

Combining Transjugular Intrahepatic Portosystemic Shunt with Balloon-Occluded Retrograde Transvenous Obliteration or Augmenting TIPS with Variceal Embolization for the Management of Gastric Varices: An Evolving Middle Ground?

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Abstract

The American College of Radiology Appropriateness Criteria Committee on interventional radiology has recently recognized balloon-occluded retrograde transvenous obliteration (BRTO) as a viable alternative to transjugular intrahepatic portosystemic shunt (TIPS) in certain anatomic and clinical scenarios for the management of gastric varices. However, it did not define these particular scenarios where BRTO would be a viable alternative. With the increased practice of BRTO in the United States, a debate ensues in the United States and Europe whether BRTO or TIPS should be the primary endovascular procedure of choice for gastric varices. From a conservative standpoint, BRTO is reserved for patients who are not TIPS candidates, while other institutions leave the decision to operator preference and “favorable anatomy” for either procedure. To add to the debate, there is a heightened interest in the improved efficacy of variceal embolization (metallic/bland embolization) concurrent with TIPS compared with TIPS without embolization, and a recent article describing a combination of TIPS and BRTO that demonstrated impressive results superior to BRTO or TIPS alone. This article discusses the most recent outcomes of TIPS and embolization of gastric varices as well as combining BRTO and TIPS.

Keywords

- ▶ TIPS
- ▶ BRTO
- ▶ portal hypertension
- ▶ interventional radiology

Objectives: Upon completion of this article, the reader will be able to describe the different roles of TIPS and BRTO in the management of gastric varices.

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shunt (TIPS) in certain anatomic and clinical scenarios for the management of gastric varices.¹ However, it did not define particular scenarios where BRTO would be a viable alternative.¹ With the increased practice of BRTO in the United States, a debate ensues in the United States and Europe whether BRTO or TIPS should be the primary endovascular procedure of choice.¹⁻³ From a conservative standpoint, BRTO is reserved for patients who are not TIPS candidates,¹⁻³ while other institutions leave the decision to operator preference and “favorable anatomy” for either procedure. To add to the debate, there is a heightened interest in the particular efficacy of combining variceal embolization with TIPS, and a recent article combining TIPS and BRTO.³ Moreover, BRTO is evolving to include techniques that do not require an indwelling balloon, thus reducing the logistical problems associated with this procedure.⁴

TIPS and Adjunctive Variceal Embolization

The effectiveness of adjunctive variceal embolization after decompressing the portal circulation with a TIPS is a matter of debate. It is thought that embolization of varices (usually associated with portosystemic shunting) helps improve TIPS patency by reducing competing shunts, especially those that significantly shunt from the portal circulation to the systemic circulation. More importantly, variceal embolization likely helps reduce the risk of bleeding in the setting of subsequent TIPS dysfunction⁵; however, closure of varices/competing shunts does increase the portosystemic gradient. With the advent of expanded polytetrafluoroethylene covered stents, the need for eliminating competing shunts to optimize patency and the need to occlude varices in case of subsequent TIPS dysfunction may be significantly less important.^{6,7} From a conservative standpoint, adjunctive embolization is performed after TIPS if the varices are still visualized during the post-TIPS portal venogram,^{8,9} or when the portosystemic gradient decreases too much and there is competing portosystemic shunting. Unfortunately, all these post-TIPS findings are subjective and not clearly defined.

However, there are mounting data that supports the concept that variceal embolization has added benefit by reducing the post-TIPS hemorrhagic rates.¹⁰⁻¹² In a retrospective study by Tesdal et al, the 2-year and 4-year rebleeding rates for TIPS and variceal embolization were 16 and 19%, respectively, whereas bleeding rates for the same time periods for TIPS alone were 39 and 47%, respectively ($p = 0.02$).¹⁰ In a prospective randomized trial by Chen et al, the 6-month rebleeding rate was significantly improved with TIPS plus embolization versus TIPS alone (6 vs. 20%, respectively).¹¹ Moreover, a meta-analysis of six studies demonstrated a significantly higher risk ($p = 0.002$) of bleeding in patients undergoing TIPS alone versus TIPS and variceal embolization (odds ratio 2.02).¹² In the same meta-analysis, there was no additional advantage to embolization with regard to TIPS-patency, post-TIPS hepatic encephalopathy occurrence, and patient survival.¹²

Combined TIPS and BRTO versus BRTO Only

BRTO and TIPS are two procedures that are considered for the treatment of bleeding gastric varices.¹⁻³ However, from a

hemodynamic standpoint, BRTO and TIPS are opposing procedures.^{2,3} BRTO involves occlusion of a commonly associated spontaneous portosystemic shunt that usually causes increased portal pressure, whereas TIPS creates a portosystemic shunt and thus decompresses the portal circulation.³ Historically, TIPS has been the endovascular approach of choice in managing gastric varices in the West, whereas BRTO was the endovascular approach to managing gastric varices in Asia.^{1,13} This somewhat holds true today but not in a clear-cut manner, since many institutions in the United States are starting to perform the BRTO procedure.¹³

Amidst studies, debates, and review articles addressing the ideal approach to endovascular or radiologic management of gastric varices, one particular study directly compared the outcomes of BRTO only versus the outcomes of combining BRTO and TIPS; this study demonstrated the superior outcomes of combining TIPS with BRTO instead of BRTO alone.³ Moreover, when comparing the available literature, the combined TIPS-BRTO procedure has demonstrated superior results to TIPS alone in the management of gastric varices.¹⁴⁻¹⁸ The advantages of combining BRTO with TIPS is that the spontaneous portosystemic shunt obliterated during the BRTO is replaced by a controlled, well-defined, man-made portosystemic shunt (the TIPS).³ Thus, the aggravated portal pressure that is commonly encountered after BRTO only is tempered. As a result, the combined TIPS and BRTO demonstrated decreased ascites/hydrothorax rates (57% at 1 year for BRTO only vs. 0% at 1 year for BRTO + TIPS), reduced esophageal variceal bleeding, and reduced overall gastric variceal rebleeding rates.³ Utilizing data gathered approximately from the same time period in the same institution in two recently published articles, the upper gastrointestinal bleeding rate at 12 months after the procedure for TIPS only, BRTO only, and TIPS + BRTO was > 11, 9, and 0%, respectively.^{3,14}

If these studies are substantiated by larger series, preferably not retrospective audits, then management of bleeding gastric

Table 1 Variations in procedures for the management of gastric varices

Procedure(s)	Variations
TIPS only	
BRTO only	
TIPS + BRTO	Concomitantly (same procedural setting)
	TIPS before BRTO
	BRTO before TIPS
TIPS + bland embolization	Concomitantly
	Delayed embolization for rebleeding
TIPS + BATO	Concomitantly
	Delayed embolization for rebleeding

Abbreviations: BATO, balloon-occluded antegrade transvenous obliteration; BRTO, balloon-occluded retrograde transvenous obliteration; TIPS, transjugular intrahepatic portosystemic shunt.

varices may very well shift to combined therapy.^{2,3,10-12,14} At that point, the stratification would depend on hepatic reserve and anatomic candidacy to define the exact approach. Should BRTO and TIPS be performed concomitantly or should one procedure precede the other? If these procedures are to be staged, which one should be performed first? Moreover, should a true, conventional BRTO be performed or can a TIPS with embolization or obliteration/sclerosis of gastric varices be performed (TIPS with a trans-TIPS balloon-occluded antegrade transvenous obliteration)? If the latter is contemplated, the presence of a gastrosplenic shunt (a prerequisite for conventional BRTO) is not necessary. ► **Table 1** summarizes the variability that is discussed in the management of bleeding gastric varices.

Conclusion

In conclusion, there is growing but not necessarily decisive evidence that embolizing or obliterating varices arising from the portal system leads to reduced rebleed rates. Moreover, combining TIPS and BRTO is more effective than either procedure alone when managing gastric varices.

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