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Variceal bleeding in the small intestine successfully treated with balloon-occluded retrograde transvenous obliteration using N-butyl-2-cyanoacrylate: A case report

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ABSTRACT

Rupture of small intestinal varices associated with portal hypertension can be a serious condition that is difficult to diagnose early and to manage. Moreover, optimal guidelines for the treatment of small intestinal varices have not yet been established. We herein report a case of a 73-year-old man with small intestinal varices. The man presented with bleeding from a stoma in the small intestine, which subsequently led to hemorrhagic shock. We successfully treated the patient with balloon-occluded retrograde transvenous obliteration via the right inferior epigastric vein using N-butyl-2-cyanoacrylate.

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Introduction

Ectopic varices, caused by portal hypertension, are defined as portosystemic collaterals located outside the gastroesophageal region [1]. Ectopic varices can cause gastrointestinal bleeding and can be life threatening. However, ectopic varices are difficult to diagnose, manage, and treat because there are no optimal guidelines for the treatment of small intestinal varices currently.

Balloon-occluded retrograde transvenous obliteration (B-RTO) is an angiographic technique that has been accepted as a treatment option for small intestinal varices [2]. B-RTO using N-butyl-2-cyanoacrylate (NBCA; Histoacryl; B. Braun, Melsungen, Germany), a liquid embolic material that works rapidly and permanently [3], has been reported to be useful for the treatment of bleeding duodenal varices [4].

We herein report a case regarding the successful treatment of ruptured small intestinal varices successfully treated by B-RTO via the right inferior epigastric vein using NBCA.

Competing Interests: All authors declare that they have no conflicts of interest.

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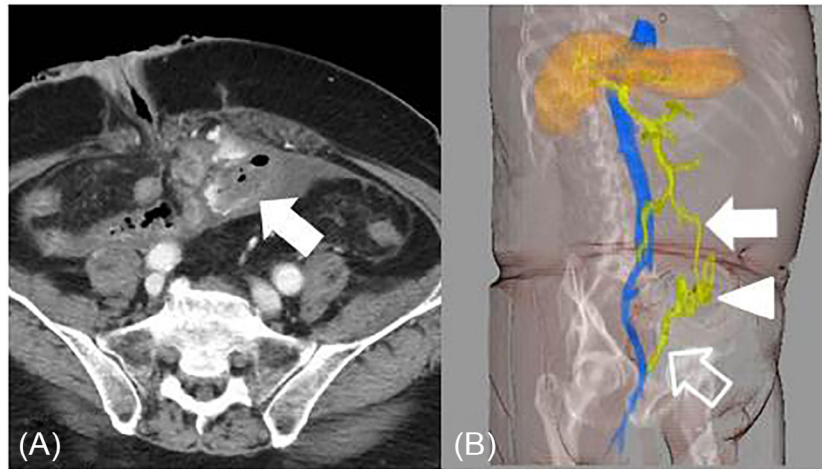


Fig. 1 – (A) Contrast-enhanced computed tomography scan reveals small intestinal varices and extravasation (arrow). (B) Three-dimensional computed tomography scan waving toward the right anterior oblique position reveals small intestinal varices (arrowhead), as well as the branch vessel of the superior mesenteric vein (arrow) and the right inferior epigastric vein (open arrow).

Case report

Case

A 73-year-old man presented to our hospital with bleeding from an ileostomy. The man had suffered from liver cirrhosis caused by nonalcoholic steatohepatitis and had undergone hemicolectomy and ileostomy because of ascending colon cancer 18 months previously. The patient's initial laboratory data were as follows: red blood cell count, $2.60 \times 10^6/L$; hemoglobin, 8.8 mg/dL (anemia); platelet count, $107 \times 10^3 \mu L$; total bilirubin, 0.8 mg/dL; albumin, 3.0 g/dL; fibrinogen, 199 mg/dL; and international normalized ratio of prothrombin time, 1.45. Six months previously, an upper gastrointestinal endoscopy was performed, and only scarring from esophageal varices was detected.

Emergency endoscopy from the ileostomy could not reveal the bleeding point. Moreover, a gradual drop in blood pressure was observed (systolic blood pressure, 60 mm Hg). To determine the source of bleeding, urgent contrast-enhanced computed tomography (CT) was performed. The CT showed small intestinal varices with extravasation and a small amount of ascites (Fig. 1).

Therefore, emergency angiography was performed. The right common femoral vein was punctured under local anesthesia, and a 6-Fr sheath introducer was inserted. Subsequently, a 4-Fr cobra-shaped catheter was inserted into the right inferior epigastric vein. Using coaxial technique, a 2.7-Fr microballoon catheter (Attendant Δ ; Terumo Clinical Supply, Gifu, Japan) was advanced into the proximal portion of the small intestinal varices. Balloon-occluded retrograde transvenous venography via the right inferior epigastric vein revealed small intestinal varices without extravasation (Fig. 2).

Complete variceal embolization was achieved using a 0.5 mL NBCA : lipiodol mixture (1:1) (Fig. 3). The duration from the injection of the NBCA : lipiodol mixture until balloon deflation was approximately 20 seconds. After embolization, the patient

had no additional bleeding and was discharged 20 days after B-RTO.

Discussion

Varices of the esophagus and the stomach are common portosystemic collaterals in patients with portal hypertension; however, ectopic varices are uncommon. Approximately 17% of ectopic varices are found in the jejunum and the ileum, 17% are found in the duodenum, 14% in the colon, 8% in the

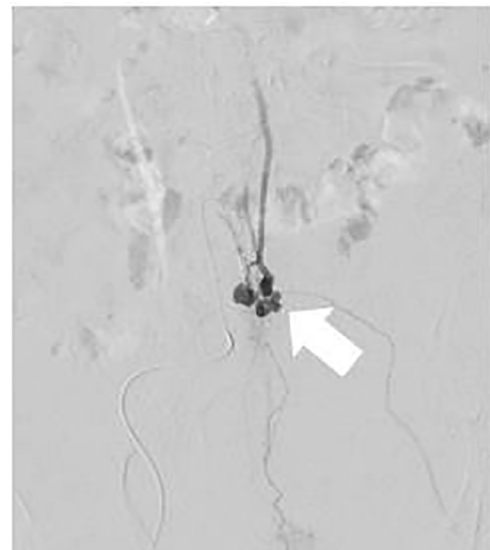


Fig. 2 – The right inferior epigastric vein was the main draining vein. Balloon-occluded retrograde transvenous venography via the right inferior epigastric vein shows small intestinal varices (arrow) with no extravasation.



Fig. 3 – Variceal embolization (arrow) using a 0.5 mL of N-butyl-2-cyanoacrylate : lipiodol mixture (1:1) results in complete embolization.

rectum, and 9% in the peritoneum, and the rupture of ectopic varices accounts for 1%-5% of all ruptured varices [1].

In patients with portal hypertension, previous abdominal surgery is one of the risk factors for small intestinal varices. The development of collateral circulation with postoperative adhesions between the abdominal wall and the small intestine results in portocaval anastomoses and the formation of ectopic varices beneath the intestinal mucosa [5].

Early diagnosis of rupture of small intestinal varices is very important but difficult. Contrast-enhanced CT is an effective method of diagnosing ectopic varices and evaluating the afferent and efferent vessels as well as other signs of cirrhosis, such as ascites [6].

Medical, surgical, and transcatheter interventions may be performed in patients with small intestinal varices. However, no established guidelines for the optimal treatment of small intestinal varices have been established. Compared with surgery, interventional radiology can be a less invasive option for rupture of small intestinal varices.

Transjugular intrahepatic portosystemic shunt placement is another option for the treatment of ectopic varices [7]. The efficacy of this procedure must be balanced with encephalopathy and liver function. Sato [8] reported successful percutaneous transhepatic obliteration (PTO) treatment in patients with small intestinal and vesical varices. However, PTO is relatively invasive and carries a risk of intraperitoneal hemorrhage and is difficult to perform in patients with large amounts of ascites or coagulopathy. Transileocolic vein obliteration [9] is an embolization technique performed via the afferent vein. Nevertheless, it is more invasive, given the necessity of performing laparotomy under general anesthesia or epidural anesthesia.

B-RTO is an embolization technique performed via the efferent vein and has been proven to be effective. Sato et al. [2] reported that B-RTO was an effective treatment for ileal varices. B-RTO can obliterate ectopic varices, as well as both afferent

and efferent veins. Given that small intestinal varices connecting to the right inferior epigastric vein, the main efferent vein could be identified through contrast-enhanced CT, we selected B-RTO for the treatment.

If B-RTO had not been suitably performed, we would have been obliged to select the alternative treatments. PTO would have been selected for such a patient because he had a small amount of ascites and mild coagulopathy. Retrograde transvenous obliteration by inserting a needle in an abdominal wall vein after surgical incision would be one of the choices [10]. If the treatment response to PTO or retrograde transvenous obliteration remained poor, TIPS and surgery would have been selected.

A number of liquid or foamy sclerosing agents have been used for B-RTO, including ethanolamine oleate, sodium tetradecol sulfate (Sotradecol; AngioDynamics, Queensbury, NY), polidocanol (Polidocasklerol; Zeria Pharmaceutical, Tokyo, Japan), and NBCA [11]. However, to obliterate the varices with 5% ethanolamine oleate, the agent must remain within the varices for 4-24 hours [11]. NBCA is an adhesive liquid embolic material that immediately polymerizes and permanently occludes the varices upon exposure to anions in blood [3]. Furthermore, NBCA is not dependent on coagulation. A potential disadvantage for NBCA, however, is the adhesion between the microcatheter and the blood vessel wall. To prevent such an occurrence, the microcatheter needs to be removed at the appropriate time after NBCA administration.

Despite retrograde blood flow and the use of a high-concentration NBCA : lipiodol mixture, no adhesion between the microballoon catheter or the microcatheter and the vessel wall was observed. We believe that the NBCA injection pressure corresponded with the blood pressure of the efferent vein during the balloon occlusion, and the timing of balloon deflation was accurate.

In conclusion, small intestinal varices can develop in patients with portal hypertension who have a history of abdominal surgery. Moreover, B-RTO using NBCA can be an effective treatment option for patients who develop hemorrhagic shock due to ruptured varices.

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