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Case Report

Afferent vein embolization via retrograde approach as a potential treatment strategy for bleeding duodenal varices ☆

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ABSTRACT

The standard treatment for ruptured duodenal varices remains to be established. Emergency balloon-occluded retrograde transvenous obliteration is challenging in patients with bleeding because re-rupture of varices can occur due to increased pressure when using the retrograde approach. Herein, we describe a case in which a catheter was retrogradely advanced to the afferent vein beyond bleeding duodenal varices; however, the varices re-ruptured during coil embolization, and a part of the catheter was deviated into the intestinal tract. The rupture site was embolized by liquid embolic materials from the microcatheter. Embolization via retrograde approach needs to be carefully performed.

Introduction

The standard treatment for duodenal varices remains to be established. Recently, a growing number of studies have reported that standby balloon-occluded retrograde obliteration (BRTO) shows favorable therapeutic efficacy [1]. However, emergency BRTO in the setting of bleeding is challenging because balloon-occluded retrograde venography (BRTV) contributes to the re-rupture of varices due to increased

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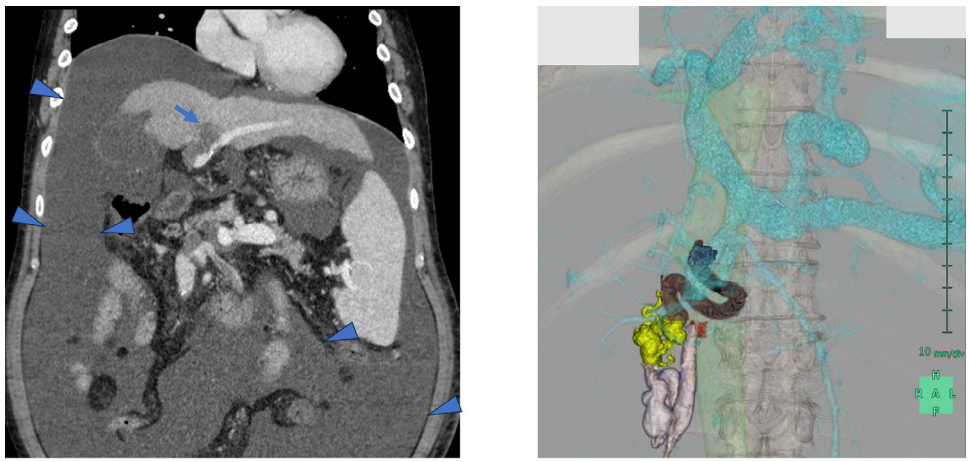

Fig. 1 – (A) Contrast-enhanced computed tomography image showing ascites (arrow head) and thrombosis of the umbilical potion of the portal vein (arrow). (B) Three-dimensional contrast-enhanced computed tomography image showing the portal venous system (light blue), duodenal varices (yellow), afferent vein (dark brown), efferent vein (grayish white) and junction of the efferent vein and inferior vena cava (red).

pressure. Herein, we describe a case in which a catheter was retrogradely advanced to the afferent vein beyond bleeding duodenal varices without performing BRTV; however, the varices re-ruptured during coil embolization and a part of the catheter was deviated into the intestinal tract. The ruptured site was embolized using liquid embolic materials and BRTO was continued. Institutional Review Board approval was not required for our study due to its type.

Case report

The patient was a 61-year-old man with alcoholic liver cirrhosis who was receiving warfarin for portal vein thrombosis. He was admitted to a nearby clinic due to fresh bloody stools (Child-Pugh score, 10; class C, total bilirubin level 1.5 mg/dL, prothrombin time 14%, prothrombin time international normalized ratio: 4.08, albumin 2.0 g/dL, Model for End-stage Liver Disease score 22). He was transferred to our gastroenterology department because he exhibited a shock status. Upper endoscopy revealed significant bloody residue in the stomach and poor visibility. Contrast-enhanced computed tomography (CECT) revealed duodenal varices, thrombosis of the main trunk of the portal vein, and ascites (Fig. 1A). Interventional radiology procedure was alternatively considered because endoscopic treatment was difficult. Due to ascites, percutaneous transhepatic/transsplenic obliteration (PTO) was deemed difficult, and the patient and his family opted out of transjugular intrahepatic portosystemic shunt (TIPS) due to insurance coverage issues. Therefore, BRTO was performed after a detailed review of the CECT. Three-dimensional CECT revealed that the varices drained into the right gonadal vein. Because the right gonadal vein meets the inferior vena cava at an acute angle (Fig. 1B), the right internal jugular vein approach was selected. Treatment was initiated 1 hour after CECT imaging via ultrasound-guided puncture under local anesthesia. A 10-Fr sheath was inserted into the inferior vena cava, and a 9F/5F double coaxial balloon catheter system (CANDIS, Medikit Corporation, Tokyo, Japan) was advanced into the right gonadal vein. Coaxial microcatheters (2.7 Fr and 1.9 Fr; Carnelian HF/Carnelian Marvel NT, Tokai Medical, Tokyo, Japan) were inserted into the balloon catheter. The 1.9 Fr microcatheter was advanced into the afferent vein beyond the tortuous varices (Fig. 2A) after coil embolization of the collateral efferent vein, and embolization was performed using detachable coils (MICRUSFRAME C, 12 mm 42 cm Cerenovus (Johnson & Johnson), NJ). During embolization, a part of the catheter deviated into the duodenal lumen (Fig. 2B). The patient became restless and went into shock again. One milliliter of N-butyl-2-cyanoacrylate (NBCA) diluted with lipiodol at a ratio of 1:4 was injected from the microcatheter to fill the bleeding point from the lumen. The patient's vital signs and restlessness improved; thus, BRTO was continued and 5 mL of 5% ethanolamine oleate iopamidol containing low-grade gelatin sponge particles was injected under balloon occlusion of the efferent vein. Stagnation of the sclerosants was confirmed up to the interior of the varices and efferent and afferent veins (Fig. 2C). However, after a certain period, the sclerosants slowly disappeared from the afferent veins. At this point, upper gastrointestinal endoscopy was performed, which revealed that the NBCA cast had plugged the bleeding point, but oozing was observed around the NBCA cast (Fig. 3). Therefore, endoscopic injection sclerotherapy was performed. Finally, coil embolization of the drainage vein was performed, following which the balloon was deflated. On the day after the procedure, CECT revealed complete obliteration of the varices. The patient was transferred back to the treating hospital; how-

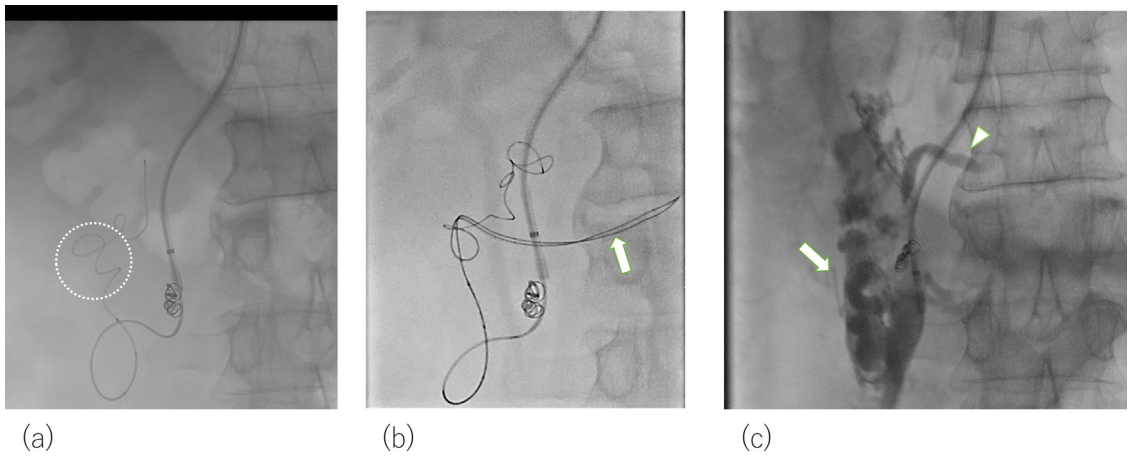

Fig. 2 – (A) Fluoroscopic image showing the advancement of tip of the microcatheter into the afferent vein of the varices. The circular dotted white line shows the variceal area. (B) The tip of the coil is in the pancreaticoduodenal vein, which is the afferent vein of the varices. A part of the microcatheter is deviated into the duodenal lumen (arrow). (C) After N-butyl-2-cyanoacrylate injection through the microcatheter at the bleeding point, 5% ethanolamine oleate iopamidol is injected from the efferent vein under balloon occlusion. The sclerosant fills the varices (arrow) and afferent veins (arrowhead).

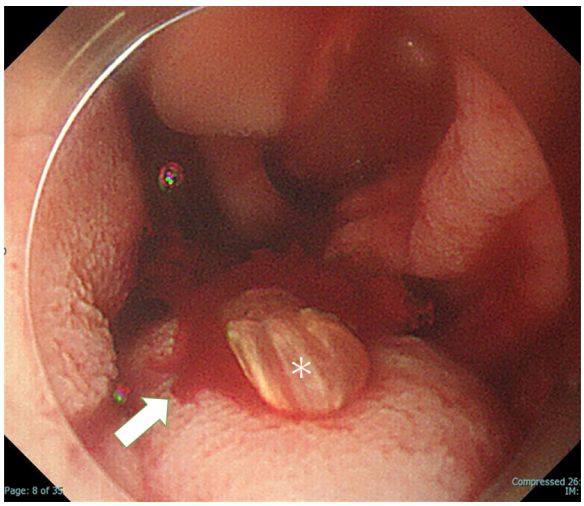

Fig. 3 – Endoscopic image showing an N-butyl-2-cyanoacrylate cast (asterisk) injected through the microcatheter trapped at the bleeding point and was visible oozing around the cast.

ever, he had transient elevation of aspartate aminotransferase and alanine aminotransferase levels and required blood transfusions.

Discussion

Duodenal varices are ectopic varices that occur in sites other than the esophagogastric region. They are found in approximately 3.5% of patients with portal hypertension [2]. Endoscopic observation is performed in the event of duodenal variceal rupture, and hemostasis is achieved via ligation or cyanoacrylate injection if possible [3]. Other treatment options included TIPS with or without embolization, PTO, and BRTO [4] (Table 1).

TIPS reduces the portal venous pressure, thereby preventing hemostasis and/or rebleeding. It performed using bare metal stents, patients have shown rebleeding rates approximating 20% after 2 years and the use of the Viatorr has shown a further reduction in rates of recurrent hemorrhage following TIPS to <10% [5]. They discuss gastroesophageal variceal bleeding mainly. A few case reports report favorable outcomes of TIPS for duodenal varices [6,7]. However, in a coherent report that described ectopic varices, including duodenal varices [8], 25% of patients after TIPS had re-rupture. Furthermore, 33% of the rebleeding cases were observed despite a post-TIPS portacaval gradient lower than 12 mm Hg.

PTO can be performed for both prophylaxis and emergency treatment because it involves an afferent vein approach. However, it is sometimes difficult to perform in severe cases where the patient finds breath holding difficult, and in cases of massive ascites because there is a risk of bleeding due to puncture or accurate puncturing. It has high hemostatic effects, however is associated with a reported rebleeding rate of 65% [9].

Prophylactic BRTO for gastric varices has a high success rate and is associated with very good outcomes, with reported post-BRTO bleeding rates of 2.7%-3.2% [10,11]. In a randomized controlled trial of endoscopic injection sclerotherapy (EIS) versus BRTO for gastric varices, BRTO (3.7%) demonstrated a significantly lower rebleeding rate at 1 year postoperatively than EIS (23%) [12]. In a recent case series, prophylactic BRTO has shown favorable therapeutic efficacy for duodenal varices [1].

Table 1 – Emergency catheter therapy for ruptured varices.

	Advantage	Disadvantage	Rebleeding rate post treatment*
BRTO	The superficial vein such as femoral vein is easy to puncture	Risk of re-rupture Uncertainty that the catheter will reach the target vessel	2.7%-3.2%; Gastric varices
PTO	Can be used for both prophylactic and emergency treatment	Occasional difficulty in puncturing the portal vein due to ascites and/or the patient's condition	65%; Gastroesophageal varices
TIPS	Can be used to treat varices, ascites, and PHG because of the portal pressure reduction	The varices are not directly treated	< 10%-20%; Mainly in gastroesophageal varices 33%; Ectopic varices

BRTO, balloon-occluded retrograde transvenous obliteration; PTO, percutaneous transhepatic obliteration; TIPS, transjugular intrahepatic portosystemic shunt; PHG, portal hypertensive gastropathy.
* Prophylactic treatment is also included.

In contrast, emergency BRTO is controversial because BRTV is associated with a risk of re-rupture because of the increased pressure in the varices. BRTO may be an option if primary hemostasis has been achieved. In our patient, the catheter was inserted into the afferent veins without performing BRTV, to avoid increasing the pressure in the varices. Nonetheless, the varices re-ruptured during coil embolization of the afferent vein, possibly because of the high pressure applied to the tortuous varices owing to the stiff shaft of the detachable coil. Hence, hydraulic coils and/or NBCA should be used for embolization instead of detachable coils when insertion of a catheter into afferent vein via the ruptured varices is performed. Though NBCA is useful for rapidly stopping active bleeding, care should be taken to avoid adherence to a retrogradely inserted catheter.

Conclusion

Afferent vein embolization via retrograde approach regarding ruptured varices needs to be carefully performed. It may be a useful treatment strategy for bleeding duodenal varices when approach from afferent approach is difficult.

Patient consent

Informed consent was obtained from individual participants included in this study.

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