Portal hypertension is defined by the hepatic venous pressure gradient and is measured via a percutaneous transhepatic route [1]. We describe a novel technique for direct portal pressure measurement using endoscopic ultrasound (EUS). A 27-year-old man with Noonan syndrome and congenital heart disease presented with recurrent gastrointestinal bleeding, which continued despite cardiac surgery. Angiography failed to visualize these vessels, but the gastroduodenal artery and adjacent aberrant vessel were embolized prophylactically (Fig. 1a, b). Given that the periduodenal vessels could not be visualized, coils were prophylactically placed in the gastroduodenal artery (orange arrow) and communicating branch (green arrow).

EUS revealed an extensive network of periduodenal vessels with both an arterial and venous component and a low resistance, high flow waveform (Fig. 2a, b). After calibration, the portal pressure measured 11 mmHg, thereby excluding significant portal hypertension. The middle hepatic vein pressure was then measured at 10 mmHg (Fig. 4c, d, Fig. 5a), confirming a 1 mmHg pressure gradient as recorded by interventional radiology. There was no evidence of bleeding and the hemoglobin was stable 4 days later.

Prior EUS-guided portal pressure measurements in porcine models correlated with percutaneous measurements [2–4]. This is the first clinical report demonstrating the feasibility and apparent safety of portal vein and hepatic vein pressure measurements by EUS, thereby allowing diagnosis of arteriovenous malformations as have been reported in Noonan syndrome [5].

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Larissa L. Fujii-Lau, Michael D. Leise, Patrick S. Kamath, Ferga C. Gleeson, Michael J. Levy
Division of Gastroenterology and Hepatology, Mayo Clinic, Rochester, Minnesota, USA

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Fig. 3  a Routine endoscopy revealed multiple duodenal serpiginous folds before therapy. b Their appearance following EUS-guided coil insertion therapy.

Fig. 4  a EUS demonstrates the portal vein with power Doppler imaging. b Fine needle aspiration (FNA) needle position during pressure monitoring.
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**Bibliography**


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**Corresponding author**

**Michael J. Levy**

Mayo Clinic

Division of Gastroenterology and Hepatology

200 1st St SW

Rochester

MN 55905

USA

Fax: +1-507-266-3931

levy.michael@mayo.edu