Case 15845

Eurorad

Tackling a thrombosed TIPSS

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Section: Abdominal imaging
Area of Interest: Abdomen Interventional vascular
Portal system / Hepatic veins
Procedure: Complications
Procedure: Stents
Procedure: Recanalisation
Imaging Technique: Ultrasound-Colour Doppler
Imaging Technique: Catheter venography
Imaging Technique: Fluoroscopy
Imaging Technique: Ultrasound-Spectral Doppler
Special Focus: Embolism / Thrombosis Case Type:
Clinical Cases
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Patient: 20 years, female

Clinical History:

A 20-year-old female patient, case of Budd-Chiari syndrome with thrombosis of portal, hepatic, inferior mesenteric and splenic veins, status post TIPS and porto-mesenteric stenting done in our hospital. She came back with abdominal pain.

Imaging Findings:

Doppler study revealed absence of flow in TIPS and porto-mesenteric stents suggesting acute thrombotic occlusion (Fig. 1, 2). Patient was urgently shifted to operation theater equipped with digital subtraction angiography, where TIPS venogram revealed complete occlusion of the stent extending from the IVC to SMV (Fig. 3). Using catheter guide wire combination, TIPS stent was negotiated and balloon angioplasty and chemical thrombolysis done (Fig. 4, 5). Repeat Doppler revealed good flow across both the stents (Fig. 6, 7, 8). Patient was kept on alteplase infusion. Next day she had severe abdominal pain with a significant drop of haemoglobin. USG revealed haemoperitoneum. Her B.P decreased significantly requiring multiple transfusions and she had to be ventilated for a day. Repeat Doppler showed patent stent with good flows. She was later discharged on warfarin with advice to follow up regularly with Doppler. Subsequent Doppler showed patent stents and patient has been doing well clinically.

Discussion:

Budd-Chiari syndrome is characterised by hepatic venous outflow obstruction at the level of hepatic veins, IVC or right atrium. Manifestations range from mild symptoms to fulminant acute liver failure to chronic liver disease. Since manifestations are non-specific, imaging is necessary for diagnosis and assessment of extent of disease. Duplex

ultrasonography is a useful tool as it allows easy assessment of hepatic venous flow and detection of hepatic parenchymal heterogeneity. If not treated promptly, the outcome is dismal. Goal of treatment is to relieve hepatic congestion, thereby improving hepatocyte function and allowing resolution of portal hypertension. Various medical, endovascular, and surgical treatment options are available. Transjugular intrahepatic portosystemic shunt (TIPS) is an effective means of decompressing the portal system in patients unresponsive to traditional medical therapy [1]. TIPS can become dysfunctional if stenosis/thrombosis develops in the stent. Trans-shunt venography is the gold standard technique in TIPS evaluation, but it is expensive and invasive. Doppler ultrasound is most commonly used non-invasive tool in checking TIPS patency. Ultrasound screening allows detection of stent occlusion before complications occur and warrants its timely management. First examination should be performed within 1 week of placement for Wallstents and 1 month after placement for covered stents. Surveillance schedule consists of an examination 3 months after the first examination, with a follow-up every 6 months thereafter [2]. Each examination consists of looking for shunt patency and flow characteristics. Each stent is assessed at hepatic vein end, mid portion and portal vein end. Optimally functioning stent shows pulsatile turbulent flow and PSV of at least 50–60 cm/s (range 90–120 cm/s); portal vein velocity at least 30 cm/s (range 20–50 cm/s) [3]. Increased echogenicity within the stent lumen and absence of colour flow is seen in occluded stents. Abnormal indices are localised high velocity (>220 cm/s) with post-stenotic turbulent flow, change in velocity of >100 cm/s across the stent, diffuse low velocity throughout the stent (<50 cm/s) or velocity <30 cm/sec in the main portal vein. Development of hepatofugal main portal or splenic vein flow or hepatopetal flow in the intrahepatic portal vein branches [3], development or recurrence of collaterals, new, recurrent, or worsening ascites are signs of failure of shunt [2]. Timing of dysfunction of TIPS cannot be predicted; hence routine surveillance is required to ensure its patency. Timely anticoagulant therapy or shunt revision can significantly improve the outcome.
Written informed patient consent for publication has been obtained.

Differential Diagnosis List: Thrombosed TIPS, Stenotic occlusion of stent, Intra-abdominal haemorrhage

Final Diagnosis: Thrombosed TIPS

References:

M Cura, Z Haskal, J Lopera (2009) Diagnostic and interventional radiology for Budd-Chiari syndrome. Radiographics, 2009 Volume 29, pages 669- 681
Dean Alexander McNaughton , Monzer M. Abu-Yousef (2011) Doppler US of the Liver Made Simple. RadioGraphics Vol. 31, No. 1 (PMID: 21257940)
Zwiebel WJ, Pellerito JS (2004) Introduction to Vascular Ultrasonography. Elsevier Saunders, Philadelphia 5th edition

Figure 1

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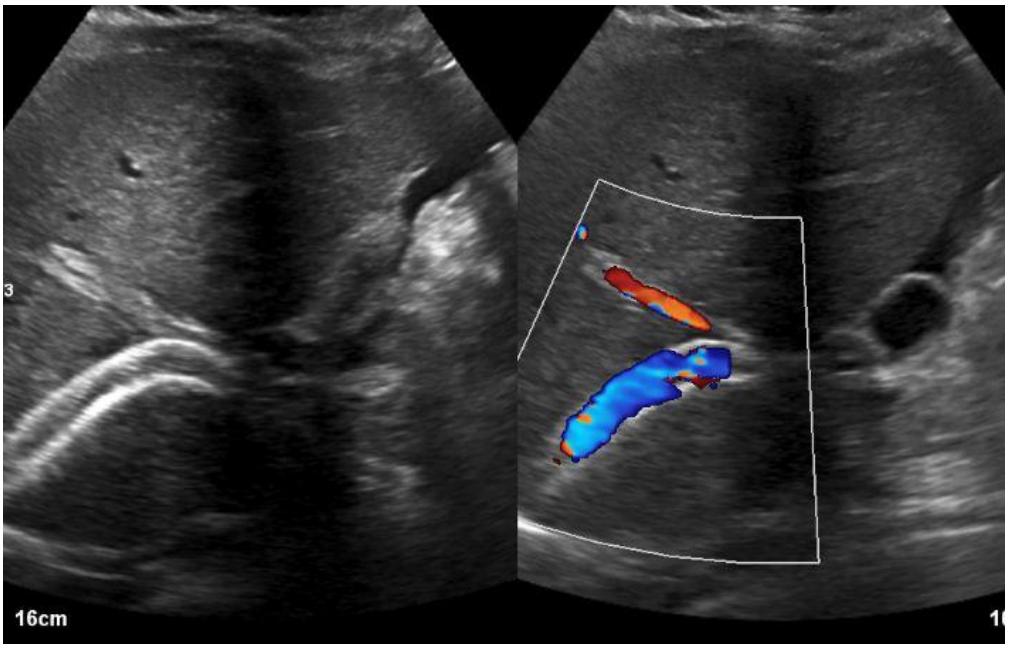

Description: Ultrasound images showing patent lumen of TIPS stent on B mode and wall-to-wall filling on colour Doppler, post-balloon angioplasty and thrombolysis (Fig. 6). **Origin:** Shreya S, Department of Ultrasonography, Jaslok Hospital and Research Centre, Mumbai.

Figure 2

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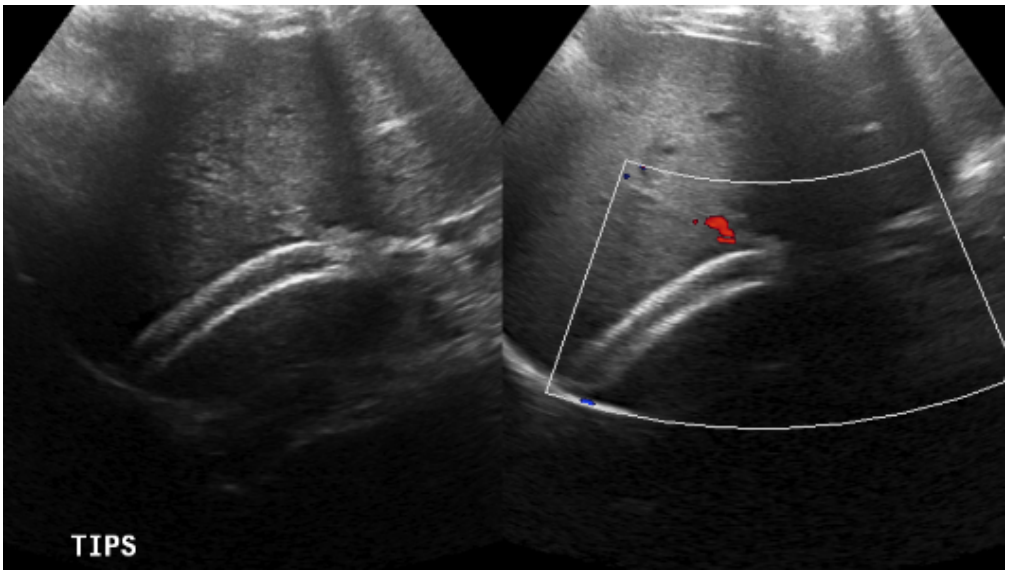

Description: Colour Doppler image showing absent colour flow within TIPS stent suggestive of thrombotic occlusion (Fig. 1). **Origin:** Dr. Shreya Shukla, Dept. of Ultrasound, Jaslok Hospital, Mumbai

Figure 3

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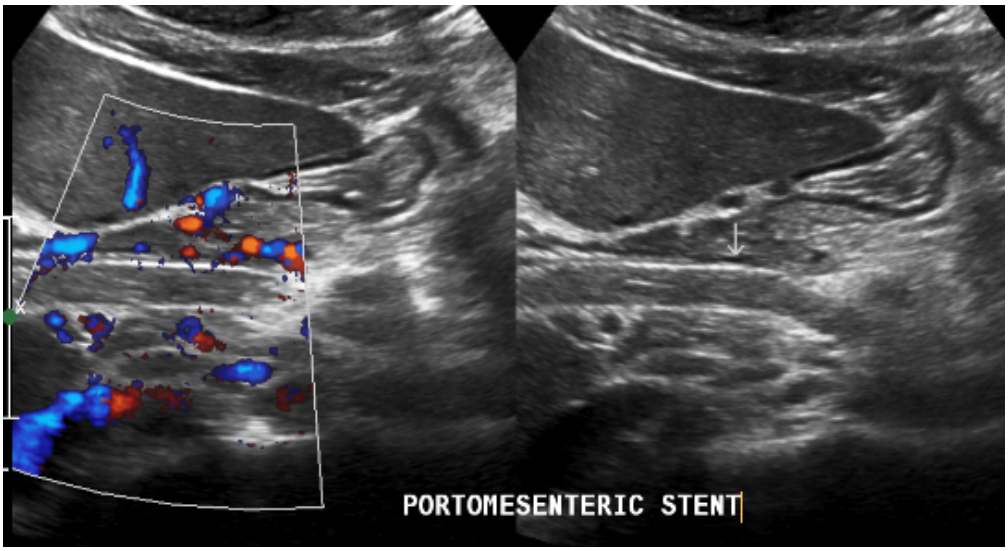

Description: Colour Doppler image showing absent colour flows in portomesenteric stent suggestive of thrombotic occlusion. Collaterals are noted around the stent (Fig. 2). **Origin:** Dr. Shreya Shukla, Dept. of Ultrasound, Jaslok Hospital, Mumbai

Figure 4

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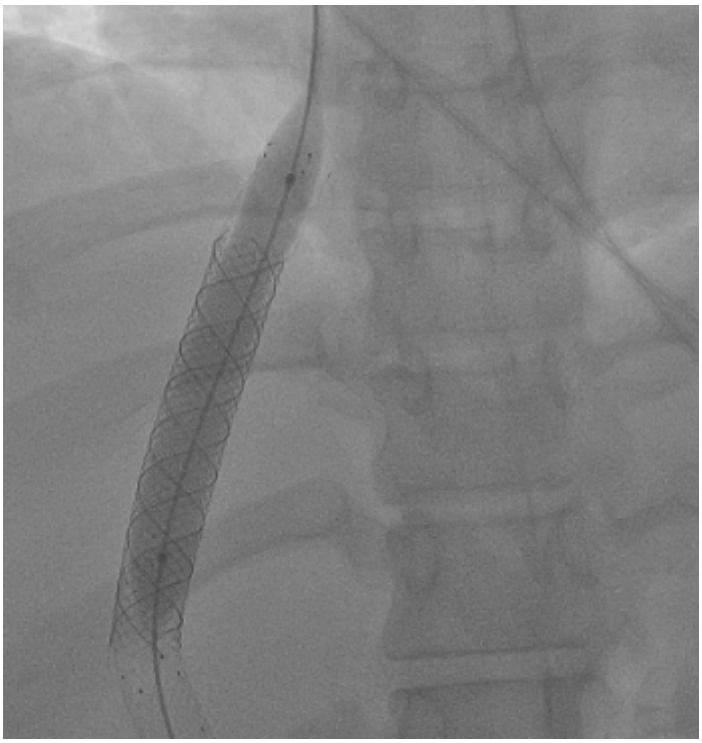

Description: Fluoro-scopically guided access through right internal jugular vein done. Using catheter guide wire combination, TIPSS stent negotiated and balloon angioplasty done using 10x40 mm balloon (Fig. 4). **Origin:** Shreya Shukla, Department Of radiology, Jaslok Hospital and Research Centre, Mumbai, India.

Figure 5

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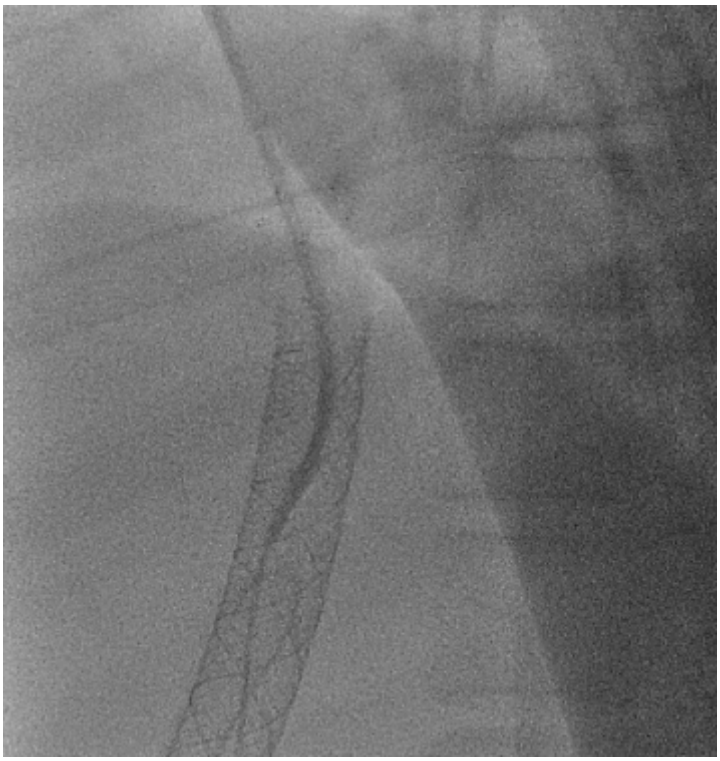

Description: TIPSS venogram showing complete occlusion of the stent (Fig. 3). **Origin:** Shreya Shukla, Department of Radiology, Jaslok Hospital and Research Centre, Mumbai, India.

Figure 6

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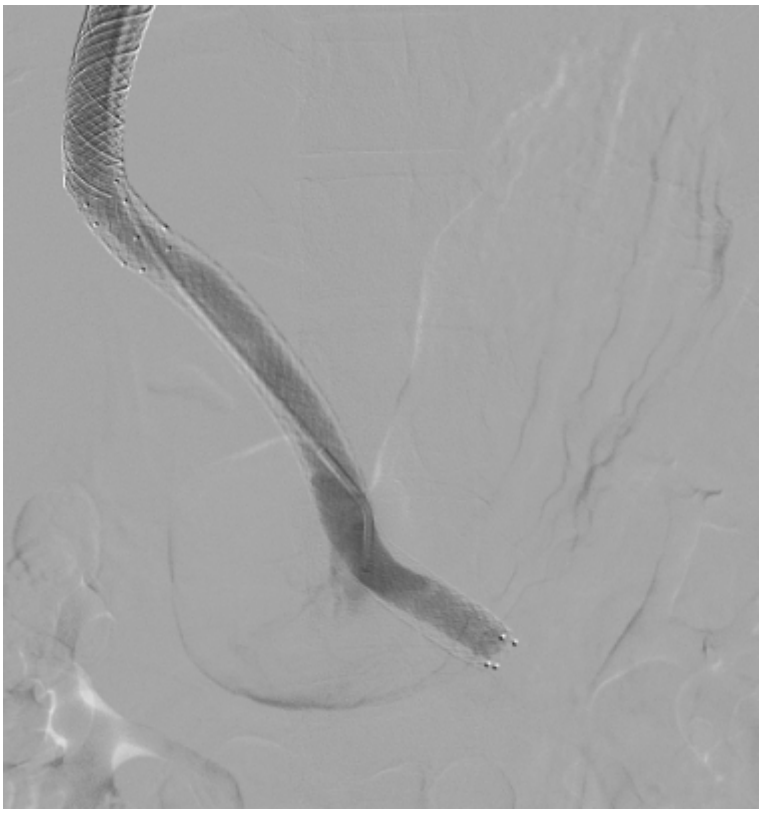

Description: TIPSS venogram revealing good flow across stent post angioplasty and chemical thrombolysis (Fig. 5). **Origin:** Shreya Shukla, Department of Radiology, Jaslok Hospital and Research Centre, Mumbai, India.

Figure 7

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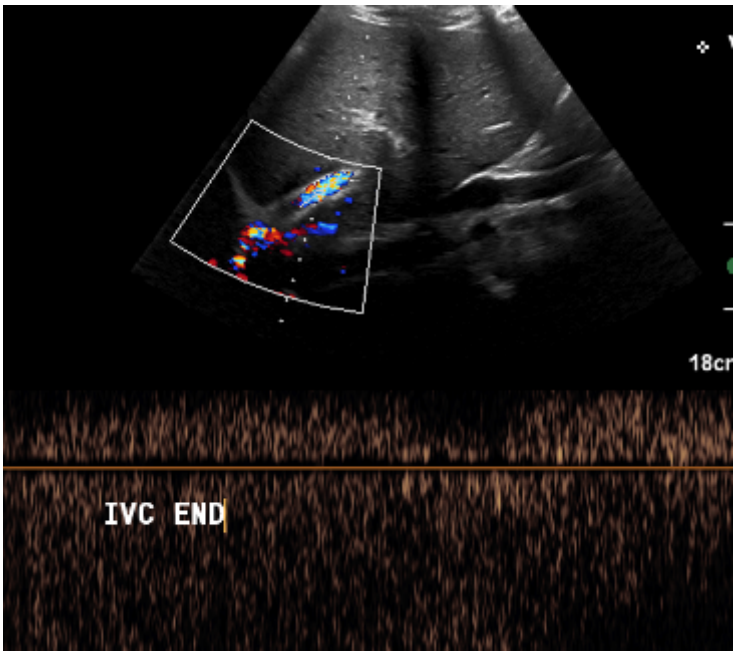

Description: Ultrasound - Spectral Doppler of TIPS stent showing normal flows post-balloon angioplasty and chemical thrombolysis (Fig. 7). **Origin:** Shreya Shukla, Dept. of Radiology, Jaslok Hospital and Reasearch Centre, Mumbai, India

Figure 8

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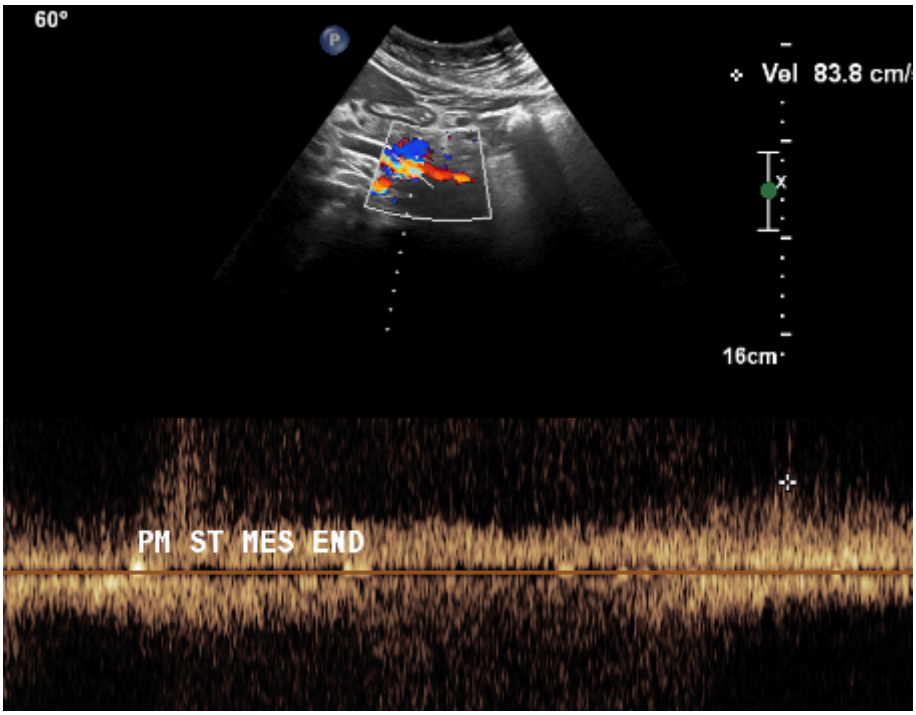

Description: Ultrasound - Spectral Doppler showing normal flows in portomesenteric stent following balloon angioplasty and chemical thrombolysis (Fig 8.). **Origin:** Shreya Shukla, Department of Ultrasound, Jaslok Hospital and Research Centre