal venography under dual-balloon occlusion revealed entire esophagojejunal varices with good stagnated and well-opacified contrast medium. Subsequently, 12 mL of 5% ethanolamine oleate-contrast medium mixture was slowly injected into the esophagojejunal varices. He was discharged without complications one week after the procedure, and abdominal computed tomography demonstrated the disappearance of the esophagojejunal varices six months after the procedure.

Key words: esophagojejunal varices, percutaneous transhepatic obliteration, dual-balloon occlusion

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Introduction

Esophagojejunal varices occurring after gastrectomy are uncommon due to the resection of supplying vessels. Endoscopic treatment can become challenging due to the intricated configuration of the alimentary tract after surgical reconstruction. Therefore, there is no widely accepted standard strategy for treating esophagojejunal varices. We present a case of esophagojejunal variceal rupture after total gastrectomy and esophagojejunostomy that was successfully treated with percutaneous transhepatic obliteration (PTO) under dual-balloon occlusion of feeding and draining veins.

Case Report

Eleven years ago, a man in his 60s underwent total gastrectomy and esophagojejunostomy for gastric carcinoma in our hospital. He presented to our hospital with massive hematemesis and melena. His systolic blood pressure was 60 mmHg with a pulse rate of 120 bpm at admission. He had no symptoms of ascites, jaundice, or hepatic encephalopathy. Laboratory examination demonstrated white blood cells of 16,600/μL; red blood cells of 247 × 10^4/μL; hemoglobin, 8.1 g/dL; platelet count, 14 × 10^4/μL; total-bilirubin, 0.49 mg/dL; albumin, 2.75 g/dL; prothrombin time, 52%; international normalized ratio of prothrombin time, 1.40; and ammonia, 81 μg/dL. He had a history of alcoholic liver cirrho-

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sis, and his liver function was Child-Pugh B. An emergent upper gastrointestinal endoscopy revealed esophageal varices with exposed blood vessels (LmF2Cb without RC sign; Terms and conditions of the Japan Society for Portal Hypertension) and hemorrhage originating from the anal side of the esophagojejunal anastomosis. Endoscopic variceal ligation (EVL) for the bleeding varices was successful, with temporal hemostasis and stable hemodynamics. However, additional endoscopic treatment, such as endoscopic injection sclerotherapy (EIS), could not be performed to prevent rebleeding due to its difficulty in reaching and isolating the bleeding source. Abdominal contrast-enhanced computed tomography (CT) 3 d after admission revealed a dilated jejunal vein connected to the ascending jejunal limb. A part of the esophagojejunal varices was contrasted (**Fig. 1**). Therefore, he was diagnosed with esophagojejunal varices. Additionally, the azygos vein was suspected to be the drainage vein.

Figure 1. Abdominal contrast-enhanced coronal CT image. The abdominal CT image demonstrates a dilated jejunal vein connected to the ascending jejunal limb (arrows). A part of the esophagojejunal varices is contrasted (arrowheads).

PTO was planned to prevent rebleeding from the varices 2 w after admission. Written informed consent was obtained from the patient and his family. The procedure was performed under local anesthesia. The left branch of the portal vein was punctured with a 21-gauge coaxial needle using a micro-puncture kit (Merit Mini Access Kit®; Merit Medical, Tokyo, Japan) under ultrasonographic guidance. A 5-French sheath (Super sheath®; MEDIKIT, Tokyo, Japan) was introduced into the portal vein. Subsequently, superior mesenteric venography identified the feeding and draining veins of the esophagojejunal varices (**Fig. 2**). The flow direction in the portal vein was hepatopetal, whereas that in the dilated jejunal vein was hepatofugal. The esophagojejunal varices originated from the dilated jejunal vein and drained into the azygos vein, which flowed into the superior vena cava. A 5-French occlusion balloon catheter with a 9-mm diameter balloon (Selecon MP catheter®; Terumo, Tokyo, Japan) was wedged into the dilated jejunal vein to control the blood flow into the varices. Subsequently, a 2.2-French tip microcatheter (Progreat® β^3; Terumo, Tokyo, Japan) was introduced adjacent to the esophagojejunal varices via a 5-French balloon catheter. However, selective jejunal venography un-

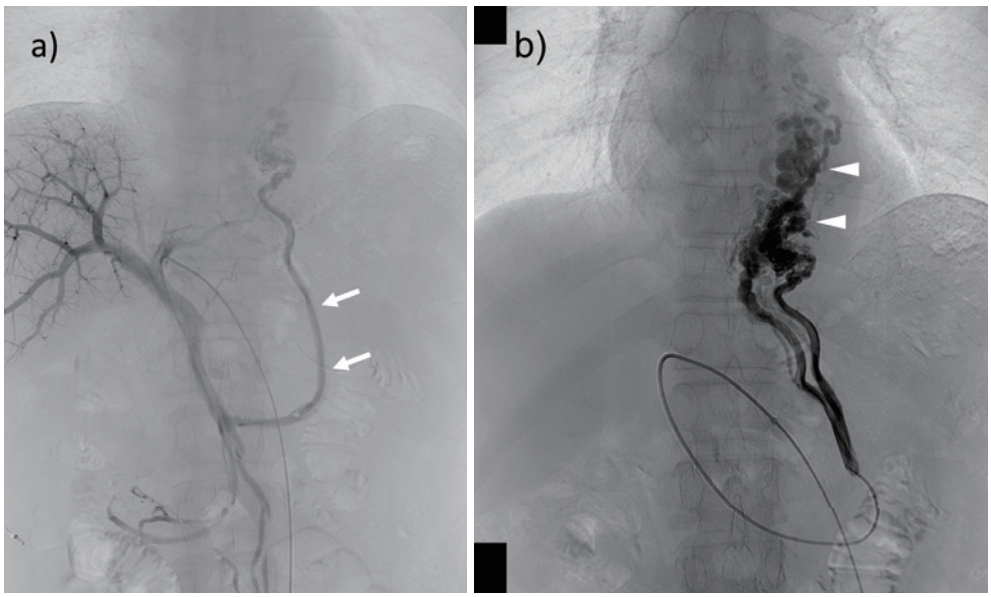

Figure 2. Angiography images. (a) Superior mesenteric venography and (b) Selective jejunal venography.
(a) The flow direction in the portal vein is hepatopetal. The esophagojejunal varices are supplied by a dilated jejunal vein (arrows) through the esophagojejunal anastomosis. (b) The esophagojejunal varices (arrowheads) are depicted via the dilated jejunal vein with hepatofugal blood flow.

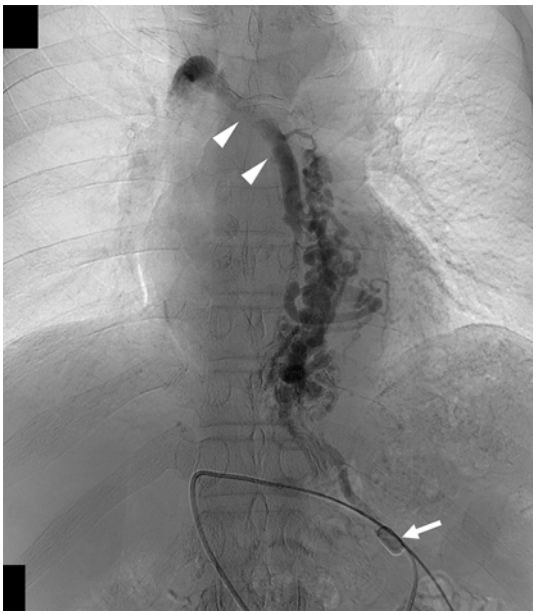

Figure 3. Selective jejunal venography under balloon occlusion (arrow) reveals that the contrast medium injected from the jejunal vein is washed out through the azygos vein (arrowheads).

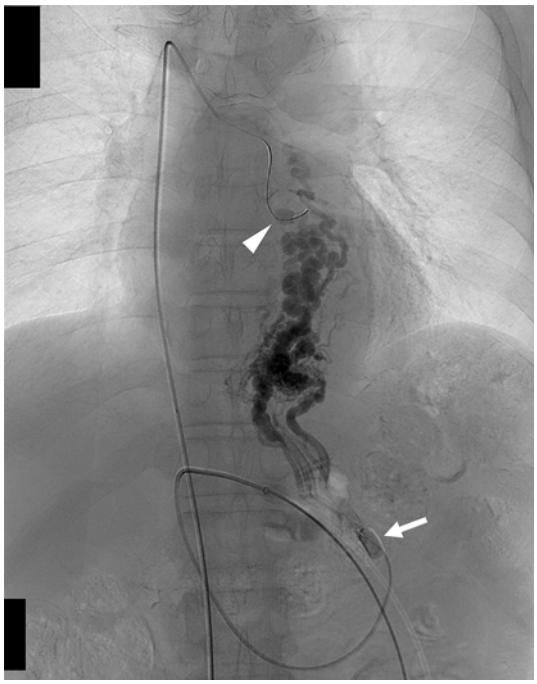

Figure 4. Selective antegrade jejunal venography under dual-balloon occlusion reveals the entire esophagojejunal varices with a good stagnated and well-opacified contrast medium. A 5-French occlusion balloon catheter is wedged into the jejunal vein (arrow), and a 3-French occlusion balloon catheter into the outflow of esophagojejunal varices via the azygos vein (arrowhead).

der balloon occlusion revealed the contrast medium injected from the jejunal vein was washed out through the azygos vein (**Fig. 3**). We thought that occlusion of the outflow vessels might be necessary to eradicate varices due to the possible migration of sclerosant from the varices into the systemic venous circulation. Therefore, a PTO approach with balloon occlusion of the outflow vessels was planned. Another 5-French sheath was inserted into the right femoral vein. A 5-French catheter (Hanaco Excellent EN catheter®; Hanaco Medical, Saitama, Japan) was introduced into the azygos vein via a 5-French sheath. A 3-French occlusion balloon catheter with a 5-mm diameter balloon (LOGOS®; Piolax, Yokohama, Japan) was wedged into one drainage channel of the esophagojejunal varices using 5-French catheter at the azygos vein. Subsequently, selective antegrade jejunal venography under dual-balloon occlusion revealed the entire esophagojejunal varices with a good stagnated and well-opacified contrast medium (**Fig. 4**). Further, 4000 units of human haptoglobin (Haptoglobin I.V. 2000 units "JB"®, Japan Blood Products of Organization, Tokyo, Japan) was intravenously delivered to prevent hemolysis and subsequent renal failure. Then, 10 mL of 50% glucose solution was slowly injected into the esophagojejunal varices via a 2.2-French tip microcatheter at the jejunal vein under dual-balloon occlusion. Subsequently, 12 mL of 5% ethanolamine oleate (Oldamin®; Takeda Pharmaceutical, Osaka, Japan)-contrast medium (Iopamidol® 300; Fuji Pharma Corporation, Tokyo, Japan) mixture (EOI) was slowly injected into the esophagojejunal varices under fluoroscopy. Fluoroscopy performed 30 min after the injection demonstrated that the entire esophagojejunal varices were filled with sclerosing agents. Test injection of the contrast medium showed clot formation in the varices. Finally, coil embolization of the jejunal veins with their blood supply routes associated with the esophagojejunal varices was performed using microcoils (Interlock®; Boston Scientific, MA, USA). The 5-French balloon catheter at jejunal vein was withdrawn. The esophagojejunal varices disappeared on superior mesenteric venography after the procedure (**Fig. 5**). The 5-French sheath at the portal vein was withdrawn after placing a 2.0 mm diameter microcoil (C-stopper®; Piolax, Yokohama, Japan) in the needle tract of the liver parenchyma. Balloon occlusion of the outflow of esophagojejunal varices was pursued until the next day. The following day, 3-French balloon catheter at the azygos vein and 5-French sheath in the right femoral vein was withdrawn. One week after the procedure, the patient was discharged without complications such as fever or abdominal pain.

Endoscopy performed 2 mon after the procedure showed a decrease in the size of the esophagojejunal varices and the appearance of bronze color varices, which suggested thrombosis. Six months after the procedure, abdominal contrast-enhanced CT images demonstrated the disappearance of the esophagojejunal varices (**Fig. 6**). There were no major complications or recurrence of varices, and his liver and renal functions did not significantly change during the 2-year follow-up period.

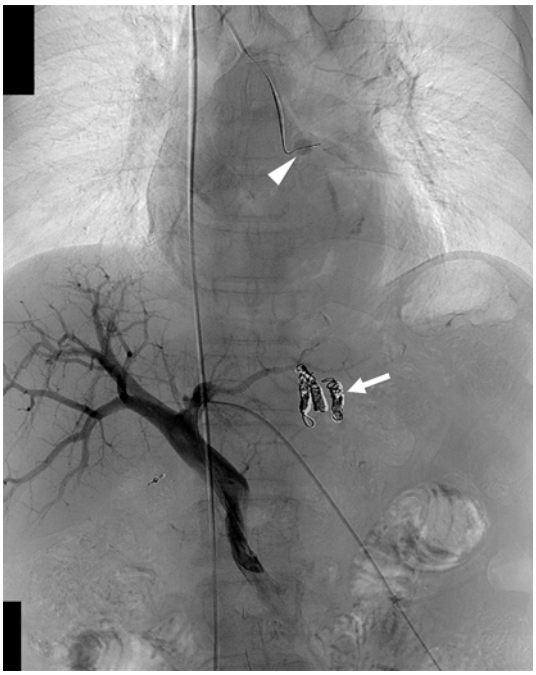

Figure 5. The esophagojejunal varices disappear on superior mesenteric venography after the procedure. Occlusion balloon catheter at the outflow of esophagojejunal varices (arrowhead) and coil embolization of jejunal veins (arrow) are observed.

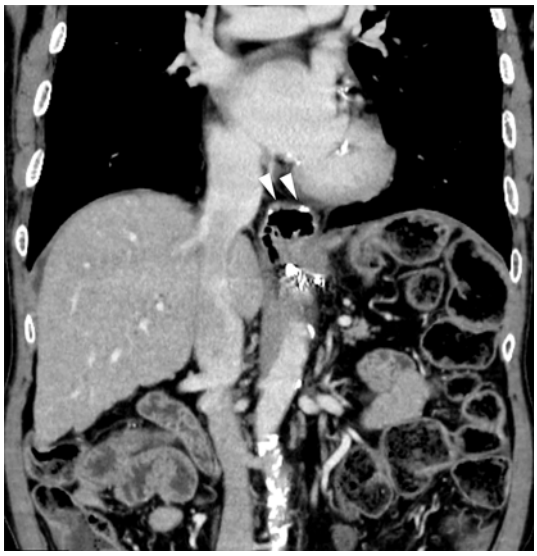

Figure 6. Abdominal contrast-enhanced coronal CT image. The abdominal CT image demonstrates no enhancement of the esophagojejunal varices (arrowheads).

Discussion

Most variceal bleeding occurs in the gastroesophageal area, and the incidence of ectopic varices is reported to be less than 5% in all variceal bleeding cases [1]. According to a current survey of ectopic varices in Japan, the rectum (44.5%) is the most common site of ectopic varices, followed by the duodenum (32.9%) [2]. The endoscopic treatment for ectopic variceal bleeding is often difficult, and the mortality rate has been reported as high as 40% [3]. Ectopic varices after surgical reconstruction are supplied and drained via a special route. In cases with a history of proximal or total gastrectomy, esophagojejunal varices infrequently develop because the feeding veins, such as the left gastric vein, posterior gastric vein, or short gastric vein, are all resected in operation [4-8]. An increase in the venous outflow in the anastomotic region after total gastrectomy and esophagojejunostomy and neovascularization due to adhesion and inflammation in the peritoneal cavity cause variceal formation [4]. Particularly in patients with portal hypertension, the esophagojejunal varices are commonly supplied by the dilated jejunal veins, which acquire hepatofugal blood flow in association with resecting the other hepatofugal collaterals in the operation. In this case, the varices were directly supplied by the jejunal vein and almost completely drained through the azygos vein.

Emergent endoscopic treatment is generally performed to achieve hemostasis in variceal bleeding. EIS and EVL are currently the mainstream treatments for hemostasis of esophagogastric varices [9]. However, endoscopic approaches are occasionally unsuccessful due to the complicated configuration of the alimentary tract after surgical reconstruction. In these cases, intraperitoneal tissue adhesion and intricate anatomical reconstruction make reoperation difficult. Several case reports have described the successful treatment of esophagojejunal varices using an endoscopic approach, PTO, or PTO combined with transjugular intrahepatic portosystemic shunt (TIPS) [4-8]. Initially, we also attempted the PTO technique, and we later combined a transfemoral retrograde approach. We consider that the use of balloon catheters enabled the successful treatment of the esophagojejunal varices entirely filled with the sclerosing agents. Yune et al. [10] reported that using an occlusion balloon catheter could achieve a temporary flow reduction and prevent reflux of the sclerosant back into the portal system. In addition, the transvenous retrograde approach might prevent the sclerosant from treating the large-capacity varices from leaking into the pulmonary circulation. Occlusion of the outflow vessels may be necessary to eradicate varices effectively. We consider that occlusion of the draining vein combined with antegrade approach is useful for the reduction of sclerosant leakage because many variceal systems have multiple feeding and draining pathways. The esophagojejunal varices were trapped through dual-balloon occlusion of the feeding and draining vessels, and the blood flow was almost completely stagnated. This technique allowed the sclerosing agent to be distributed into the entire esophagojejunal varices and stagnate in the varices sufficiently. Coil embolization of the feeding vessels might also contribute to the stagnation of the sclerosant inside the varices.

The possibility of new ectopic varices must be considered, as portal blood pressure is expected to rise after variceal embolization. The shunt occlusion therapy for

varices with portal hypertension might risk worsening ascites or portal hypertensive gastropathy. TIPS is another treatment of choice for ectopic variceal bleedings. Wu S et al. [7] reported a case of bleeding esophagojejunal varices after total gastrectomy treated with TIPS plus antegrade embolization; they achieved adequate hemostasis and reduction of portal pressure after the procedure. TIPS plus antegrade embolization, portal pressure reduction therapy and variceal embolization therapy, may be a useful method to achieve hemostasis and improve the complications of portal hypertension, such as ascites, portal vein thrombosis, or new formation of ectopic varices.

Conclusion

PTO under dual-balloon occlusion of the feeding and draining veins was effective for esophagojejunal varices after total gastrectomy and esophagojejunostomy.

Conflict of Interest: None

Author Contribution: Tsuyoshi Kawai is the "main operator and lead author" and decided final approval of the manuscript.

Kensuke Matsumoto, Kenichi Miyoshi, and Naoya Noguchi are "Clinical Investigators."

Shinsaku Yata and Shinya Fujii "participated in the editing of the manuscript."

IRB: The ethics committee at our institution approved the interventional case report.

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