Case Report

Percutaneous Transhepatic Obliteration for Treating Stomal Variceal Bleeding Using a Microballoon Catheter with Systemic Drainage Vein Compression

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Abstract

We report a case of successful treatment of stomal variceal bleeding with percutaneous transhepatic obliteration using a microballoon catheter concomitantly with drainage vein compression. A 72-year-old man with alcoholic cirrhosis was admitted to our hospital due to repeated hemorrhage of stomal varices. Percutaneous transhepatic obliteration was then selected for treatment because computed tomography revealed the stomal varices being fed by only two branches of the superior and inferior mesenteric veins. During microballoon inflation, 5% ethanolamine oleate with iopamidol was injected into each branch, and the systemic drainage veins were compressed by the gauze from the body surface near the stoma. No rebleeding from the stomal varices has been observed 14 months after the procedure.

Key words: percutaneous transhepatic obliteration, stomal varices, portal hypertension, microballoon catheter, venous compression

(Interventional Radiology 2022; 7: 100-103)

Introduction

Stoma varices are not rare, and up to 5% of all people who have a stoma are affected. Stoma formation provides an unusual anatomical location that allows abnormal communication between the high-pressure portal venous system and the relatively low-pressure systemic venous system. Liver cirrhosis is the most common cause of stomal varices, which result from increased portal pressure [1]. The mortality rate associated with stomal variceal bleeding episode is 3%-4%, much less than the 30%-40% mortality rate of an acute gastroesophageal variceal hemorrhage [2]. Nonetheless, if bleeding continues, it can lead to serious morbidity, including repeated hospitalizations and blood transfusions [3]. Strategies for managing stomal variceal bleeding include local compression, balloon-occluded retrograde transvenous obliteration (B-RTO), embolization by direct puncture [4], percutaneous transhepatic obliteration (PTO), transjugular intrahepatic portosystemic shunting (TIPS), or stomal revision and liver transplantation [5]. Here, we report a case of successful PTO for stomal variceal bleeding using a microballoon catheter with systemic drainage vein compression from the body surface.

Case Report

Informed consent was obtained for every diagnostic or interventional procedure and the use of electronic medical records. This is a case report involving one patient; thus, institutional review board approval was not required. A 72-year-old man with alcoholic cirrhosis was admitted to our hospi-

Received: January 7, 2022. Accepted: May 12, 2022.
doi: 10.22575/interventionalradiology.2021-0033
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Figure 1.

(a) Computed tomography (CT) axial images revealing the dilated and tortuous venous collateral network around the transverse colon stoma (white arrow).

(b) Maximum intensity projection CT images revealing transverse colon stomal varices (white arrowhead) fed by two enlarged branches of the middle colic vein branching from the superior mesenteric vein (black arrow) and the left colic vein branching from the inferior mesenteric vein (white arrow) and multiple systemic drainage veins (black arrowhead). The diameter of the afferent vein was 4.3 mm in diameter distal to the middle colic vein and 4.7 mm in diameter distal to the left colic vein.

tal due to repeated hemorrhage from the transverse colon stoma. The patient had undergone transverse colon colostomy 5 years earlier due to urethra-rectal fistula caused by high-intensity focused ultrasound and intensity-modulated radiation therapy for prostate cancer as his past history. His vital signs were stable upon admission. The stoma exhibited venous congestion and swelling. The hemoglobin level was 8.3 g/dL; albumin, 2.7 g/dL; bilirubin, 1.3 g/dL; and prothrombin time, 56%. There was a small amount of ascites on computed tomography (CT) and a Child-Pugh score of 9 (Child-Pugh class B). Although bleeding from the stoma was conservatively treated using infusion and transfusion, the bleeding continued. CT axial images revealed a dilated and tortuous venous collateral network around the transverse colon stoma (**Fig. 1a**). Based on the above findings, the patient was diagnosed with stomal variceal bleeding. Interventional radiological therapy was required because even at admission, the stoma bag was repeatedly filled with pale red blood. The stomal varices were fed from two enlarged branches originating from the middle colic vein branching from the superior mesenteric vein and the left colic vein branching from the inferior mesenteric vein (IMV) and multiple systemic drainage veins, as seen in three-dimensional reconstruction in maximum intensity projection (MIP) CT images (**Fig. 1b**). The diameter of the afferent vein was 4.3 mm in diameter distal to the middle colic vein and 4.7 mm in diameter distal to the left colic vein. Therefore, it was expected that treatment using an antegrade approach would be better than a retrograde approach; thus, the percutaneous transhepatic approach was selected.

Under local anesthesia, the left portal vein branch was accessed using a 21-gauge needle. A 4-French (Fr) sheath was then introduced into it. The IMV portogram revealed the left colic vein, which was an afferent vein of the stomal varices; stomal varices; and systemic drainage veins (**Fig. 2a**). Next, a 1.8-Fr microballoon catheter (length, 12 mm and inflation diameter range, 3-5 mm; Logos grand master; Piolax, Yokohama, Japan) with a 0.016-in microguidewire (Meister; Asahi Intecc, Seto, Japan) was coaxially inserted. The 1.8-Fr microballoon catheter was advanced toward the distal left colic vein. However, using microballoon occlusion alone, a selective portogram of the distal left colic vein revealed the stomal varices and systemic drainage veins (**Fig. 2b**). Therefore, the latter were additionally compressed by the gauze from the body surface near the stoma. Thereafter, a selective portogram of the distal left colic vein revealed that the contrast medium was stagnant within the stomal varices (**Fig. 2 c**). As an embolization material, we selected 5% EOI (ethanolamine oleate [Oldamin; Takeda Pharmaceutical, Tokyo, Japan] mixed with the same volume of a nonionic contrast medium [370 mg of iodine as iopamidol]). First, under fluoroscopic guidance, 4 mL of 5% EOI was injected into the stomal varices and the distal left colic vein through the microballoon catheter. Microballoon occlusion and systemic drainage vein compression was continued for 30 min following EOI injection. To prevent renal injury caused by hemolysis, 4000 units of haptoglobin (Human haptoglobin; Japan Blood Products Organization, Tokyo, Japan) were intravenously administered before and during EOI injection. The IMV portogram revealed no stomal varices 30 min after the 5% EOI injection (**Fig. 2d**). Second, the microballoon catheter was advanced toward the distal middle colic vein, which was another afferent vein of the stomal varices. Again, under fluoroscopic guidance, 3 mL of 5% EOI was injected into the stomal varices and the distal middle colic vein in the manner described above. CT 4 days after the procedure revealed that the stomal varices had been obliterated (**Fig. 3**). At the 14-month follow-up, the congested stoma had improved, and stomal variceal bleeding had not recurred.

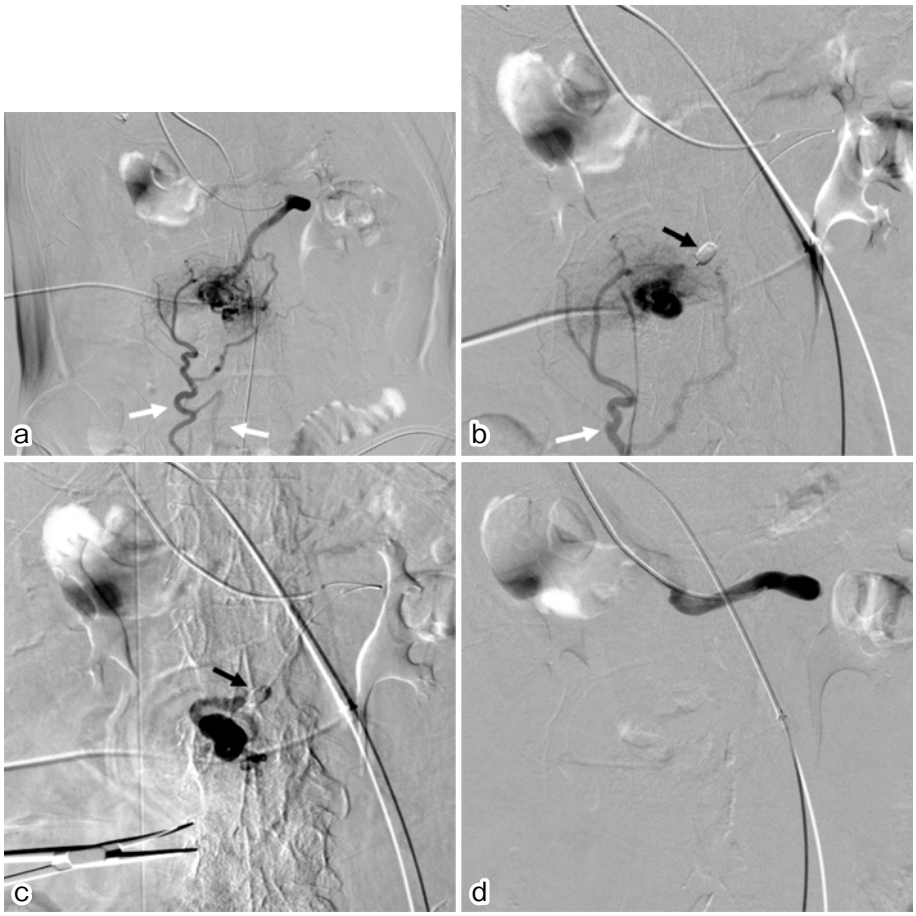

Figure 2.
(a) Inferior mesenteric vein (IMV) portogram illustrating the left colic vein, stomal varices, and systemic drainage veins (white arrow).
(b) With microballoon occlusion (black arrow) alone, a selective portogram of the left colic vein reveals the stomal varices and systemic drainage veins (white arrow).
(c) Selective portogram of the distal left colic vein after its microballoon occlusion (black arrow) and systemic drainage vein compression by the gauze from the body surface near the stoma, appearing stagnant within the stomal varices.
(d) IMV portogram revealing no stomal varices 30 min after injection of 4 mL of 5% EOI into the stomal varices and distal left colic vein through the microballoon catheter.

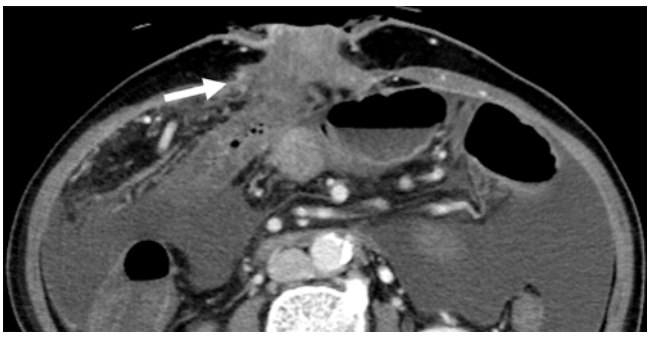

Figure 3. Computed tomography revealing the obliteration of the stomal varices 4 days after the procedure (white arrow).

Discussion

PTO using a microballoon catheter for treating stomal variceal bleeding was selected for this case because the MIP images identified only dilated middle and left colic veins supplying the stoma varices. Although the management of stomal variceal bleeding is not standardized, the use of minimally invasive endovascular techniques is often preferred to surgical measures [1]. Regardless of the approach, the goal is to fill the entire stomal varices and upstream lumen of varices with the sclerosant to prevent long-term rebleeding [6]. One advantage of B-RTO and embolization by direct puncture, which are categorized as the retrograde approach, is that they are less invasive than PTO or TIPS. However, B-RTO may be complicated in varices with multiple systemic drainage veins [7]; thus, it may not be success-

fully performed in this situation. The direct puncture method may be difficult to fill the entire stomal varices and upstream lumen of varices with the sclerosant, whereas PTO can fill them from the upstream lumen with the sclerosant. TIPS shunt creation may increase the incidence of hepatic encephalopathy and can damage the liver function [8]. PTO is more invasive than the retrograde approach methods. PTO for stomal varices can result in long-term recurrence due to failure to occlude all afferent veins or due to the rapid development of new afferent veins. However, if there is no malignant hepatic tumor or cysts on the puncture route, small amount of ascites, few dilated afferent veins, and multiple drainage vessels on preoperative CT images, as in this case, PTO may be selected to treat the stromal varices. Moreover, in this case, the microballoon catheter could be advanced as close as possible to the stomal variceal network located upstream of the stomal varices to avoid early reopening of shunts [6]. However, the microballoon catheter also has the limitation that if the diameter of the afferent vein is larger than 5 mm even in the distal site, it cannot be occluded with a microballoon catheter. A larger balloon catheter is required for occlusion of the afferent vein in this situation. Therefore, it is important to measure the afferent vein diameter on the preoperative CT images to confirm that the afferent vein can be occluded by the microballoon catheter.

To ensure the sufficient stagnation of the sclerosant and sufficient filling of the entire varices and upstream lumen of varices, 5% EOI, which has been used in conventional B-RTO [9], was used. Even when balloon occlusion of the afferent vein is performed, the sclerosant may not become stagnant in the stomal varices. In this situation, the compression of the systemic drainage veins is required [10]. Finally, microballoon occlusion of the afferent vein and systemic drainage vein compression by the gauze from the body surface near the stoma allowed the 5% EOI to remain in the stomal varices in this case. To the best of our knowledge, there have been no other reports of PTO using a microballoon catheter with systemic superficial drainage vein compression for treating stomal variceal bleeding.

In conclusion, PTO using a microballoon catheter and 5% EOI with systemic drainage vein compression from the body surface can safely and effectively treat stomal variceal bleeding.

Acknowledgement: The authors have no grants.

Conflict of Interest: None

Funding: The authors have no financial disclosure.

Author Contribution: All authors listed in the manuscript met the criteria of contribution described by ICMJE in the Recommendations for the Conduct, Reporting, Editing, and Publication of Scholarly work in Medical Journals. The corresponding author ensured that all authors had read and approved the manuscript.

Contributions to the Resubmitted Work from Each Author: Kensuke Osaragi, Rika Yoshimatsu, Ayano Ito, Junko Nagata, and Seiichiro Kojima: the acquisition of data for the work and revising the work.

Tomohiro Matsumoto, Terumitsu Hasebe, Takayoshi Suzuki, and Takuji Yamagami: revising the work.

Disclaimer: Takuji Yamagami is one of the Editorial Board members of Interventional Radiology. This author was not involved in the peer-review or decision-making process for this paper.

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