Contemporary Issue

TRANSJUGULAR INTRAHEPATIC PORTASYSTEMIC STENT SHUNT

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MJAFI 1995; 51 : 281-283

KEY WORDS : Portal hypertension; Portasystemic shunt.

Introduction

Transjugular intrahepatic portosystemic stent shunt (TIPSS) is a new non-surgical method of creating a portasystemic communication [1]. It is yet another innovative technique for the prevention of bleeding from oesophageal varices in patients of portal hypertension. Like all other surgical and non-surgical methods, TIPSS does not attack the underlying pathology in portal hypertension. However, early reports suggest a low morbidity following TIPSS [2,3] and available follow-up studies are encouraging [4,5]. In its present state, TIPSS should be viewed as an alternative to surgical shunting in patients who continue to bleed despite pharmacological methods and injection sclerotherapy.

Historical perspective

Rosch described portal venography by a transjugular route in experimental animals in 1969 [6]. However, it was only in 1983 that Colapinto and colleagues reported transjugular portasystemic shunt in man [7]. Although the shunting procedure was successful, the patency of the stent could not be maintained for long. With advances in the types of stents, TIPSS has caught the fancy of researchers all over the world [8-10]. The technique is still being refined, and future research will be directed towards the development of more reliable intravascular stents and safer techniques of their introduction.

Technique

First, the patency of the portal vein is ascertained by Doppler ultrasound scanning. Under strict aseptic precautions and antibiotic cover, a long, sheathed catheter is introduced into the right internal jugular vein. Local anaesthesia and light intravenous sedation alone are required for the procedure. The catheter is advanced under fluoroscopic control into the hepatic veins. Whenever possible, the catheter is manoeuvred into the middle hepatic veins, as these are nearest to the branches of portal vein. A Ross trans-septal needle is now passed over a guide wire down the catheter. The hepatic vein is punctured under ultrasound or fluoroscopic control, and one of the branches of the portal vein is entered by a hit-and-trial method. The portal venous system is opacified. A guide wire is now passed through the Ross needle, into the portal vein, and advanced well into the superior mesenteric vein. A 9F Cook's catheter is then passed over the Ross needle (and its contained guide wire). The catheter helps dilate the tract for the subsequent steps. Portal venous pressure is measured, and the catheter and needle are withdrawn. A balloon catheter is then passed over the guide wire and the intrahepatic track dilated to about 8 mm width [11]. Additional analgesia may be required at this stage. The stent is now positioned between the hepatic and portal veins, and its position checked by fluoroscopy and Doppler ultrasonography.

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Successful stent placement leads to a drop of 10-13 mm in the portal pressure [12]. Stent patency is ascertained by Doppler and ultrasound scanning.

Some workers in Japan have recently reported a percutaneous, transhepatic puncture technique under ultrasonographic control. However, this is still in the experimental stage [13].

Types of stents

(a) Palmaz stent (Johnson & Johnson) : It has the following advantages :

- (i) It has a smooth inner surface. This facilitates homogenous endothelialization and consequent laminar flow [14].
- (ii) Two or three stents can be overlapped in series to cater to the length of the shunt required in each individual patient.
- (iii) It can be further dilated in situ using balloon catheters. Stent diameters of 7 to 10 mm can be easily achieved.
- (iv) It is claimed to have better long term patency due to its inherent resistance to compression by surrounding tissue [14].

(b) Wall stent (Schneider) : It is a self-expanding stent. An outer sheath holds the stent in its collapsed, elongated form. After insertion, the outer sheath is withdrawn. The stent now expands to a predetermined diameter. However, its length now diminishes. A further slight shortening occurs later, and it may then retract out of the hepatic or portal vein [11]. Thus a proper selection of the length of the stent is necessary so that its ends stay within the lumens of the two veins.

(c) Gianturco-Rosch 'Z' stent : This stent is not very popular as it tends to collapse under extrinsic pressure.

Advantages of TIPSS over surgically created shunts

(a) In TIPSS, shunt diameter can be calibrated according to the degree of portal pressure. In surgical shunting, the limiting factor for shunt size is the diameter of the veins to be anastomosed.

(b) TIPSS can be offered to patients awaiting

liver transplantation, as it does not alter the venous anatomy of the liver.

(c) TIPSS spares the patient of the morbidity of shunt surgery. However, no gross difference is noted between the mortality due to TIPSS and that due to shunt surgery in specialised centres.

Disadvantages

(a) TIPSS is still in the evolutionary stage. It is as yet available only in a few centres around the world.

(b) The stents and other disposable used in TIPSS are prohibitively costly. However, the overall cost to the patient in terms of hospital stay after surgery and repeated admissions for sclerotherapy may be comparable.

(c) It cannot be offered to patients with extra-hepatic obstruction of the portal vein.

Indication for TIPSS

As on date, the place of TIPSS in the management of portal hypertension is not established [15]. Where TIPSS is practiced, the indications are as given in Table 1. Its role in the treatment of intractable ascites and hepatorenal syndrome is controversial [16].

TABLE 1
Indications for TIPSS

1.	Emergency treatment of variceal bleeding : Failed pharmacological therapy Failed injection sclerotherapy
2.	As an alternative to shunt surgery in patients with recurrent haemorrhage
3.	In patients with gastric variceal bleeding when other measures have failed
4.	In patients awaiting liver transplantation
5.	Treatment of resistant ascites*
6.	Treatment of hepatorenal syndrome*

* Use not yet fully established

Complications

Most of the complications related to TIPSS are uncommon (Table 2). However, death due to intra-abdominal haemorrhage has been reported [14]. This can occur as a result of rupture of the liver capsule or due to

perforation of both walls of the portal veins. Meticulous aseptic technique, use of prophylactic antibiotics, and accurate positioning of stents under ultrasound guidance should help decrease the incidence of complications.

TABLE 2
Complications of TIPSS

Immediate complications	
*	Intraperitoneal haemorrhage
*	Infection in the stent
*	Portal vein thrombosis
*	Haemobilia
*	Cardiac failure
*	Occlusion of stent
*	Migration of stent
Late complications	
*	Occlusion of shunt
*	Hepatic encephalopathy

Status of shunt surgery in the era of TIPSS

TIPSS is no doubt an exciting new alternative for shunt surgery. It seems to achieve a similar haemodynamic result as shunt surgery and does not preclude a future liver transplantation. However, surgical shunting involves a one-time expenditure which is negligible in most centres in our country. Surgical diversion is possible, indeed it is ideal, in patients with extrahepatic obstruction. With a good liver status as is commonly seen in Indian patients, the incidence of recurrent bleeding and hepatic encephalopathy are low after surgery. Therefore, the prediction that TIPSS will soon replace surgical shunting [17] seems a bit premature.

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