

Transjugular Intrahepatic Portosystemic Shunt Creation and Variceal Coil or Plug Embolization Ineffectively Attain Gastric Variceal Decompression or Occlusion: Results of a 26-Patient Retrospective Study

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ABSTRACT

Purpose: To assess the efficacy of transjugular intrahepatic portosystemic shunt (TIPS) creation with or without variceal coil and/or plug embolization in decompressing or occluding gastric varices (GVs).

Materials and Methods: In this retrospective study, 78 patients with GV bleeding who underwent TIPS creation with or without embolotherapy with metallic coils and/or plugs from 1999 to 2014 were identified. Individuals who had a bare-metal TIPS and/or lacked post-TIPS imaging or endoscopic follow-up were excluded. The final cohort included 26 patients (16 men; median age, 54 y; median Model for End-stage Liver Disease score, 16). Variceal types, supplying vessels, and postprocedure GV patency on cross-sectional imaging or endoscopy were assessed. The primary study outcome measure was GV patency rate as a surrogate for efficacy of TIPS creation with or without embolization.

Results: GV types included gastroesophageal varix types 1 (n = 10) and 2 (n = 2), isolated GV types 1 (n = 4) and 2 (n = 2), and unspecified (n = 8). TIPS creation resulted in a median final portosystemic pressure gradient of 7 mm Hg. Multiple GV-supplying vessels (left/posterior/short gastric veins) were present in 65% of patients (n = 17). Embolization was performed in 69% (n = 18). Thirteen, four, and nine patients had imaging, endoscopic, or both imaging/endoscopic follow-up. GV patency rate was 65% (n = 17; 61%/75% with/without embolization) at a median of 128.5 days (range, 1–1,295 d) after TIPS creation. Incidence of recurrent bleeding was 27% (n = 7), and the 90-day mortality rate was 15% (n = 4).

Conclusions: In this study, most GV types showed persistent patency despite TIPS decompression and variceal embolization, and the incidence of recurrent bleeding was high. The findings suggest suboptimal efficacy for GV treatment, and indicate a need for study of alternative or adjunctive approaches to GV treatment, such as chemical obliteration.

ABBREVIATIONS

BATO = balloon-occluded antegrade transvenous obliteration, BRTO = balloon-occluded retrograde transvenous obliteration, CAQ = Certificate of Added Qualifications, EGD = esophagogastroduodenoscopy, EV = esophageal varix, GEV = gastroesophageal varix, GV = gastric varix, IGV = isolated gastric varix, LGV = left gastric vein, PGV = posterior gastric vein, PSG = portosystemic gradient, SGV = short gastric vein, TIPS = transjugular intrahepatic portosystemic shunt

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Gastric varices (GVs) occur in 5%–33% of patients with cirrhotic liver disease and have a 25% bleeding incidence within 2 years of development (1,2). First-line therapy in patients who have not experienced bleeding includes preventive pharmaceuticals, whereas acute bleeding is typically treated with vasoconstrictive agents and endoscopic variceal ligation or sclerotherapy (1,3). In cases of recurrent bleeding or acute hemorrhage refractory to medical management, transjugular intrahepatic portosystemic shunt

(TIPS) creation is recommended to decompress varices and divert blood flow through a controlled synthetic conduit (4). TIPS creation may be accompanied by variceal embolization to block blood flow through varices, with a typical approach employing coil occlusion of variceal supplying vessels (5). In the modern era, TIPS creation with or without embolotherapy is associated with initial GV bleeding control in greater than 90% of cases (6–8). However, recurrent GV bleeding rates are nontrivial—widely ranging between 13% and 53% (9,10)—and procedural outcomes are generally thought to be inferior to those of TIPS creation with or without embolotherapy for esophageal varices (EVs), in which recurrent hemorrhage rate ranges are narrower, at approximately 11%–22% (9,10). Moreover, GVs are widely thought to remain patent and sustain bleeding at lower portosystemic gradients (PSGs) compared with EVs (9,11,12). Given the uncertainty pertaining to the relative effectiveness of TIPS creation and coil embolization in treating GVs, the present study was undertaken to assess the efficacy of TIPS creation with or without variceal coil embolization in decompressing or occluding GVs.

MATERIALS AND METHODS

Institutional review board approval was granted for this study. Informed consent was obtained for TIPS creation and variceal embolization procedures.

Clinical Setting and Patients

The patient sample was selected from a registry of 302 patients who underwent 305 technically successful TIPS procedures between November 1999 and December 2014 at an academic tertiary-care medical center. Seventy-eight patients who underwent TIPS creation for GV hemorrhage refractory to medical therapy were identified. The diagnosis of GVs was established by upper endoscopy in all cases. Those patients who underwent bare-metal stent TIPS creation ($n = 2$) were not included in the analysis to ensure a uniform study cohort of patients who received a stent-graft TIPS. Additionally, those patients ($n = 50$) who lacked post-TIPS radiologic or endoscopic imaging—with computed tomography (CT), magnetic resonance (MR) imaging, or esophago-gastroduodenoscopy (EGD)—were excluded from analysis as a result of inability to anatomically assess TIPS and embolotherapy efficacy. The final cohort included 26 patients. Patient characteristics are summarized in [Table 1](#).

TIPS Procedures

The technique for TIPS creation has been previously described (13,14), and TIPSs were created by seven Certificate of Added Qualifications (CAQ)-licensed interventional radiologists with 2 years to more than

Table 1. Study Population Features (N = 26)

Measure	Value
Age (y)	
Median	53.5
Range	26–81
Sex	
Male	16 (62)
Female	10 (38)
Ethnicity	
White	15 (57)
Hispanic	7 (27)
Black	2 (8)
Other	2 (8)
Liver disease etiology	
Alcohol	7 (27)
Alcohol and viral	4 (15)
Viral	10 (39)
Other*	5 (19)
MELD score	
Median	15.5
Range	10–33
TIPS indication	
Acute GV bleeding [†]	14 (54)
Recurrent GV bleeding [‡]	12 (46)

Note—Values in parentheses are percentages.

GV = gastric varix; MELD = Model for End-stage Liver Disease; TIPS = transjugular intrahepatic portosystemic shunt.

*Includes nonalcoholic steatohepatitis and autoimmune hepatitis.

[†]Hemorrhage requiring rescue therapy.

[‡]Hemorrhage intolerant or resistant to medical and endoscopic treatment.

20 years of attending physician experience. Ten-millimeter VIATORR stent-grafts (W.L. Gore & Associates, Flagstaff, Arizona) were used in all cases. The targeted final PSG was less than 12 mm Hg (4), with hemodynamic success defined as a PSG reduction meeting this threshold. To achieve ample PSG reduction, shunts were incrementally dilated by using 8-mm and 10-mm balloons. Embolization of varices was performed following TIPS creation at the discretion of the primary interventional radiologist based on clinical circumstance (eg, active bleeding), absolute final PSG, number and size of varices, and degree of angiographic variceal filling following shunt creation. Embolization was performed by using 0.035- and/or 0.018-inch metallic coils (Nester or MicroNester; Cook, Bloomington, Indiana) or vascular plug devices (AMPLATZER Vascular Plug; St. Jude Medical, Saint Paul, Minnesota) in the case of larger-caliber varices, with the goal of disappearance of variceal filling on final postembolization splenoportal venography as the endpoint of embolization. In general, embolization occurred at the level of GV inflow vessels such as the left gastric vein (LGV), posterior gastric vein (PGV), and short gastric vein (SGV), and coil or plug embolization of the GV proper

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