Virtual Mentor
American Medical Association Journal of Ethics
December 2008, Volume 10, Number 12: 805-809.

CLINICAL PEARL

Indications for Use of TIPS in Treating Portal Hypertension

Elizabeth C. Verna, MD

For more than 20 years, transjugular intrahepatic portosystemic shunts (TIPS) have been used to treat complications of portal hypertension and are now being introduced in an expanding number of clinical settings. The TIPS procedure involves the angiographically guided creation of a connection between the hepatic vein and the intrahepatic portal vein that allows blood to flow from the portal vein to the inferior vena cava and back to systemic circulation with little resistance. The shunt, generally put in place by interventional radiologists, is kept open by the deployment of a metal stent across the tract. The procedure and evidence for its use in specific manifestations of portal hypertension were reviewed in detail in the American Association for the Study of Liver Diseases (AASLD) guidelines [1].

Accepted indications for TIPS are:

- Multiple episodes of variceal bleeding
- Refractory variceal hemorrhage despite adequate endoscopic treatment
- Refractory ascites

Experimental and emerging indications:

- Bleeding portal hypertensive gastropathy
- Bleeding gastric varices
- Gastric antral vascular ectasia
- Refractory hepatic hydrothorax
- Hepatorenal syndrome
- Budd-Chiari syndrome
- Veno-occlusive disease
- Hepatopulmonary syndrome
- Protein-losing enteropathy due to portal hypertension

Gastrointestinal Bleeding

Portal hypertension may lead to gastrointestinal bleeding from a variety of lesions, including varices of the esophagus, stomach, small or large intestine, portal hypertensive gastropathy (PHG), and gastric antral vascular ectasia (GAVE). The role of TIPS in the treatment and prevention of these lesions has not been fully studied in most cases, but about one-third of deaths from cirrhosis are due to gastrointestinal bleeding. TIPS procedures are best studied in this patient population and have been shown to eradicate esophageal varices effectively. The shunts are successful in the treatment of esophageal variceal bleeding that is refractory to first-line endoscopic and pharmacologic therapy, especially in patients who are poor

candidates for surgery [1-5]. The procedure is more effective in secondary prevention of rebleeding than endoscopic and medical therapy, although at the expense of increased encephalopathy, the risk of procedural complications, and likelihood of no improvement in overall survival [1, 6-10]. In recent guidelines, TIPS is not recommended for prevention of rebleeding in patients who have bled only once in the past [1].

Despite its success in eradicating varices, TIPS cannot be recommended in all patients because of the risks of encephalopathy and procedural complications. TIPS should not be used for primary prophylaxis of esophageal variceal bleeding, for example, inasmuch as the large majority of patients with varices never bleed, and bleeding on initial presentation can be controlled with urgent endoscopic therapy in most cases [1]. In general, choosing among endoscopy therapy, TIPS, or surgical shunt for acute variceal bleeding or secondary prophylaxis should be based upon the individual patient's bleeding, encephalopathy, and surgical risks. Bleeding from gastric or ectopic varices or PHG has been shown to improve with TIPS, although this is not yet well studied [5].

Refractory Ascites and Hepatic Hydrothorax

Ascites and hepatic hydrothorax refractory to medical treatment present significant clinical dilemmas for many hepatologists. The treatments available for refractory ascites include serial paracentesis, TIPS, surgical shunting, and liver transplant. Several randomized trials have compared TIPS to repeated large-volume paracentesis in the treatment of refractory ascites, which are summarized in at least three meta-analyses [11-13]. In general, these studies showed that TIPS is superior in preventing ascites reaccumulation but is associated with more complications such as hepatic encephalopathy, and it remains unclear whether overall mortality is improved. Current guidelines recommend that TIPS be reserved for patients with refractory ascites who are intolerant of repeated paracentesis [1]. Additional studies are needed because many of the existing studies were conducted in the early period of TIPS placement, when complications remained high, perhaps due to inexperience with the procedure. Patient selection is critical, taking into account the risk of encephalopathy and hepatic decompensation associated with TIPS. A few, small, uncontrolled studies have also shown a benefit from TIPS in patients with refractory hepatic hydrothorax, and TIPS is a consideration in these patients, especially if respiratory function is significantly compromised [14].

Other Uses

TIPS has been implemented in treating a variety of other disorders related to portal hypertension, such as Budd-Chiari syndrome, veno-occlusive disease, hepatorenal syndrome (HRS), and hepatopulmonary syndrome [15]. Data on TIPS in these settings is limited, however, creating a need for more controlled trials.

Contraindications

Placement of the shunt has a complex effect on pulmonary and systemic circulation, which results in a rapid increase in venous return to the heart as well as decreased

systemic vascular resistance. Therefore, patients with significant heart failure, valvular disease, or pulmonary hypertension are poor candidates for TIPS. The procedure may not be possible in some patients for anatomical reasons such as significant portal or hepatic vein thrombosis. Replacement of liver parenchyma with tumor, dilated biliary tracts, or cysts in the path of the shunt increases the risks of complications such as tumor spread, bleeding, and infection. Precipitating or worsening encephalopathy is common and must be taken into consideration when deciding whether to use TIPS. Finally, the decision to place a shunt should be made by a gastroenterologist or hepatologist in concert with the interventional radiologist who will perform the procedure, and referral to a liver-transplant center should be considered in all patients who qualify for TIPS and may be transplant candidates [1].

Contraindications for TIPS

Absolute contraindications:

- Primary prevention of variceal hemorrhage
- Congestive heart failure
- Severe pulmonary hypertension
- Severe tricuspid regurgitation
- Active biliary obstruction
- Sepsis
- Multiple hepatic cysts or Caroli's disease

Relative contraindications:

- Hepatocellular carcinoma
- Moderate pulmonary hypertension
- Portal or hepatic vein thrombosis
- Severe coagulopathy or thrombocytopenia
- Severe encephalopathy

References

1. Boyer TD, Haskal ZJ; American Association for the Study of Liver Diseases. The role of transjugular intrahepatic portosystemic shunt in the management of portal hypertension. *Hepatology*. 2005;41(2):386-400.
2. Jalan R, John TG, Redhead DN, et al. A comparative study of emergency transjugular intrahepatic portosystemic stent-shunt and esophageal transection in the management of uncontrolled variceal hemorrhage. *Am J Gastroenterol*. 1995;90(11):1932-1937.
3. Banares R, Casado M, Rodriguez-Laiz JM, et al. Urgent transjugular intrahepatic portosystemic shunt for control of acute variceal bleeding. *Am J Gastroenterol*. 1998;93(1):75-79.
4. Sanyal AJ, Freedman AM, Luketic VA, et al. Transjugular intrahepatic portosystemic shunts for patients with active variceal hemorrhage unresponsive to sclerotherapy. *Gastroenterology*. 1996;111(1):138-146.
5. Chau TN, Patch D, Chan YW, Nagral A, Dick R, Burroughs AK. "Salvage" transjugular intrahepatic portosystemic shunts: gastric fundal

compared with esophageal variceal bleeding. *Gastroenterology*. 1998;114(5):981-987.
6. Sanyal AJ, Freedman AM, Luketic VA, et al. Transjugular intrahepatic portosystemic shunts compared with endoscopic sclerotherapy for the prevention of recurrent variceal hemorrhage. A randomized, controlled trial. *Ann Intern Med*. 1997;126(11):849-857.
7. Cello JP, Ring EJ, Olcott EW, et al. Endoscopic sclerotherapy compared with percutaneous transjugular intrahepatic portosystemic shunt after initial sclerotherapy in patients with acute variceal hemorrhage. A randomized, controlled trial. *Ann Intern Med*. 1997;126(11):858-865.
8. Merli M, Salerno F, Riggio O, et al. Transjugular intrahepatic portosystemic shunt versus endoscopic sclerotherapy for the prevention of variceal bleeding in cirrhosis: a randomized multicenter trial. Gruppo Italiano Studio TIPS (G.I.S.T.). *Hepatology*. 1998;27(1):48-53.
9. Sauer P, Theilmann L, Stremmel W, Benz C, Richter GM, Stiehl A. Transjugular intrahepatic portosystemic stent shunt versus sclerotherapy plus propranolol for variceal rebleeding. *Gastroenterology*. 1997;113(5):1623-1631.
10. Papatheodoridis GV, Goulis J, Leandro G, Patch D, Burroughs AK. Transjugular intrahepatic portosystemic shunt compared with endoscopic treatment for prevention of variceal rebleeding: A meta-analysis. *Hepatology*. 1999;30(3):612-622.
11. Saab S, Nieto JM, Lewis SK, Runyon BA. TIPS versus paracentesis for cirrhotic patients with refractory ascites. *Cochrane Database Syst Re*v. 2006(4):CD004889.
12. Salerno F, Camma C, Enea M, Rossle M, Wong F. Transjugular intrahepatic portosystemic shunt for refractory ascites: a meta-analysis of individual patient data. *Gastroenterology*. 2007;133(3):825-834.
13. D'Amico G, Luca A, Morabito A, Miraglia R, D'Amico M. Uncovered transjugular intrahepatic portosystemic shunt for refractory ascites: a meta-analysis. *Gastroenterology*. 2005;129(4):1282-1293.
14. Siegerstetter V, Deibert P, Ochs A, Olschewski M, Blum HE, Rossle M. Treatment of refractory hepatic hydrothorax with transjugular intrahepatic portosystemic shunt: long-term results in 40 patients. *Eur J Gastroenterol Hepatol*. 2001;13(5):529-534.
15. Garcia-Pagan JC, Heydtmann M, Raffa S, et al. TIPS for Budd-Chiari syndrome: long-term results and prognostics factors in 124 patients. *Gastroenterology*. 2008;135(3):808-815.

Elizabeth C. Verna, MD, is a fellow in gastroenterology at Columbia University Medical Center in New York City. She is a graduate of Columbia University College of Physicians and Surgeons and Columbia University Medical Center internal medicine residency program, where she spent one year teaching medical students and residents as the internal medicine chief resident. Dr. Verna conducts clinical research with Columbia's Center for Liver Disease and Transplantation and looks forward to a career as a transplant hepatologist.

Related in VM
Shared Decision Making: Physicians' Duties to Patients and Other Physicians, December 2008

The viewpoints expressed on this site are those of the authors and do not necessarily reflect the views and policies of the AMA.