Trans-Jugular Portosystemic Shunt (TIPSS): A Study of 31 Cases

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Abstract
This scientific report presents a retrospective analysis of 31 cases undergoing Transjugular Intrahepatic Portosystemic Shunt (TIPSS) placement. The study, conducted at a single center, aimed to evaluate the efficacy and safety of TIPSS in managing complications of portal hypertension. The main indications for TIPSS placement included variceal bleeding, refractory ascites, and Budd-Chiari syndrome. The procedural success rate was high, with only a small number of cases requiring re-intervention due to shunt occlusion. Significant improvements were observed in controlling ascites and variceal bleeding, although complications such as hepatic encephalopathy were noted. Despite these challenges, TIPSS emerged as a valuable intervention for patients with advanced liver disease and its associated complications. This study underscores the importance of TIPSS in the management of portal hypertension and highlights the need for further research to optimize patient selection and refine procedural techniques.

Introduction
Chronic liver disease and its consequences are widespread pathologies. Approximately 90% of cases are attributed to hepatitis B and C as well as alcoholism [22-24]. The remaining 10% are due to autoimmune-related chronic hepatitis, primary and secondary biliary cirrhosis, hemochromatosis, Budd-Chiari syndrome, and other conditions. Hepatocellular carcinoma, cirrhosis, and variceal bleeding are potential causes of death. Managing ascites and hepatic encephalopathy are important factors for quality of life. Liver transplantation is the only possible treatment for cirrhosis as it is an irreversible condition [25-28]. However, liver transplantation is a costly and challenging procedure. Selection criteria are stringent, and waiting lists are long. Consequently, there is a significant population of patients suffering from portal hypertension. One of the treatments to prevent the complications of portal hypertension is transjugular intrahepatic portosystemic shunt (TIPS) [1]. There are many causes of ascites in individuals with cirrhosis and portal hypertension. A protein-poor fluid transudates into the peritoneal cavity due to high venous pressure in the stomach. A protein- rich transudate from the liver surface is caused by increased sinusoidal pressure. Renal consequences of cirrhosis lead to salt and water retention. Extravascular fluid retention is influenced by decreased albumin. Ascites results in significant deterioration in quality of life. Percutaneous punctures may frequently be necessary. Hepatorenal dysfunction and spontaneous bacterial peritonitis are complications. When HVPG is elevated, TIPS is most effective in treating ascites [2].

Materials and methods
We present a retrospective study conducted at the Department of Radiology and Diagnostic and Interventional Medical Imaging of Bab El Oued University Hospital. Patients were referred, following
multidisciplinary decision-making involving clinicians, radiologists, surgeons, intensivists, and pathologists, for placement of a transjugular intrahepatic portosystemic shunt (TIPS) between January 2015 and December 2022. The indications included the following: Variceal bleeding: Better outcomes are observed when TIPS is performed promptly, ideally within 24 hours of presentation [3, 4]. TIPS is also used to stop bleeding [5-11].

Ascites: A poor outcome is more likely in individuals over 60 years old, with a total bilirubin level above 3 mg/dL, and a creatinine level above 1.5 mg/dL [9, 10]. Budd-Chiari syndrome: Budd-Chiari syndrome is a rare disease resulting from the obstruction of hepatic venous outflow. It includes a classical form due to intrahepatic venous thrombosis and a suprarehepatic form, also known as membranous obstruction of the inferior vena cava. Our experience at Bab El Oued University Hospital is limited to the classical form [13-15].

The contraindications were as follows:

Relative contraindications include:

- Heart failure, pulmonary arterial hypertension, elevated right heart chamber pressures.
- Rapidly progressive heart failure.
- Severe coagulation disorders, without the possibility of correction.
- Uncontrolled sepsis.
- Undrained biliary obstruction.
- Malignant process (hepatocellular carcinoma), especially in the puncture path.
- Clinically significant encephalopathy.

Although polycystic liver disease has been considered a contraindication, TIPS has been safely performed in these individuals when bare metal stents are used. While not tested, covered stents are likely safe [18]. Despite relative contraindications, coagulopathy, shock, and septicemia, it may still be appropriate to undertake an urgent TIPS procedure while these disorders are being treated [29-31].

Other relative contraindications are markers of poor prognosis after TIPS such as the Model for End-Stage Liver Disease (MELD) score, which is a reliable predictive factor for death after TIPS. A MELD score greater than 24 [20] raises the mortality rate to 60% (3 out of 5). The Child-Pugh score has a similar predictive effect on patient outcomes after TIPS but may be slightly less accurate [21].

Figure 1: The TIPS procedure in a 25-year-old patient. Images from top to bottom and from right to left: catheterization of the middle hepatic vein. Percutaneous puncture under fluoroscopic guidance of the right portal vein using a Rosh Okuda needle. Catheterization along the puncture tract. Injection of contrast agent via a radio-opaque marked catheter. Final control showing a patent TIPS with redirection of venous shunts.
TIPS Procedure Technique: A recent computed tomography scan with contrast injection was performed in all patients to assess the anatomy of the portal vein, hepatic vein, and liver size. A 40 cm, 10 French introducer is inserted into the inferior vena cava via the right internal jugular vein, which is the standard access point for TIPS. The right hepatic vein is catheterized using a 5 French multipurpose-shaped catheter. An 8 mm angioplasty balloon is inflated through the parenchymal tract. Once access to the portal vein is achieved, an endoprosthesis is positioned within the portal venous system using a 9 or 10 mm balloon catheter.

Results
During this period, we performed 35 TIPS procedures in 31 patients, including 19 men and 12 women, with 11 patients presenting with Budd-Chiari syndrome. The primary indication was hemorrhagic complications of portal hypertension in 20 cases, and 11 patients had refractory ascites. It is noteworthy that two patients developed hepatorenal syndrome. The average age of our patients was 35 years. In all cases, we used a covered Fluency-type stent. The procedure was successful in nearly 94% of patients, with only 2 failures. We encountered reinterventions in 3 patients due to TIPS occlusion. We observed a marked regression of ascites in 95% of patients and hemorrhagic episodes in 73% of them during the 1, 3, and 12-month follow-up. The main complication noted was hepatic encephalopathy, present in 33% of patients, which resolved in almost all cases. We also observed transient anuria in two patients with hepatorenal syndrome, with a return of diuresis within 48 hours. However, we report one death within 72 hours of TIPS due to early recurrence of gastrointestinal bleeding.

Discussion
Early TIPS improves survival in cases of variceal bleeding in Child-Pugh B and C patients at high risk of rebleeding. A recent randomized study by Garcia-Pagan et al. showed a significant survival advantage in patients randomized to endoscopic band ligation followed by TIPS within 72 hours compared to patients treated with endoscopic band ligation alone (with TIPS as a backup solution in case of rebleeding); survival at 6 weeks and 12 months was 97% versus 67% and 86% versus 61% in the early TIPS plus band ligation versus rescue TIPS plus band ligation groups, respectively. Acute procedure-related mortality is approximately 1%. Clinical success rate is measured in terms of survival, hemorrhage or ascites control, but should also include an evaluation of encephalopathy. Survival is related to MELD score and Child-Pugh class but is less favorable for patients treated for refractory ascites. Hemorrhage is controlled in approximately 90% of cases. Late rebleeding is also more common with ectopic varices and is reduced by embolization and sclerosant injection along with TIPS. Late bleeding seems to have dramatically decreased with the widespread introduction of covered stents, reflecting much higher primary and secondary patency rates long-term. Assessment of survival and quality of life varies between series and meta-analyses. The benefits of better ascites control appear to be offset by increased encephalopathy.

In addition to TIPS failure, the main long-term complications are encephalopathy and progressive liver failure. Encephalopathy can be medically controlled, but if it becomes refractory to treatment, TIPS revision or occlusion may be performed. TIPS infection (called endotipsitis) is a rare but recognized complication affecting about 1% of cases. Most patients are successfully managed with long-term antibiotic therapy. Healing is possible, but a small percentage of patients die as a result of the infection.

Conclusion
Transjugular intrahepatic portosystemic shunt (TIPS) is a minimally invasive procedure designed to treat complications of portal hypertension. In cases of acute esophageal variceal bleeding, TIPS should be performed when bleeding is not controlled endoscopically or when there is a high risk of rebleeding.

References
of transjugular intrahepatic portosystemic shunt
dysfunction in PTFE-covered stent-grafts versus bare
10.1016/j.ejrad.2004.10.007
HF, Stanley AJ, Redhead DN, Hayes PC. Ten years’
follow-up of 472 patients following transjugular
intrahepatic portosystemic stent-shunt insertion at a
single centre. Eur J Gastroenterol Hepatol. 2004
Jan;16(1):9-18. doi: 10.1097/00042737-200401000-
00003
[26] Membreno F, Baez AL, Pandula R, Walser E,
Lau DT. Differences in long-term survival after
transjugular intrahepatic portosystemic shunt for
refractory ascites and variceal bleed. J Gastroenterol
Hepatol. 2005 Mar;20(3):474-81. doi: 10.1111/j.1440-
1746.2005.03601.x
[27] Angeloni S, Merli M, Salvatori FM, De Santis A,
Fanelli F, Pepino D, Attili AF, Rossi P, Riggio O.
Polytetrafluoroethylene-covered stent grafts for TIPS
procedure: 1-year patency and clinical results. Am J
Gastroenterol. 2004 Feb;99(2):280-5. doi:
10.1111/j.1572-0241.2004.04056.x
[28] Saket RR, Sze DY, Razavi MK, Kee ST, Frisoli JK,
Semba CP, Dake MD. TIPS reduction with use of stents
or stent-grafts. J Vasc Interv Radiol. 2004 Jul;15(7):745-
51. doi: 10.1097/01.rvi.000013526.80425.16
Emergent stent occlusion for TIPS-induced liver failure.
Dig Dis Sci. 2005 Dec;50(12):2356-8. doi:
10.1007/s10620-005-0062-2
Kaneko M, Kawano Y, Mizuguchi Y, Kumazaki T, Tajiri T.
Long-term results of partial splenic artery embolization
as supplemental treatment for portal-systemic
encephalopathy. Am J Gastroenterol. 2005
Jan;100(1):43-7. doi: 10.1111/j.1572-
0241.2005.00559.x
[31] Bouza E, Muñoz P, Rodríguez C, Grill F,
Rodríguez-Créixems M, Bañares R, Fernández J,
García-Pagán JC. Endotipsitis: an emerging prosthetic-related
infection in patients with portal hypertension. Diagn
Microbiol Infect Dis. 2004 Jun;49(2):77-82. doi:
10.1016/j.diagmicrobio.2004.03.006