

COMMENTARY

Non-invasive tools for the prediction of esophageal varices in cirrhosis: Can advanced ultrasound techniques spare endoscopy?

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Variceal bleeding is one of the major causes of death in patients affected by hepatic cirrhosis, together with hepatic failure and hepatocellular carcinoma (HCC).¹ An early diagnosis and staging of esophageal varices are therefore essential to provide effective treatment and prevent acute hemorrhage. Upper gastrointestinal endoscopy is undoubtedly the gold standard for diagnosis of varices, as it not only can reliably demonstrate

the presence and grade of varices, but it also allows endoscopic treatment when necessary.² Nevertheless, endoscopy remains an invasive and uncomfortable procedure for patients. The procedure is also costly, and serious complications such as perforation and hemorrhage can occur, however rarely.³ In addition, the risk of variceal development in early and compensated cirrhosis is low, and many endoscopies might be

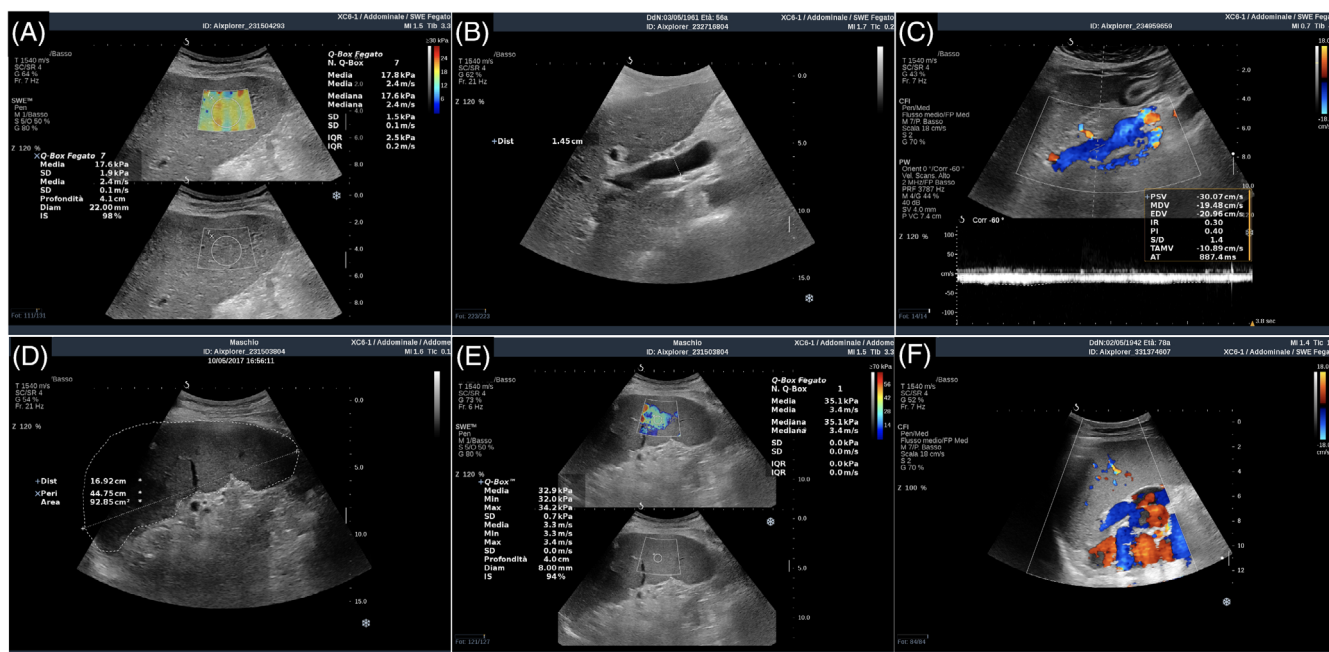


FIGURE 1 Different ultrasound-based tools for non-invasive evaluation of portal hypertension. (A) 2D shear wave elastography of the liver; (B) portal vein diameter measurement on B-mode; (C) Doppler study of the portal vein; (D) spleen bipolar diameter, perimeter and area evaluated on B-mode; (E) 2D shear wave elastography of the spleen; (F) portosystemic collateral circulation on color Doppler

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unnecessary.⁴ For these reasons, in last decades a lot of effort has been made to stratify cirrhotic patients using non-invasive indexes of portal hypertension (PH).^{5,6} The aim is to carefully select patients at high risk of variceal development and to decrease the number of needless invasive procedures. In this scenario, technological innovation of different ultrasonographic techniques represented an authentic revolution compared to more traditional indexes of PH such as platelet count and spleen diameter. In fact, multimodal ultrasound imaging allows an accurate and reproducible non-invasive evaluation of PH (Figure 1), which represents the leading cause of variceal development. However, the current American Association for the Study of Liver Diseases (AASLD) guidelines⁷ consider endoscopy avoidable only for patients with platelet count $>150\,000/\text{mm}^3$ and liver stiffness $<20\text{ kPa}$.

In this study, the authors tested the accuracy of Doppler hemodynamic liver index (HDLI) and point shear wave liver elastography (pSWE) in predicting the presence of esophageal varices using endoscopy as the reference standard.⁸ They also evaluated the performance of these techniques in identifying the different stages of varices (F1, F2, or F3) and the varices needing treatment (VNT), defined as F2-3 grade and/or presence of high-risk stigmata of bleeding such as red color sign or platelet-fibrin plug. HDLI showed 66% sensitivity and 92.3% specificity in predicting varices with the cutoff set up to 0.66 (AUROC 0.876) and 64.8% sensitivity and 96.1% specificity in predicting VNT with the cutoff set up to 0.71 (AUROC 0.858). pSWE showed 83% sensitivity and 84.6% specificity in predicting varices with the cutoff set up to 14.5 kPa (AUROC 0.884) and 79.5% sensitivity and 92.8% specificity in predicting VNT with the cutoff set up to 22.5 kPa (AUROC 0.93). The combination of the two techniques reached 94.3% sensitivity and 78.1% specificity in the identification of varices and 92.8% sensitivity and 89.2% specificity in the identification of VNT. The authors also reported a strong positive correlation between both HDLI and pSWE and varices grade (0.839 and 0.888 respectively). Based on these findings, the authors suggest avoiding routine endoscopy in patients with HDLI <0.66 and liver stiffness at pSWE $<14.5\text{ kPa}$, as the risk of varices is very low and the risk of VNT extremely low. They also suggest avoiding endoscopy if HDLI <0.71 and liver stiffness $<22.5\text{ kPa}$ in specific situations such as limited resource settings or apprehensive patients.

This very interesting cross-sectional study confirms the effectiveness of ultrasound in predicting esophageal varices and it adds three important innovations. Firstly, it supports the use pSWE, while most previous studies evaluated liver stiffness by using transient elastography (TE).⁹⁻¹¹ Secondly, the authors demonstrated for the first time a correlation between HDLI and varices grade. And finally, by combining pSWE and HDLI the authors overcame the limit of single techniques, with a real benefit in term of diagnostic accuracy.

We believe this study confirms further the crucial role of ultrasound in the follow-up of liver cirrhosis. The diagnostic power of one ultrasound examination allows physicians to detect ascites, identify and characterize new-onset nodules with contrast-enhanced ultrasound (CEUS), evaluate the amount of hepatic fibrosis with shear wave elastography (SWE), and estimate the level of PH with Doppler indexes. Furthermore, data relative to liver stiffness and Doppler study could be combined, as the present study suggests, to predict the presence and the severity of

esophageal varices with high accuracy. This rich equipment of ultrasonographic tools avoids overuse of expensive and invasive procedures and improves patient compliance to the follow-up.

There is no agreement on the appropriate frequency of non-invasive evaluation of PH in cirrhotic patients, and longitudinal studies are lacking. In clinical practice, we think it is reasonable that patients coming in for their routine six-monthly HCC screening ultrasound are also evaluated for PH. If this evaluation is integrated with clinical and laboratory data, an even more complete clinical picture of the cirrhotic patient can be obtained. This strategy could accommodate both patient convenience and health economics needs.

The main limits of this approach are the reliance on single operator skills and experience, and the difficulty in obtaining good images and measures in patients with abdominal obesity or breathing difficulties. However, even with these limitations, ultrasound remains one of the most powerful and effective assets for the hepatologist.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

No additional data has been provided.

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