Isolated Gastric Varices and Use of Balloon-occlusive Retrograde Transvenous Obliteration: A Case Report and Literature Review*

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INTRODUCTION

Isolated gastric varices are far less prevalent in Western countries where the rate of splenic thrombosis is much lower. However, in Asian countries the entity is more common and therefore a more robust treatment approach has been developed. Balloon-occlusive retrograde transvenous obliteration (BRTO) was first described in 1984 and then revived in 1996. The procedure, while uncommon in the U.S. and not recognized by the AASLD practice guidelines, allows for direct exclusion from the portosystemic system. Here we describe the case of a patient with alcoholic cirrhosis decompensated by bleeding gastric varices treated with BRTO.

ABSTRACT

Isolated gastric varices are far less prevalent in Western countries where the rate of splenic thrombosis is much lower. However, in Asian countries the entity is more common and therefore a more robust treatment approach has been developed. Balloon-occlusive retrograde transvenous obliteration (BRTO) was first described in 1984 and then revived in 1996. The procedure, while uncommon in the U.S. and not recognized by the AASLD practice guidelines, allows for direct exclusion from the portosystemic system. Here we describe the case of a patient with alcoholic cirrhosis decompensated by bleeding gastric varices treated with BRTO.

Key words: cirrhosis – gastric varices – BRTO – TIPS – balloon – variceal bleeding.

Abbreviations: BRTO: balloon-occlusive retrograde transverse obliteration; EGD: esophagogastroduodenoscopy; HE: hepatic encephalopathy; MELD: Model for End Stage Liver Disease; TIPS: transjugular intrahepatic portosystemic shunt.

CASE PRESENTATION

A 51-year-old man with alcoholic cirrhosis decompensated by hepatic encephalopathy (HE) presented with a two-week history of hematemesis and melena. Initial labs were notable for hemoglobin of 3.1 g/dL. Esophagogastroduodenoscopy (EGD) showed non-bleeding, isolated, large gastric fundic varices (Fig. 1) without esophageal varices. Endoscopic intervention was not performed during the EGD given the absence of active bleeding. Further evaluation with abdominal computed tomography demonstrated a patent splenic vein and extensive, large gastric varices (Fig. 2).

Interventional radiology was consulted for a TIPS procedure; however, given the history of HE, a decision was made to perform BRTO. The procedure involved occlusion of the outflow veins of the portosystemic shunt using an occlusion balloon with subsequent injection of a sclerosing agent directly into the varix endovascularly. Fluoroscopy with contrast dye was injected to illustrate the varices prior to embolization with 25 mL of sodium tetradecyl sulfate in foam solution and 24-hour balloon placement to prevent loss of the sclerosant.
The patient tolerated the procedure well and follow-up venography demonstrated complete obliteration of the gastric varices (Fig. 3). He was discharged two days later with no further episodes of bleeding; however, repeat endoscopy one-month post-procedure showed the emergence of three columns of grade I esophageal varices.

**DISCUSSION**

This case highlights the BRTO procedure - an often underutilized treatment for isolated gastric varices in the United States (U.S.). The BRTO procedure was first described by Olsen and colleagues in 1984. However, it was not until 1996 that Kanagawa et al. revived the procedure and coined the term BRTO [9, 10]. Balloon-occlusive retrograde transverse obliteration accesses the portosystemic gastrorenal shunt via the left renal vein through a transjugular or femoral approach. It involves occlusion of outflow veins of the portosystemic shunt using an occlusion balloon followed by the injection of a sclerosing agent directly into the varix endovascularly.

Asian countries such as Japan and Korea, where the incidence of isolated gastric varices is much higher, employ the BRTO procedure as a preferred second-line therapy only to endoscopic management [7, 8, 10]. Despite the procedure’s widespread use in Asia, BRTO is infrequently chosen as a procedure of choice in the U.S. [6]. In fact, the procedure is not recognized as a potential therapeutic option by the American Association for the Study of Liver Diseases (AASLD) practice guidelines [11].

The controversy between TIPS and BRTO comes from the fact that large gastric varices may exist despite lower portal pressures and tend to bleed at lower pressures compared with esophageal varices, reducing the effectiveness of TIPS [2, 7, 8]. The main advantage of BRTO is the preservation of the hepatic flow with a significantly reduced risk of HE – a major limitation and concern with TIPS [12]. Other potential scenarios that may favor the use of BRTO over TIPS include patients with coagulopathy and high Model for End-stage Liver Disease (MELD) score [2, 6].

The transient increase in portal pressures due to the reduction in vascular space from sclerosis is one potential complication of BRTO [13, 14]. This is known to cause aggravation of esophageal varices and may also increase the risk of developing ascites [13]. Unfortunately, the patient in this case developed worsening or new esophageal varices as demonstrated on the follow-up endoscopy one-month post-procedure. Given the relative reduction in portal vascular space and transient increase in portal pressures, follow-up endoscopy is recommended at minimum 2-4 weeks post-procedure [13].

Despite extensive literature comparing TIPS and BRTO, one study in particular found BRTO to have significant advantages over TIPS in isolated gastric varices: BRTO compared to TIPS resulted in lower one-year re-bleeding rate (2% vs 20% respectively, p<0.01) and improved 1, 3, and 5 year survival in Child Class A patients (96%, 83%, 76% vs 81%, 64%, 49% respectively, p=0.01) [15].

**CONCLUSION**

Balloon-occlusive retrograde transverse obliteration should be considered and recognized as a potential treatment modality for patients with isolated gastric varices. It is particularly
beneficial in non-TIPS candidates, such as those with a history of hepatic encephalopathy. While there is a high frequency of use in Asia, a lack of experience with the procedure in the U.S. may require a large cohort to fully evaluate BRTO's clinical effectiveness.

**Conflicts of interest:** None to declare.

**Author’s contribution:** T.M.C.: drafting and writing the manuscript, and revising it critically. M.B.: drafting the manuscript and revising it critically. T. R.: performing the procedure, drafting, writing and critically revising the manuscript.

**REFERENCES**


**Fig. 3.** Angiography showing a gastrorenal shunt (A). Balloon placement and embolization with 25 mL sodium tetradecyl sulfate in foam solution was performed (B). Complete obliteration of the gastric varices was achieved (C).