Ultrasonography in Non-cirrhotic Portal Hypertension: Correlation with Splenoportography

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Abstract
Real time sonography followed by splenoportography was performed in 38 cases with non-cirrhotic portal hypertension. Eleven of these cases, in whom porto-systemic shunt surgery was done, were also evaluated by real time sonography post-operatively. The ultrasound findings correlated well in 37 cases (98%) with splenoportography. All the post-operative cases also revealed a patent porto-systemic shunt on sonography. Ultrasonography, a valuable, non-invasive, initial investigation of portal hypertension, may thus be used as the only investigation to distinguish intra- from extra-hepatic obstruction and to evaluate patency of surgically created porto-systemic shunts. Invasive portography may be performed only if surgical treatment is anticipated.

Key words: Real time ultrasound, portal hypertension, splenoportography.

Introduction
Invasive procedures such as splenoportography, arterial portography and transhepatic portography carry a risk of mortality and morbidity,1,2 and hence cannot be used as screening tests for portal hypertension.3 Ultrasonography, a non-invasive procedure, has been reported to be a valuable initial screening investigation in portal hypertension. In addition, it can be used to distinguish intrahepatic from extrahepatic obstruction and also in the evaluation of patency of surgically created porto-systemic shunts.4,5

We compared the results of real time ultrasonography with splenoportography in 38 patients with non-cirrhotic portal hypertension.

Material and Methods
Thirty eight patients with non-cirrhotic portal hypertension (24 males, 14 females, aged 4 months to 42 years, mean 18 years) underwent ultrasound examination with a real time 3.5-5.0 MHz sector scanner (Philips SDU-1000). Scans were taken along the sagittal, transverse and oblique axes and in the supine and right lateral decubitus positions, care being taken to examine the entire splenoportal axis. The echopattern of the liver, spleen and vascular structures was also noted. For comparison the mean diameter of normal portal vein in these age groups was taken from an earlier study.6

Splenoportography (SPG) was done in all these patients; in addition superior mesenteric arteriography was done in two patients. Eleven of these 38 patients underwent porto-systemic shunt surgery and were also evaluated for shunt patency by ultrasonography. The results were analysed by two radiologists in a prospective manner.

Liver function tests and endoscopy were done in all cases. Liver biopsy was done in 19 of them. Based on these investigative findings, the patients were diagnosed as extrahepatic portal venous obstruction (EHO; n = 30) or non-cirrhotic portal fibrosis (NCPF; n = 8).

Results
In all 38 patients, ultrasound showed normal echo-pattern of liver with evidence of splenomegaly. In the EHO group, the portal vein and its two branches could not be visualized in 25 of 30 cases (86%). Instead multiple, irregular, tortuous hypoechoic vascular structures of variable sizes were found around the porta (Fig 1a). Two cases each had multiple echoes in the portal and splenic vein, indicating thrombi. In one case there was dilated patent splenoportal axis along with visualisation of collaterals.

Splenoportography (SPG) showed portal cavernoma in 26 of the 30 EHO cases (Fig 1b). In two cases, the contrast was rapidly washed out through multiple retroperitoneal collateral veins, indicating non-visualised splenoportal axis. These patients were subjected to arterial portography which showed patent portal vein, suggesting splenic vein thrombosis. Two other cases showed patent splenic vein and the main portal or its main branches were not visualised, suggesting a local thrombus. In one patient where ultrasound revealed a patent splenoportal axis, the SPG showed a blocked splenic vein over which a large bridging collateral was running.

Ultrasound in all eight cases with NCPF showed dilated patent splenoportal axis along with visualisation of collaterals (Fig 2). Splenoportography (SPG) showed the same findings and did not yield any additional information.

The patency of porto-systemic shunt was seen on sonography in all post-operative cases.

Recipient thanks to: Dr. (Mrs) Nagi, Assistant Professor, Department of Radiodiagnosis.
Discussion

Our study and earlier ones have shown that real time ultrasonography can identify in a non-invasive manner the intra- and extra-hepatic portal venous system, hepatic veins, superior mesenteric vessels, splenic vein and also the collaterals in portal hypertension. In a small percentage of patients, even splenoportography and arteriography do not produce images of portal vessels due to diversion of blood flow into a wide collateral circulation. Ultrasound can provide useful information in such cases.

Extrahepatic portal venous obstruction can be diagnosed by the absence of the portal vein and its two main branches, the presence of multiple, irregular vascular channels of variable sizes around the porta and/or by the presence of a band of hyperchogenicity in the porta. A dilated splenoportal axis along with visualisation of collaterals and a normal liver echotexture suggest idopathic or non-steriotic portal fibrosis.

Ultrasonography, being a safe, simple, non-invasive and non-ionising procedure, is the modality of choice in cases with extrahepatic obstruction, non-visualisation of the portal vein on portography, or suspected hepato-caval flow, and for evaluation of patency of porto-systemic shunts. Portography does give a better anatomical picture of the splenoportal axis and may still be required when surgery is considered.

References