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Editorial

Non-Invasive Assessment of Portal Hypertension: An Evolving Landscape

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Portal hypertension is a key pathophysiological consequence of chronic liver disease (CLD), and its progression plays a pivotal role in the development of complications such as variceal bleeding, ascites, hepatic encephalopathy, and spontaneous bacterial peritonitis. Early detection and staging of portal hypertension are crucial to delay or prevent these complications and to guide management strategies.

Traditionally, hepatic venous pressure gradient (HVPG) measurement has been considered the gold standard for assessing portal hypertension. However, HVPG is invasive, costly, and limited to specialized centers, making it impractical for routine or repeated use in many healthcare settings, especially in resource-limited regions. [1]

Upper GI endoscopy for screening gastroesophageal varices is another accepted tool but is also invasive, not always readily accessible, and does not offer a quantitative measure of portal pressure. Overuse in asymptomatic patients adds unnecessary burden to healthcare systems and can lead to patient fatigue and financial stress.

Over the past decade, a range of non-invasive tests (NITs) have emerged to assess liver fibrosis and indirectly estimate portal hypertension. [2] These include:

- ***Liver stiffness measurement (LSM) using transient elastography (TE) (e.g., Fibro Scan) or shear-wave elastography;*** When combined with platelet count, LSM becomes a valuable predictor of clinically significant portal hypertension (CSPH). This approach has been shown to potentially obviate the need for screening endoscopy in up to 30% of patients with compensated cirrhosis. [3]

- Spleen stiffness measurement (SSM); is gaining ground as a complementary tool to LSM. In advanced fibrosis, where liver stiffness may plateau, spleen stiffness continues to correlate with increasing portal pressure. The Baveno VII consensus suggests SSM values 50 kPa to rule in CSPH. [4] Other studies suggest thresholds between 46– 55 kPa for optimal sensitivity and specificity. [5]

- Doppler ultrasound of the abdomen, when performed by an experienced radiologist, can reveal surrogate markers of portal hypertension, such as collateral circulation, splenomegaly, and altered portal vein flow dynamics.

- Magnetic resonance elastography (MRE) is more sensitive and reproducible than ultrasound-based modalities, especially in obese patients or those with ascites, and can help confirm fibrosis staging when TE results are equivocal. [6]

- FIB-4 index remains a useful, FIB-4 inexpensive scoring tool for estimating advanced fibrosis, particularly in primary care and outpatient settings.

- Artificial intelligence-based imaging and deep learning models are being developed to interpret liver and spleen elastography data with higher precision, although their current clinical utility is limited by cost and availability. [7]

The Baveno VII consensus (2022) made significant strides in validating the use of noninvasive tools to assess compensated advanced chronic liver disease (cACLD) and CSPH. [4] It proposed the following criteria:

- LSM 150 × 10^9/L: CLD is likely, but endoscopy can be avoided. - LSM 15–20 kPa: suggests possible cACLD. - LSM >20 kPa and platelet count >150 × 10^9/L: CLD is likely, but endoscopy can be avoided. - LSM 15–20 kPa: suggests possible cACLD. - LSM >20 kPa and platelet count <150 x 10^9 /L: indicates a significant risk of CSPH.

In viral alcohol or MASH related cACLD. The ANTICIPATE model may be applied in patients with LSM value between 20-25 kPa, where the risk of CSPH may exceed 60% in the presence of thrombocytopenia.[8]

Conclusion

Non-invasive assessment of portal hypertension has moved from a research interest to a clinical imperative. When properly applied, these tools improve risk stratification, reduce unnecessary endoscopies, and offer safer, more efficient patient care. In Pakistan and other resource-limited settings, embracing non-invasive models is not only practical but essential. Continuous validation and adaptation of these methods—guided by international recommendations like Baveno VII—will enhance our ability to provide timely and costeffective care to patients with chronic liver disease.

References:

1. Bosch J, Abraldes JG, Berzigotti A, García-Pagán JC. The clinical use of HVPG measurements in chronic liver disease. Nat Rev Gastroenterol Hepatol. 2009;6(10):573–582.

2. de Franchis R, et al. Expanding consensus in portal hypertension: report of the Baveno VI Consensus Workshop: stratifying risk and individualizing care for portal hypertension. J Hepatol. 2015;63(3):743–752.

3. Berzigotti A, et al. Spleen stiffness measurement by transient elastography identifies severe portal hypertension in patients with compensated cirrhosis. Gastroenterology. 2013;144(1):102–111.

4. de Franchis R, Bosch J, Garcia-Tsao G, et al. Baveno VII – Renewing consensus in portal hypertension. J Hepatol. 2022;76(4):959–974.

5. Colecchia A, Montrone L, Scaioli E, et al. Measurement of spleen stiffness to evaluate portal hypertension and the presence of oesophageal varices in patients with compensated liver cirrhosis. Gut. 2021;70(2):319–327.

6. Hsu C, Caussy C, Imajo K, et al. Magnetic resonance vs transient elastography analysis of patients with advanced fibrosis due to NASH: a systematic review and meta-analysis. Hepatology. 2019;70(3):832–845.

7. Yasaka K, Akai H, Kunimatsu A, Abe O, Kiryu S. Deep learning with convolutional neural network in radiology. Jpn J Radiol. 2018;36(4):257–272.

8. Abraldes JG, Bureau C, Stefanescu H, et al. Noninvasive tools and risk of clinically significant portal hypertension and varices in compensated cirrhosis: the "ANTICIPATE" study. Hepatology. 2016;64(6):2173–2184.