Endovascular Management of Gastric Varices

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KEYWORDS

• BRTO • TIPS • Gastric varices • Bleeding • Model for end-stage liver disease
• Hepatic encephalopathy

KEY POINTS

- The management of gastric varices is largely uncharted.
- Balloon-occluded retrograde transvenous obliteration (BRTO) for the management of gastric varices is safe and effective.
- Clinicians have not yet reached the stage where patients (stratified according to clinical presentation, endoscopic and/or vascular classifications, hepatic reserve, and comorbidities) undergo treatments that are tailored to their needs and based on evidence-based medicine.

INTRODUCTION

Bleeding from gastric varicesis a major complication of portal hypertension. Although less common than bleeding associated with esophageal varices, gastric variceal bleeding has a higher mortality.[1,2] Moreover, compared with endoscopic treatment of esophageal varices, endoscopic treatment of gastric varices is less effective.[3] Despite decades of varying endoscopic, percutaneous, and surgical treatment strategies, the literature is less established and overall is less effective.[3,4] From an endovascular perspective, transjugular intrahepatic portosystemic shunts (TIPSs) to decompress the portal circulation and/or transvenous obliteration are used to address bleeding gastric varices.[5–7] Until recently, there was a clear medical cultural divide between the strategy of decompressing the portal circulation (TIPS creation, for example) and transvenous obliteration for the management of gastric varices.[8,9] In Asia (predominantly Japan), the approach was obliteration and not decompression for cultural, historical, and financial reasons. In the West (United States and Europe), the approach was to decompress the portal circulation and not to obliterate the gastric varices due to the availability of the TIPS procedure and its clinical success (particularly with stent-grafts in the last decade) and the historical long-term clinical failures of

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sclerosing (obliterating) varices in the 1970s in Europe and the United States.[8,9] In the past 5 to 7 years, and more so in the last 2 to 3 years, contemporary physicians (interventional radiologists, hepatologists, gastroenterologists, and surgeons) from both sides of this geocultural divide have entertained the other's strategy. Anecdotally, Japanese interventionalists are trying to reintroduce the concept of TIPSs to Japan, and American interventionalists and hepatologists are using transvenous obliteration to manage their patients either as an augment or alternative to decompression. There is resistance on both sides of the divide, which is understandable given the conservative nature of medicine and that this is the health and lives of humans. No one can argue, however, that there are advantages and disadvantages to both strategies.[9] What the author believes needs to be done is to define and stratify patients to understand which patients do better than others for each strategy in order to tailor treatments to patients' needs, morbidities, and risks.[8,9] Tailoring management strategy requires a more scientific multidisciplinary approach and considerably more and better clinical research to better understand and analyze this largely poorly understood and potentially mortal portal hypertension complication. To unintentionally compound the scientific debate and stratification further, combination therapy of transvenous obliteration and decompression can be performed and/or augmenting either strategy (or both strategies) with partial splenic arterial embolization can be performed.[9–12]

This article discusses the outcomes of transvenous obliteration and TIPSs for the management of gastric varices individually or in combination. Definitions, endovascular technical concepts, and contemporary vascular classifications of gastric variceal systems are described to help grasp the complexity of the hemodynamic pathology and hopefully help define the pathology better for future reporting and lay the ground for more defined stratification of patients not only based on comorbidity and hepatic reserve but also on anatomy and hemodynamic classifications.

ANATOMY, DEFINITIONS, AND CLASSIFICATIONS

Terminology and definitions of types of transvenous obliteration are discussed below in the BRTO-PROCEDURE section. The majority (>60%–80% of patients) of gastric varices are associated with a spontaneous portosystemic shunt that is to the left of the anatomic midline (left-sided portosystemic shunts).[9,13] These shunts include gastrorenal shunts, direct gastrocaval shunts, and gastrocaval shunts via the inferior phrenic vein.[9,13] More than 90% of these left-sided spontaneous portosystemic shunts are gastrorenal shunts. Morphologically, splenorenal shunts (or lienorenal shunts) are spontaneous left-sided portosystemic shunts that communicate the splenic vein with, most commonly, the left renal vein without passing through the gastrointestinal tract, thus without forming submucosal gastrointestinal varices (ectopic varices).[13] From a hemodynamic standpoint, gastrorenal shunts and splenorenal shunts are both splenorenal shunts: portal blood flow moves from portal to systemic circulations in gastrorenal shunts from the splenic vein siphoning up to form gastric varices and then descending to empty into the left renal vein (essentially it shunts from splenic to renal veins) (**Fig. 1**).[13] This is the source of interchangeable terminology and anatomic definition confusion.[13]

The gastric varices and the gastrorenal shunt are collectively termed*, the gastric variceal system or complex*.[13] The gastric variceal system can be simple with minimal portal venous feeders (afferent veins) and a singular draining portosystemic shunt (efferent vein) or complex, and commonly tortuous, with multiple afferent and efferent (collaterals included) veins. The detailed vascular components of the gastric variceal system can be seen in **Fig. 2**.[13] Morphologically and anatomically, gastric variceal