—Case Reports—

Successful Management of Duodenal Varices by Balloon-occluded Retrograde Transvenous Obliteration

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Abstract

We describe a case of duodenal varices successfully treated with balloon-occluded retrograde transvenous obliteration (BRTO) alone. A 63-year-old man presented with tarry stools. Computed tomography demonstrated dilated varices around the duodenum. Emergency endoscopic examination revealed varices of the second portion of the duodenum without active bleeding. There was no evidence of bleeding in the esophagus or stomach. Colonoscopy revealed no bleeding sites in the colon. On the day after admission, a superior mesenteric arteriogram obtained in the venous phase demonstrated a collateral vein from the inferior pancreaticoduodenal vein to the inferior vena cava. Retrograde venography performed via the right femoral vein confirmed that the right inferior adrenal vein was the draining vein and that the collateral vein was occluded. There were no tarry stools after BRTO. The patient was discharged 7 days after BRTO. Two months after discharge, computed tomography showed no dilated varices around the duodenum. Three months after discharge, endoscopy confirmed the absence of varices. No bleeding has been detected as of 10 months after discharge. We conclude that BRTO is an effective treatment for duodenal varices.
(J Nippon Med Sch 2008; 75: 36–40)

Key words: balloon-occluded retrograde transvenous obliteration, duodenal varices, portal hypertension

Introduction

Duodenal varices are a rare complication of portal hypertension[1]. Although bleeding is often severe and fatal[2], a definitive treatment for bleeding duodenal varices has not been established. Balloon-occluded retrograde transvenous obliteration (BRTO) is a new treatment recently used to prevent fatal bleeding from gastric fundic varices[3]. We describe the successful treatment of duodenal varices with BRTO alone.

Case Report

A 63-year-old man presented with tarry stools. He had a history of hepatitis C virus-positive liver cirrhosis for 4 years. Four months before admission,

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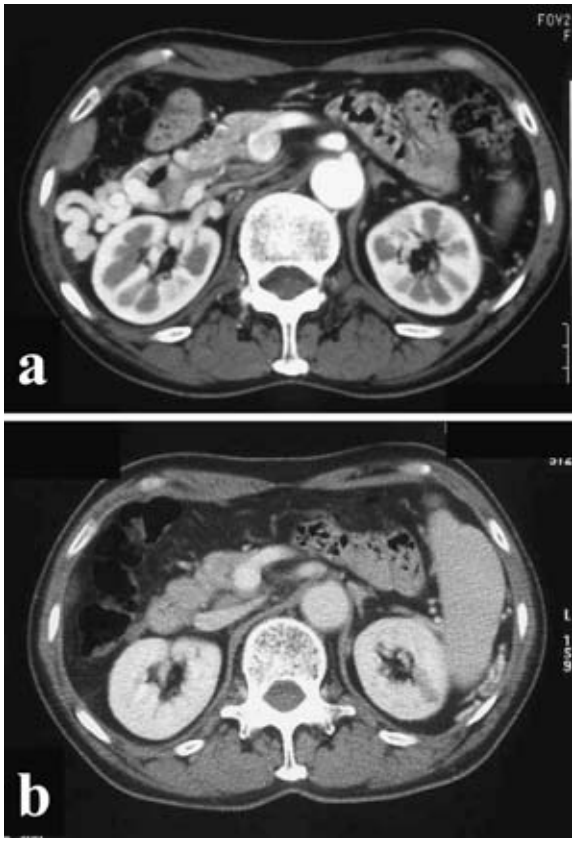

Fig. 1 A computed tomographic scan obtained before treatment, showing varices around the second portion of the duodenum, with part of the varices protruding into the lumen of the duodenum (a). Three months after BRTO, the dilated varices had disappeared (b).

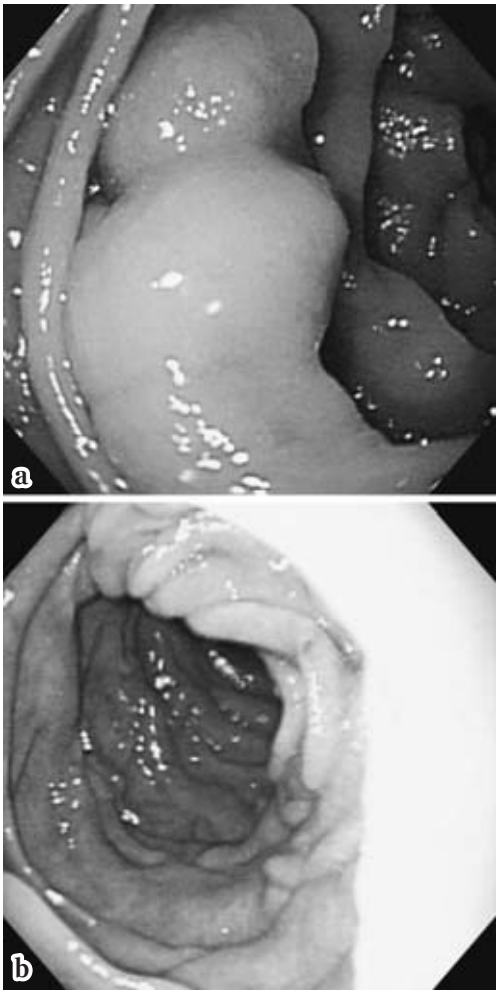

Fig. 2 Endoscopic findings before treatment, showing varices of the second portion of the duodenum without active bleeding (a). Seven days after BRTO, endoscopy demonstrated that the varices had regressed (b).

endoscopic examinations of the esophagus, stomach, and duodenal bulb revealed no varices. However, hepatocellular carcinoma was diagnosed, and transarterial embolization was performed.

Laboratory studies on admission revealed the following: serum aspartate aminotransferase, 44 IU/L (normal, < 28 IU / L); serum alanine aminotransferase, 38 IU/L (normal, <33 IU/L); serum lactic dehydrogenase, 253 IU/L (normal, 180 to 460 IU/L); serum gamma glutamic transpeptidase, 22 IU/L (normal, 8 to 39 IU/L); serum C-reactive protein, 0.1 mg/dL (normal, <0.3 mg/dL); white blood cell count, 5,000/μL (normal, 4,000 to 8,000/μL); red blood cell count, 232 × 10^4/μL (normal, 410 to 550 × 10^4/μL); and serum hemoglobin concentration, 5.4 g/dL (normal, 14 to 18 g/dL). Examination of the serum was positive for anti-hepatitis C virus antibody but was negative for hepatitis B surface antigens. Packed red blood cells (800 mL) were transfused.

Computed tomography demonstrated dilated varices around the duodenum **(Fig. 1a)**. Emergency endoscopic examination revealed varices of the second portion of the duodenum without active bleeding **(Fig. 2a)**. There was also no evidence of bleeding in the esophagus or stomach. Colonoscopy revealed no bleeding sites in the colon.

One day after admission, the venous phase of superior mesenteric arteriography demonstrated a collateral vein from the inferior pancreaticoduodenal vein to the inferior vena cava **(Fig. 3a)**. Retrograde venography performed via the right femoral vein confirmed that the right inferior adrenal vein,

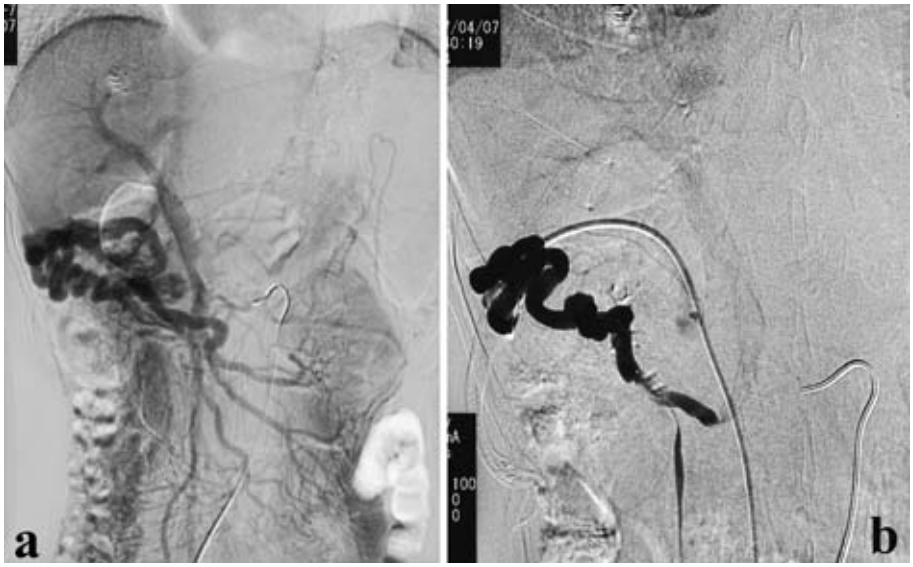

Fig. 3 A superior mesenteric arteriogram obtained during the venous phase, showing a collateral vein from the inferior pancreaticoduodenal vein to the inferior vena cava (a). Retrograde venography performed via the right femoral vein confirmed that the right inferior adrenal vein, connected to the right renal vein, was the draining vein. An occlusive balloon catheter was inserted into the right inferior adrenal vein via the right renal vein and inflated (b).

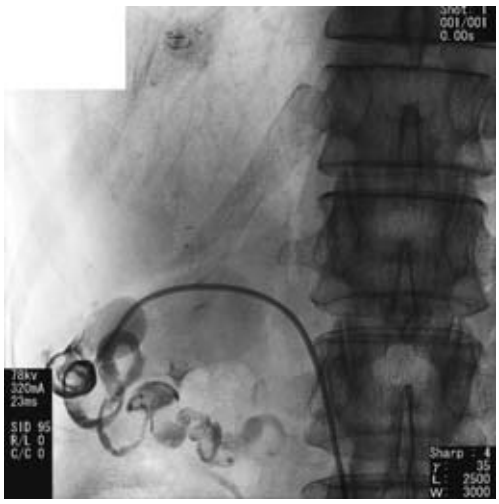

Fig. 4 BRTO was performed with 5 mL of 5% ethanolamine oleate.

connected to the right renal vein, was the draining vein. An occlusive balloon catheter was inserted into the right inferior adrenal vein via the right renal vein and inflated. The collateral vein was filled with 6 mL of contrast medium **(Fig. 3b)**. Before BRTO, the patient received 4,000 units of haptoglobin intravenously. Subsequently, 5 mL of ethanolamine oleate with iopamidol (EOI) was injected through the catheter to occlude the collateral vein **(Fig. 4)**. There were no tarry stools after BRTO. The patient was discharged 7 days after BRTO. Two months after discharge, computed tomography showed no dilated varices around the duodenum **(Fig. 1b)**. Three months after discharge, endoscopy confirmed the absence of varices **(Fig. 2b)**. No bleeding has been detected as of 10 months after discharge.

Discussion

Duodenal varices are believed to be caused mainly by portal hypertension due to cirrhosis, idiopathic portal hypertension, or extrahepatic portal hypertension[4]. Duodenal varices are rare, occurring in only 0.4% of patients with portal hypertension[5,6]. Most cases are detected during routine upper gastrointestinal endoscopy. The duodenal bulb is the most common site, followed by the second portion of the duodenum[7]. Bleeding from duodenal varices is rare, and there are no guidelines for, or comparative studies of, the ideal approach or treatment options. Massive bleeding is usually the presenting manifestation. Blood flow in duodenal varices is so rapid that bleeding often becomes profuse. Rupture of these vessels and failure to identify them as the

source of massive enteral bleeding has led to catastrophic outcomes, with a mortality rate as high as 40%[2,8].

Surgical procedures are associated with high mortality in patients with cirrhosis. In emergency cases, endoscopic treatment, such as injection sclerotherapy or variceal ligation, is performed to achieve hemostasis[9–11]. However, long-term hemostasis is difficult to maintain after endoscopic treatment alone[7]. Endoscopic variceal ligation has the limitation that duodenal varices larger than 15 mm in size cannot be treated[12]. Endoscopic treatment is also associated with the risks of tissue damage, perforation, and progression of bleeding. As in the present case, bleeding from duodenal varices may resolve spontaneously, without endoscopic treatment.

There is increasing interest in the use of interventional radiology, including BRTO and transjugular intrahepatic portosystemic shunting (TIPS), to treat duodenal varices[13]. Several reports have described the use of TIPS with embolization for the treatment of bleeding duodenal varices refractory to sclerotherapy[14,15]. Although TIPS can be performed in patients with severe liver dysfunction, it has certain limitations in the presence of severe liver atrophy and carries the increased risk of complications such as hepatic encephalopathy and cerebral embolization[16,17]. BRTO was originally developed by Kanagawa et al.[3] as a treatment for fundic varices. This method has since gained wide acceptance and is now one of the most frequently used procedures for treating fundic varices in Japan because of its high success rate and safety[18]. The main advantage of BRTO is obliteration of both varices and afferent and efferent veins by retrograde injection of 5% EOI with the use of a balloon catheter, which often leads to complete variceal eradication. Compared with TIPS, BRTO is simpler to perform and associated with fewer complications. The major complication of BRTO is renal failure caused by the EOI, which can be avoided by prophylactic administration of haptoglobin. It is important to prevent EOI leakage from the target area. Thus, BRTO seems to be a safer method that can even be used for patients with severe liver dysfunction[13]. There are several English-language reports describing the treatment of duodenal varices with BRTO[13,16,19–25]. Variceal bleeding was controlled initially by endoscopic techniques. Such techniques should be used initially to achieve hemostasis, followed by more radical treatment of duodenal varices by interventional radiology. Zamora et al.[20] have described the use of BRTO, percutaneous transhepatic obliteration, or both in 5 patients with cirrhosis and bleeding duodenal varices that could not be managed with endoscopic treatment. Complete variceal thrombosis was achieved, and no bleeding occurred during follow-up. In conclusion, our experience and that of others suggests that BRTO is an effective and safe procedure for the elective treatment of duodenal varices.

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(Received, September 26, 2007)
(Accepted, November 6, 2007)