ACG CASE REPORTS JOURNAL

CASE REPORT | ENDOSCOPY

Endoscopic Ultrasound-Guided Coil Injection Therapy for Gastric Variceal Bleeding Not Amenable to Interventional Radiology-Guided Therapies

Ahmad Najdat Bazarbashi, MD[1], and Marvin Ryou, MD[1]

[1]*Division of Gastroenterology, Hepatology and Endoscopy, Brigham and Women's Hospital, Harvard Medical School, Boston, MA*

ABSTRACT

Gastric varices account for 10%–30% of all variceal bleeds and are associated with significant morbidity and mortality. Interventional radiology–guided therapies such as balloon-occluded retrograde transvenous obliteration and coil-assisted retrograde transvenous obliteration can provide hemostasis when traditional endoscopic treatments such as cyanoacrylate injection fail. However, their applicability in certain cases can be limited because of anatomical constraints. We describe the use of endoscopic ultrasound–guided coil and absorbable gelatin sponge injection for the treatment of bleeding gastric varices arising from pancreatitis-induced splenic vein thrombosis not amenable to interventional radiology–guided therapies.

INTRODUCTION

Gastroesophageal varices are present in 50% of patients with cirrhosis, with higher rates present in individuals with more advanced liver disease.[1] Despite occurring less frequently than esophageal varices, gastric varices (GV) account for 10%–30% of variceal bleeding and are associated with significant morbidity and mortality with a higher risk of rebleeding.[2] The most common cause of GV is portal hypertension, with splenic vein thrombosis (SVT)-induced GV occurring at a less frequent rate.[3] GV occurring from portal hypertension arise from splenorenal or gastrorenal shunts commonly resulting in fundal GV (Figure 1), whereas those occurring in the setting of splenic vein thrombosis arise from short gastric veins (Figure 2).[4] GV arising from SVT are usually multiple and more difficult to manage endoscopically.[4]

Treatment of GV ranges from endoscopic interventions to interventional radiology (IR)-guided procedures. Current endoscopic treatment options are premised on cyanoacrylate injection, which is technically challenging and is associated with the risk of rebleeding and other complications such as systemic embolization (eg, pulmonary embolism).[5] For GV that have failed or are not amenable to primary endoscopic therapy, IR-guided interventions have emerged as promising therapies. These include transjugular intrahepatic portosystemic shunt (TIPS), balloon-occluded retrograde transvenous obliteration (BRTO), and more recently coil-assisted retrograde transvenous obliteration (CARTO) (Figure 3).[6,7] However, the applicability of these procedures can be limited, particularly in cases when portosystemic shunts such as a gastrorenal or splenorenal shunt are absent or poorly delineated, precluding percutaneous access to the portal venous system. Endoscopic intervention remains an important consideration for patients with bleeding GV, especially with the advent of endoscopic ultrasound (EUS)-guided therapies (Figure 4).

ACG Case Rep J 2019;6:1–4. doi:10.14309/crj.0000000000000013. Published online: February 12, 2019

Correspondence: Marvin Ryou, MD, 45 Francis St, ASB-II, Brigham & Women's Hospital, Boston, MA 02115 (mryou@bwh.harvard.edu).

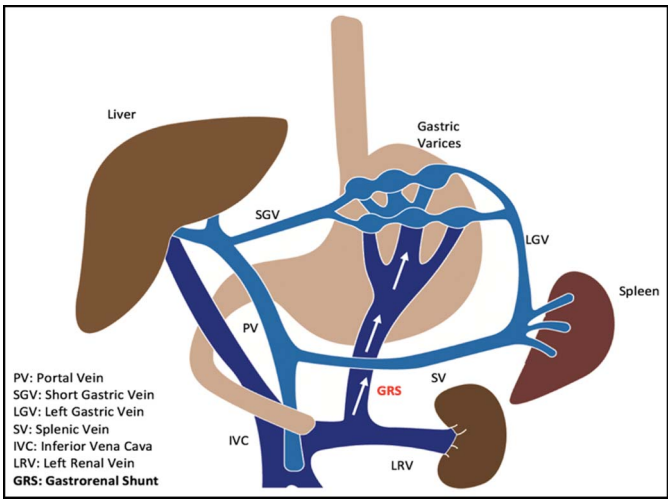

Figure 1. Portal hypertension–related gastric varices arising from the gastrorenal shunt (dark blue denotes the caval venous system, and light blue denotes the portal venous system).

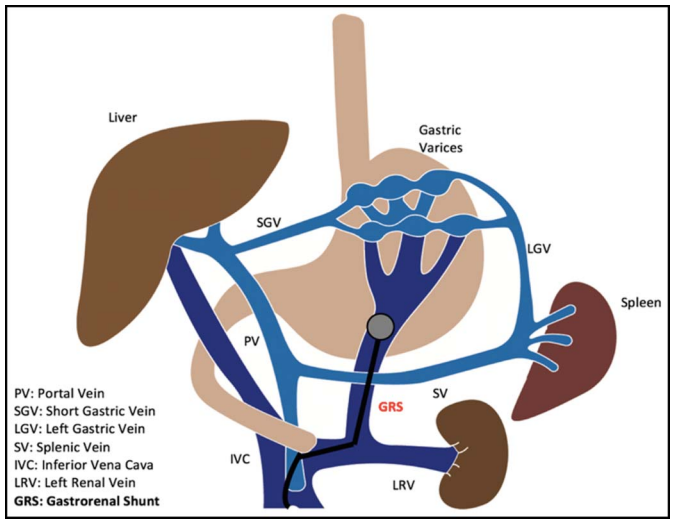

Figure 3. Balloon retrograde transvenous obliteration of gastric varices through the gastrorenal shunt (dark blue denotes the caval venous system, and light blue denotes the portal venous system).

CASE REPORT

A 58-year-old man with a history of alcohol-induced pancreatitis complicated by SVT and walled-off pancreatic necrosis (WOPN) was initially treated with percutaneous drainage. He then presented to our hospital with fevers and tachycardia in the setting of purulent drain output. Abdominal and pelvic computed tomography (CT) revealed persistent large WOPN. He was started on broad-spectrum antibiotics. During day 14 of his hospitalization, he developed new-onset hematemesis. Laboratory workup revealed a hemoglobin decrease from baseline of 10 g/dL to nadir 6.8 g/dL and a blood urea nitrogen (BUN) increase from 6 mg/dL to 23 g/dL. Abdominal and pelvic CT angiogram revealed ongoing pancreatic fluid collection with patent external drain and multiple prominent GV arising from chronic SVT. The liver parenchyma appeared normal without evidence of cirrhosis. He was given two units of packed red blood cells and started on intravenous proton pump inhibitor.

Esophagogastroduodenoscopy revealed a normal esophagus and type 1 isolated GV in the gastric fundus without active bleeding (Figure 5). EUS confirmed multiple small anechoic structures in the gastric fundus consistent with GV, the largest measuring 5 mm in cross-sectional diameter (Figure 6). These were thought to be his bleeding source. IR was consulted for management options. However, because of the absence of a gastrorenal shunt, BRTO or CARTO could not be offered. Because of the absence of portal hypertension, TIPS was not offered. Alternative options

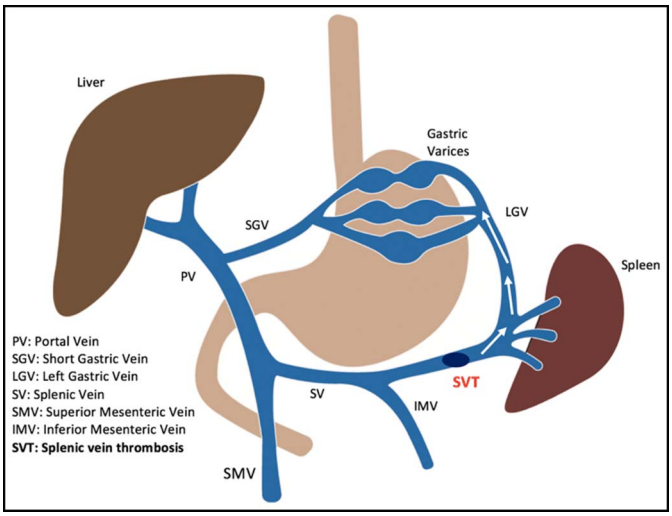

Figure 2. Splenic vein thrombosis causing development of gastric varices arising from the left gastric vein.

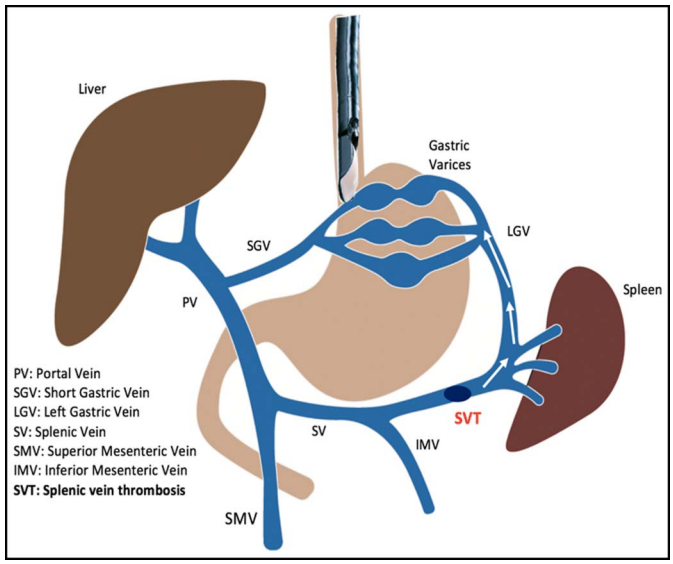

Figure 4. Endoscopic ultrasound–guided treatment of splenic vein thrombosis–induced gastric varices.

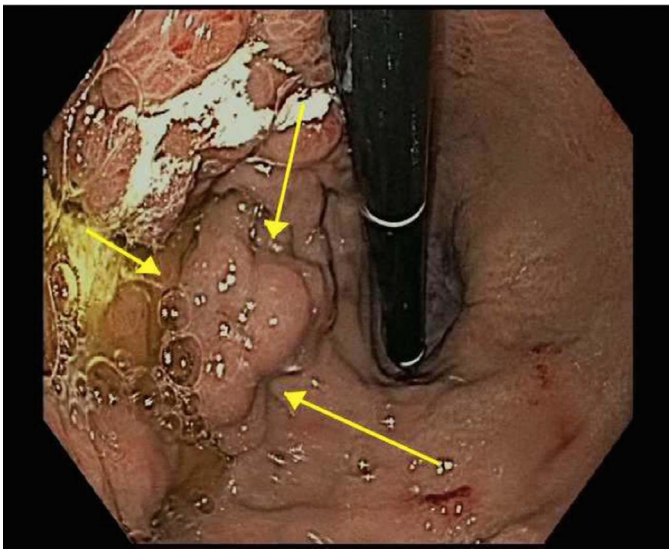

Figure 5. Retroflexed view of gastric fundus with evidence of type 1 isolated gastric varices (arrows).

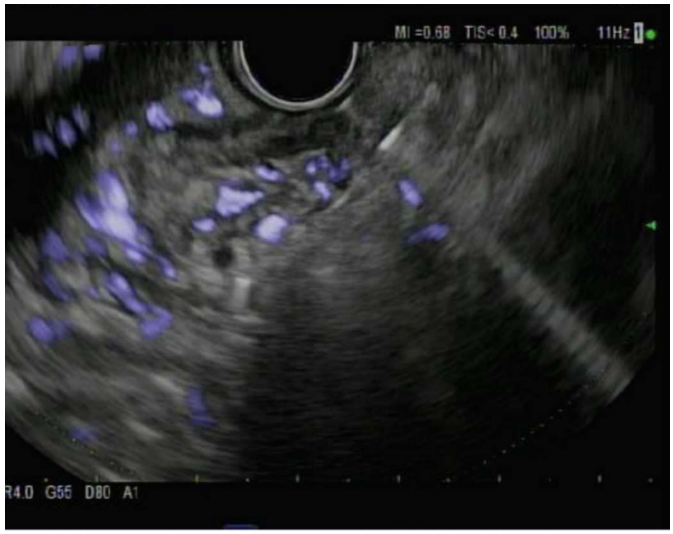

Figure 7. Endoscopic ultrasound–guided coil injection into gastric varices.

included restoring outflow through splenic vein recanalization, staged splenic artery embolization, or splenectomy, all of which would have been difficult because of the altered anatomy from pancreatic fluid collections. It was thus decided to pursue EUS-guided therapy.

Under endosonographic and fluoroscopic guidance, a total of three embolization coils (0.018 inch × 10 mm × 14 cm) were injected into the largest gastric varix through a 22-G FNA needle (Figure 7). Doppler confirmed an immediate, significant reduction in blood flow. Next, 2 ml of contrast was injected to demonstrate the absence of run-off, a prerequisite for subsequent injection of absorbable gelatin sponge SurgiFlo (5 ml) to ensure avoidance of embolic complications. There was near-complete obliteration of Doppler flow. Coil and absorbable gelatin sponge injection were confirmed with fluoroscopy (Figure 8). Diagnostic endoscopy at the end of the procedure revealed no bleeding. The patient's hemoglobin remained stable thereafter without evidence of further rebleeding. He had no postprocedural complications. Two days later, he underwent successful EUS-guided cystgastrostomy using a lumen-apposing metal stent subsequent pancreatic necrosectomy. The external WOPN drain was removed a few days later. A follow-up esophagogastroduodenoscopy/EUS performed six weeks later revealed GV decompression (Figure 9).

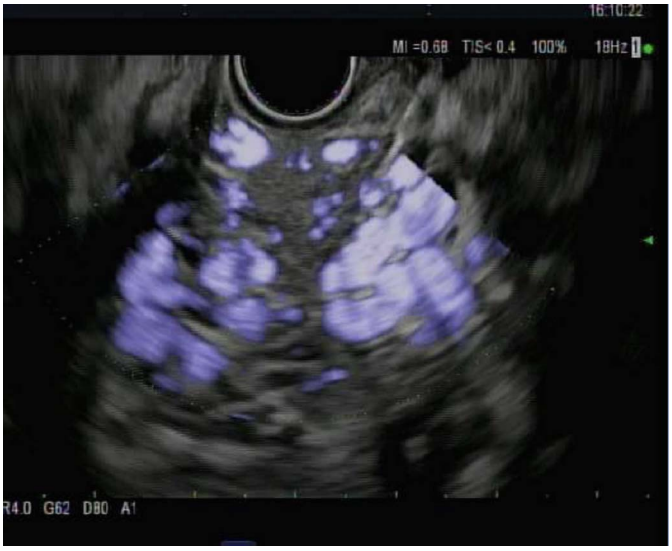

Figure 6. Endoscopic ultrasound with Doppler flow revealing multiple nests of gastric varices.

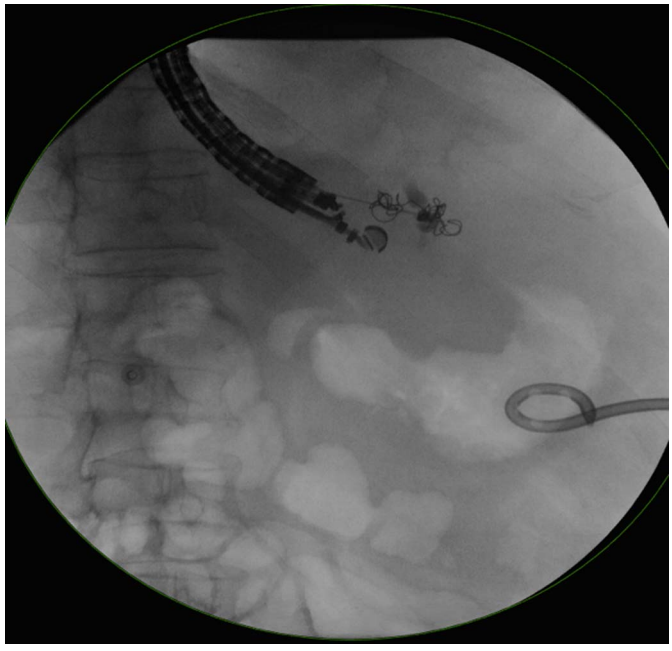

Figure 8. Fluoroscopic image after endoscopic ultrasound–guided coil and absorbable gelatin sponge Surgiflo (mixed with contrast) injection revealing coils and Surgiflo within the variceal nests.

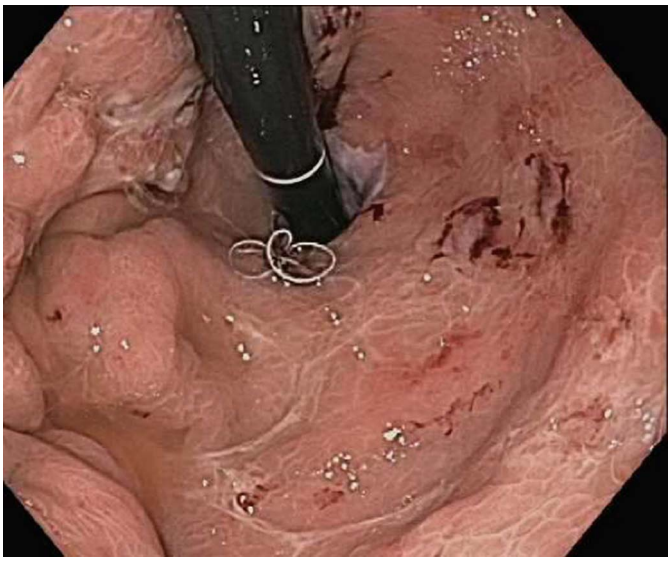

Figure 9. Post–endoscopic ultrasound coil injection with retroflexed view revealing gastric varices decompression and benign coil tip extrusion without bleeding.

DISCUSSION

We report a novel EUS-guided therapeutic intervention combining coil and absorbable gelatin sponge injection in a patient with GV occurring from pancreatitis-induced splenic vein thrombosis. This modality provided successful therapy when alternative IR means for GV management were limited. In this case, BRTO and CARTO could not be offered because of the absence of spontaneous portosystemic shunt such as gastrorenal shunt, whereas the absence of portal hypertension precluded TIPS evaluation. Alternative IR-guided therapies such as splenic vein recanalization and splenic artery embolization were deemed high risk and difficult to achieve, given altered anatomy from underlying WOPN. Finally, splenectomy was deemed too high risk by our surgical colleagues. We report successful EUS-based treatment of the patient's GV, as evident by lack of further bleeding or need for reintervention with evidence of GV obliteration on surveillance EUS. The patient did not have any postprocedural complications.

Combining coils with absorbable gelatin sponge has been recently described through IR intervention, best known as CARTO.[7] Our report highlights the ability to use this combination therapy through EUS guidance.[8] Advantages of this treatment option include EUS-guided direct therapy to the culprit lesion, availability of Doppler to provide real-time assessment of hemostasis, fluoroscopic assistance to minimize embolic complications, and the use of absorbable gelatin sponge, which is widely available with well-known intravascular hemostatic properties and low risk of complications (self-dissolves within 4–6 weeks). Cyanoacrylate was not used because of its known risk of embolization, varying hemostatic effect, significant rebleed rate, and potential for damage to endoscopes. Limitations include the need for interventional EUS expertise.

Future studies will need to investigate the full potential of this combination therapy to manage GV bleeding in patients with portal hypertension and non–portal hypertension-related GV bleeding.

DISCLOSURES

Author contributions: A.N. Bazarbashi and M. Ryou reviewed the literature and wrote and reviewed the manuscript. M. Ryou is the article guarantor.

Financial disclosure: None to report.

Informed consent was obtained for this case report.

Received October 18, 2018; Accepted December 7, 2018

REFERENCES

1. Garcia-Tsao G, Bosch J. Management of varices and variceal hemorrhage in cirrhosis. *N Engl J Med*. 2010;362:823–32.
2. Wani ZA, Bhat RA, Bhadoria AS, et al. Gastric Varices: Classification, endoscopic and ultrasonographic management. *J Res Med Sci*. 2015;20(12):1200–7.
3. Sarin SK, Lahoti D, Saxena SP, Murthy NS, Makwana UK. Prevalence, classification and natural history of gastric varices: A long-term follow-up study in 568 portal hypertension patients. *Hepatology*. 1992;16(6):1343–9.
4. Al-Osaimi A, Caldwell SH. Medical and endoscopic management of gastric varices. *Semin Intervent Radiol*. 2011;28(3):273–82.
5. Al-Hillawi L, Wong T, Tritto G, Berry PA. Pitfalls in histoacryl glue injection therapy for oesophageal, gastric and ectopic varices: A review. *World J Gastrointest Surg*. 2016;8(11):729–34.
6. Garcia-Pagan JC, Barrufet M, Cardenas A, et al. Management of gastric varices. *Clin Gastroenterol Hepatol*. 2014;12:919–28.
7. Lee EW, Saab S, Gomes AS, et al. Coil-assisted retrograde transvenous obliteration (CARTO) for the treatment of portal hypertensive variceal bleeding: Preliminary results. *Clin Transl Gastroenterol*. 2014;5:e61.
8. Ge P, Bazarbashi AN, Thompson C, Ryou R, et al. Successful EUS-guided treatment of gastric varices with coil embolization and injection of absorbable gelatin sponge. *VideoGIE*. https://doi.org/10.1016/j.vgie.2018.08.004. Accessed on January 29, 2019.