

Treatment of Chronic Ascites Due to Right-sided Heart Failure by Transjugular Intrahepatic Portosystemic Shunt Stent—Implantation After Orthotopic Heart Transplant

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Abstract

Long-term outcome after orthotopic heart transplant is often critical in patients with long-persisting right-sided heart failure and consecutive ascites. Transjugular intrahepatic portosystemic stent shunt is an effective treatment for chronic ascites. However, a case of transjugular intrahepatic portosystemic stent shunt implantation after orthotopic heart transplant and left ventricular assist device bridging has not been previously reported.

Key words: *Transjugular intrahepatic portosystemic shunt stent, Heart transplant, Right heart failure, Left ventricular assist device(s)*

Case Report

We report a 47-year-old man who was listed for an orthotopic heart transplant owing to dilated cardiomyopathy involving both the left and especially the right ventricles. Our patient had a history of recurrent ascites despite normal liver synthesis resulting from chronic right-sided heart failure. Because of recurrent cardiac decompensation, implantation of a left ventricular assist device (Berlin Heart EXCOR, Berlin Heart GmbH, Berlin, Germany) was performed. Implantation of a right ventricular support system had to be avoided owing to a right

atrial vein, which had a 7-cm thrombus. Recurrent ascites owing to the existing right ventricular congestion with long-term liver damage was observed in the following. Placement of a transjugular intrahepatic portosystemic stent shunt (TIPSS) was not possible because of left ventricular assist device (LVAD)-induced anticoagulation and the associated risk of bleeding. The patient was admitted to the high-urgent waiting list. A suitable donor organ was available on August 15th, 2009. An orthotopic heart transplant was performed after EXCOR-LVAD explantation. The immediate postoperative course was uneventful.

Immunosuppression was composed of cyclosporine (target level, 200-250 $\mu\text{g}/\text{mL}$), mycophenolate mofetil, and prednisolone. On 17th postoperative day, because of recurrent pleural effusions with formation of pleural peel, thoracoscopic decortications were performed. Subsequently, the patient recovered well, but recurrent ascites persisted despite good biventricular pump function. Therefore, implantation of a TIPSS was indicated. After puncture of the right internal jugular vein, a J-wire was advanced into the inferior vena cava. A multipurpose catheter was placed into the hepatic vein over a guide wire. The catheters were brought into the portal vein, which showed a pressure gradient of 10 mm Hg (15 mm Hg/5 mm Hg). After balloon dilatation and implantation of 2 Bard-Luminexx metal stents (12 \times 60 or 12 \times 40 mm) (Figure 1) with subsequent dilatation, the portosystemic pressure gradient dropped to 4 mm Hg (14 mm Hg/11 mm Hg). In the subsequent series of contrast angiograms, rapid outflow of blood through the stent tract could be observed (Figure 2). After an interval of about 3 months, the patient was finally free of ascites under support of mild diuretics. Sonographic controls revealed an adequate TIPSS function.

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Acknowledgements: The authors of the manuscript "Treatment of chronic ascites due to right heart failure by TIPSS-Implantation after orthotopic heart transplant" declare that they have no conflicts of interest to disclose.

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Experimental and Clinical Transplantation (2011) 2: 156-158

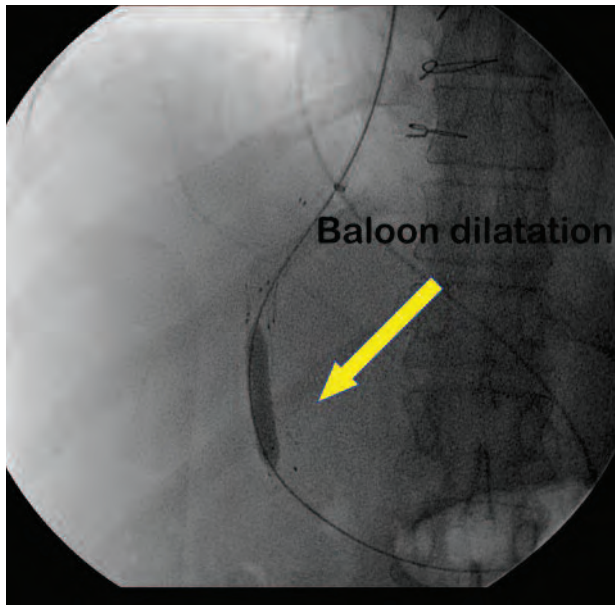


Figure 1. The Figure displays the balloon dilatation and implantation of 2 Bard-Luminexx metal stents.

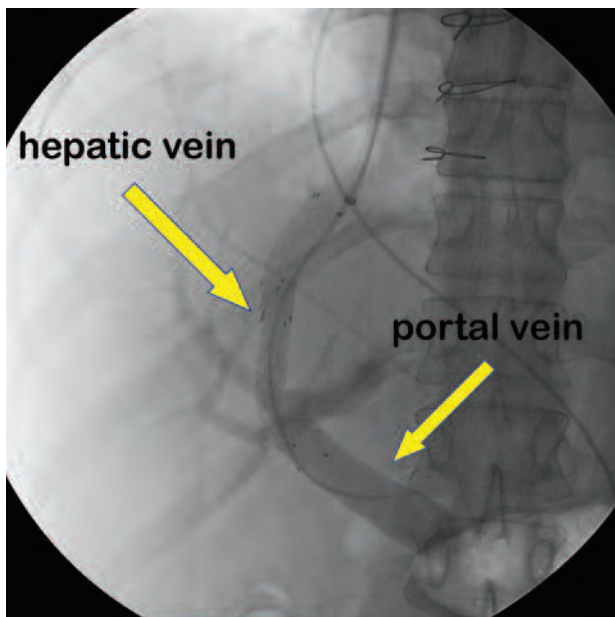


Figure 2. The Figure displays the final result after transjugular intrahepatic portosystemic stent shunt implant.

Discussion

Transjugular intrahepatic portosystemic stent shunt refers to a connection between the intrahepatic portal vein and hepatic vein. A portion of the blood flows from the portal vein bypassing the liver directly into the great bloodstream.¹

An important indication for TIPSS-implantation is recurrent bleeding from esophageal or fundal varices despite consequent endoscopic therapy in combination

with propranolol.² A second important indication is, as in our case, intractable ascites. This occurs when massive ascites persist despite a low sodium diet, fluid restriction, and medication therapy after an infection has been excluded.³ The increased portal venous pressure is the main factor in the pathogenesis of ascites. A shunt leads to a reduction of portal venous pressure, which in turn reduces ascites. Frequent complications are spontaneous bacterial peritonitis, a hepatorenal syndrome, or renal dysfunction induced by diuretics. Treatment options consist of repeated paracentesis, peritoneal venous shunt (owing to frequent shunt obliterations largely abandoned), surgical portosystemic shunts, and liver transplants.⁴⁻⁶ Fava and associates⁷ presented a female patient with arrhythmogenic dysplasia of the right ventricle that evolved to refractory heart failure, ascites, and peripheral edema. After heart transplant refractory ascites impaired the patient's respiratory function, it resulted in prolonged mechanical ventilation. She was successfully treated with TIPSS-placement, which allowed satisfactory weaning of ventilatory support.

A TIPSS implantation is an effective means of treating refractory ascites with reduction or complete washing out of the ascites in 60% to 80% of patients.⁸⁻¹¹ In a randomized, controlled trial with 60 patients, Rössle and associates showed that after 3 months, 61% of patients treated with TIPSS no longer had ascites, compared with 18% in the paracentesis group. Survival without liver transplant was marginally longer in the TIPSS group than in the paracentesis group (69% and 58% after 12 and 24 months vs 52% and 32%).¹²

The present case indicates that the combination of orthotopic heart transplant and TIPSS is a successful means of treating heart failure patients presenting with severe ascites, thereby opening a therapeutic field for heart failure patients hampered by signs of chronic right-sided heart failure, such as ascites.

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