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## CASE REPORT

# Percutaneous intervention averted the need for liver transplantation

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### KEYWORDS

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Balloon dilatation

**Abstract** A patient with Budd–Chiari Syndrome who had Trans-jugular Intrahepatic Portosystemic Stent Shunt (TIPSS) performed with no improvement and was consequently put on the liver transplant list. A non-obstructed channel up to the right atrium was created by opening the misplaced TIPSS stent and dilating supra-hepatic inferior vena cava stenosis. Marked clinical improvement occurred with the patient losing ten kilograms of weight and both his lower limb edema and ascites disappeared 6 weeks after the procedure. In this case percutaneous intervention averted the need for liver transplantation.

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## 1. Introduction

Budd–Chiari syndrome is a clinical condition caused by obstruction of the venous outflow of the liver. Its pathogenesis is complex, usually involving an acquired thrombotic stimulus associated with a genetic clotting abnormality producing occlusion of the hepatic veins.<sup>1</sup> Several treatments are available for the different stages and clinical manifestations of the disease with liver transplantation being offered after more conventional therapy, such as anticoagulation, diuretics or portosystemic shunts, had failed<sup>2</sup> as was the case in this patient.

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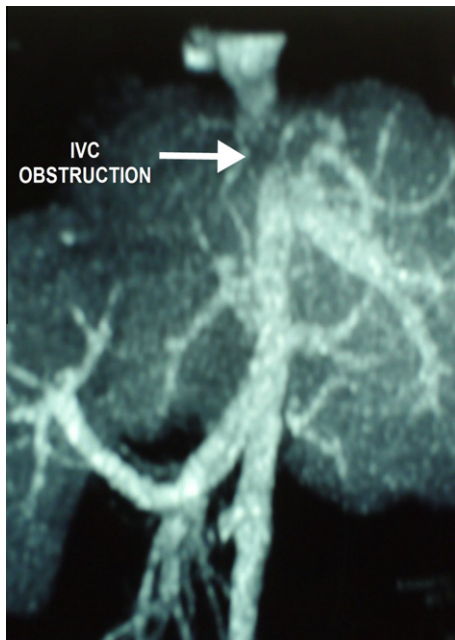


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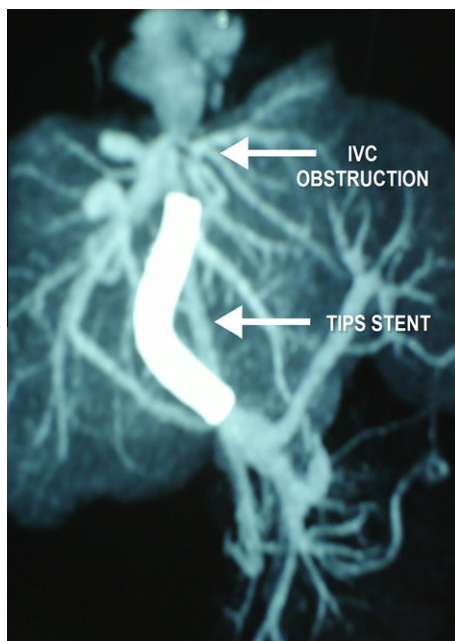
## 2. Manuscript

A 20 year old male presented with a history of long standing bilateral lower limb edema accompanied by progressive abdominal swelling. He was thoroughly investigated and an abdominal CT scan revealed significant narrowing in all hepatic veins with a web obstruction extending into the supra-hepatic inferior vena cava (IVC) (Fig. 1). He was diagnosed as a case of Budd–Chiari Syndrome due to heterozygous Factor V Leiden mutation. Transjugular Intrahepatic Portosystemic Stent Shunt (TIPSS) was performed, and a 10 cm 8 French stent was placed between the portal vein and IVC with no improvement of the patient's condition. An abdominal CT scan performed six months later revealed that the stent was misplaced as it was seen extending horizontally across the IVC lumen and the already present supra-hepatic IVC narrowing itself had not been tackled (Fig. 2).

On examination, the patient had bilateral wasting of temporal muscles and mild pallor. Abdominal examination revealed tense ascites with dilated veins visible over his flanks



**Figure 1** Abdominal CT scan prior to TIPSS procedure.

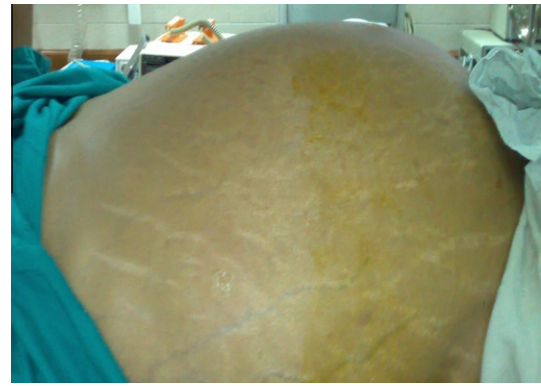


**Figure 2** Abdominal CT scan six months after TIPSS stent.

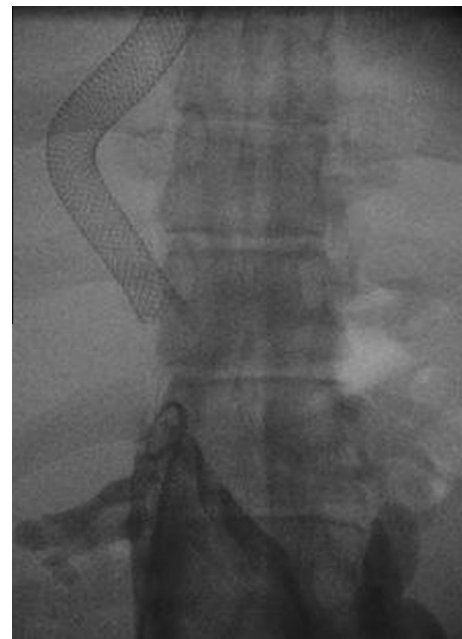
(Fig. 3) that drained upward by milking test. There was bilateral, pitting lower limb edema up to the level of his knees.

Laboratory investigations revealed microcytic hypochromic anemia, with an International Normalized Ratio (INR) of 1.1. His serum creatinine level was 1.1 mg/dL, total bilirubin was 1 mg/dL, albumin was 2.6 mg/dL, ASOT was 55 mg/dL, and ALT was 66 mg/dL.

The patient was listed for liver transplant after failure of the TIPSS procedure with persistence of symptoms.<sup>3</sup> He had required repeated abdominal paracentesis nearly every week and he was on diuretic therapy. We approached the patient



**Figure 3** Abdominal distension and visible veins on the flanks after TIPSS stent.



**Figure 4** Venography showing the IVC obstruction above the level of the renal veins.

with the plan of percutaneous (transfemoral) intervention to relieve the two levels of obstruction; the first caused by the endothelialized, misplaced TIPSS stent and the second in the supra-hepatic portion of the IVC before its entry into the right atrium. At first the patient refused, but because of the long waiting list, he finally gave his approval to perform the procedure after 6 months.

### 2.1. Procedure

We aimed to create a non-obstructed channel up to the right atrium. This would be achieved by opening a channel in the misplaced TIPSS nitinol stent and dilating the suprahepatic inferior vena cava (IVC) stenosis. We planned to deploy balloon expandable stents at both sites.

After inserting a femoral sheath, venography revealed obstruction of the IVC above the level of the renal veins

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