Intra-hepatic porto-systemic venous shunt - Park type 1

Clinical History:
A 65-year-old man, alcoholic for 40 years, came with history of abdominal pain for 1 year, jaundice for 3 months and one episode of haematemesis. No history of trauma, liver biopsy or surgery. On examination pallor, icterus, facial puffiness and bilateral pitting pedal oedema were present.

Imaging Findings:
Ultrasound performed on Philips iU 22, showed mildly enlarged liver (16cm) with surface nodularity and altered echotexture. The main portal vein (11mm) was patent with antegrade flow. The left and right portal veins were prominent (9mm), with a prominent posterior branch of right portal vein (8mm) seen communicating with IVC (Fig 1, 2). On Doppler imaging there was flow from the posterior branch of right portal vein to the IVC. Flow volume of shunt 0.16 L/min, flow volume in main portal vein 0.48L/min; shunt ratio - 33%. No portal vein thrombosis. The hepatic veins, spleen and splenic vein were normal. No ascites. Other abdominal organs were normal. CT confirmed the sonographic findings. The portosystemic shunt is seen from posterior branch of right portal vein along the posterior surface of liver to enter the IVC, adjacent to the adrenal venous confluence with IVC (Fig 3).

Discussion:
Portal to systemic venous communication are classified as extrahepatic and intrahepatic (IPSVS). Although IPSVS is uncommon, with improved diagnostic imaging techniques such as US, CT and MRI, intrahepatic shunts have been detected in an increasing number of patients. IPSVS may cause hepatic encephalopathy, hence identification is important. The aetiology of IPSVS is uncertain; may be either congenital or acquired secondary to portal hypertension due to chronic liver damage [1, 2]. In our case it is likely to be acquired since there was associated evidence of chronic liver disease.

Park et al classified IPSVS into four types. Type 1 - single large tube of constant diameter that connects the right portal vein to the inferior vena cava. Type 2 - localised peripheral shunt in which single or multiple communications are found between peripheral branches of portal and hepatic veins in one hepatic segment. Type 3 - aneurysmal communication between the peripheral portal and the hepatic veins. Type 4 - shows multiple communications between the peripheral portal and the hepatic veins diffusely in both lobes [1, 2]. The presumed basis for intrahepatic portosystemic shunts is a persistent communication between the vitelline veins...
of the omphalomesenteric system and the sinus venosus due to a focal absence of sinusoid formation [3, 4]. The most common types of IPSVS are type 1 or 2, located in the right lobe [2]. Our patient had Park's type 1- single large tube connecting the right portal vein to the IVC.

IPSVS is clinically important because it can lead to hepatic encephalopathy. The natural history of IPSVS depends upon the shunt ratio and on the patient age. The frequency of hepatic encephalopathy increases with age due to decreasing tolerance of brain to toxic metabolites with increasing age [1, 2]. Hence large shunts causing hepatic encephalopathy require appropriate therapeutic intervention. Owing to the rarity of this disorder, the correct choice of treatment is uncertain. Surgical interventions include shunt ligation, embolisation, coiling and hepatic resection [2]. Colour Doppler demonstrates the communication between the portal vein and the systemic veins and also measures blood flow volume and shunt ratio and obviates the need for angiography. It measures shunt ratios, is useful in follow up and helps choose the appropriate therapeutic option of IPSVS [2].

In conclusion, colour Doppler US with CECT of the abdomen provides an accurate diagnosis of IPSVS and helps evaluate the shunt haemodynamics.

**Differential Diagnosis List:** Right posterior branch portal vein communication with IVC-Park type1 IPSVS, Iatrogenic communication between IVC & portal vein, Post-traumatic communication between IVC & portal vein

**Final Diagnosis:** Right posterior branch portal vein communication with IVC-Park type1 IPSVS

**References:**


Description: Transverse ultrasound right hepatic lobe shows the posterior branch of right portal vein, prominent and extending beyond the posterior border of liver. The right portal vein posterior branch is seen communicating with inferior vena cava. Origin: Dept. of Radiodiagnosis, FMMC, Mangalore.
Description: Colour Doppler shows a large tubular structure in the right lobe of liver continuous with the IVC. Origin: Dept. of Radiodiagnosis, FMMC, Mangalore.

Description: CECT abdomen: reveals a tubular contrast opacified structure extending from the posterior branch of right portal vein into the inferior vena cava. Origin: Dept. of Radiodiagnosis, FMMC, Mangalore.