Accuracy of spleen stiffness measurement for the diagnosis of clinically significant portal hypertension in patients with compensated advanced chronic liver disease: a systematic review and individual patient data meta-analysis

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Background

The diagnosis of clinically significant portal hypertension is crucial for prognosis and treatment guidance in patients with compensated advanced chronic liver disease (ACLD). Spleen stiffness measurement (SSM) might improve the non-invasive diagnosis of clinically significant portal hypertension, but previous studies have reported heterogeneous SSM cutoffs. We aimed to evaluate the accuracy of SSM and SSM-based algorithms in this setting.

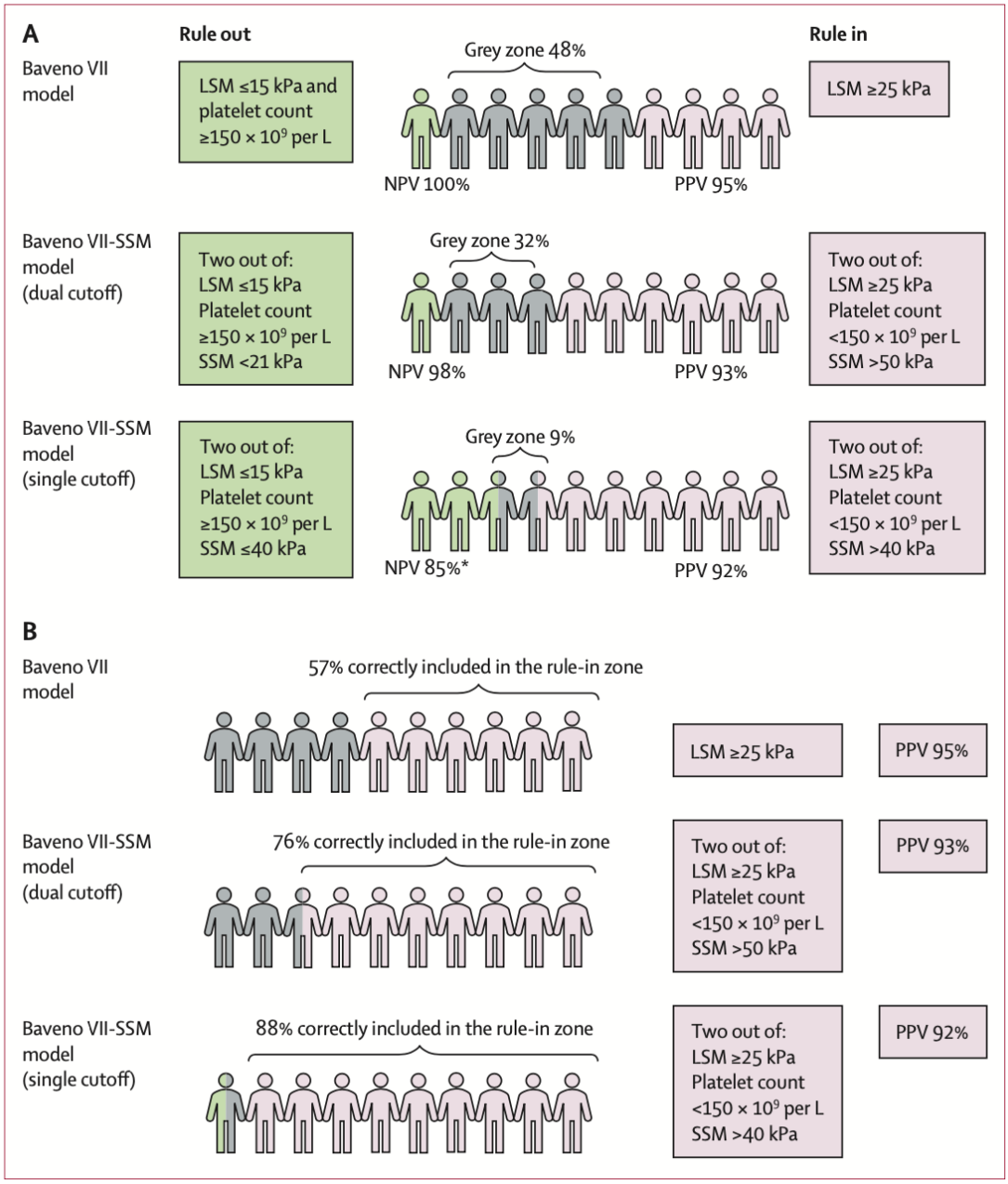
Methods

In this systematic review and individual patient data meta-analysis, we searched PubMed, Embase, Scopus, Web of Science, and the Cochrane Library from database inception to Dec 31, 2022, for articles, abstracts, and letters, with no restrictions on language. Cross-sectional studies reporting hepatic venous pressure gradient and SSM by different techniques (transient elastography; two-dimensional shear-wave elastography [2D-SWE]; point shear-wave elastography [p-SWE]) in adults (≥18 years) with compensated ACLD were eligible for inclusion. The main outcome was the diagnostic performance of two SSM-based algorithms, with the Baveno VII model as a reference, evaluating sensitivity and specificity, as well as summary negative predictive values (NPVs) and positive predictive values (PPVs). In the Baveno VII model, clinically significant portal hypertension was ruled out if patients had a liver stiffness measurement (LSM) of 15 kPa or less and a platelet count of 150 × 109 platelets per L or higher and ruled in if they had an LSM of greater than 25 kPa. The two SSM-based models combined these same cutoffs with additional criteria. In the Baveno VII-SSM single cutoff model, clinically significant portal hypertension was ruled out if at least two of the following were present: LSM of 15 kPa or less, platelet count of 150×109 platelets per L or higher, and SSM of 40 kPa or less; and ruled in if at least two were present: LSM of greater than 25 kPa, platelet count of less than 150×109 platelets per L, and SSM of greater than 40 kPa. The Baveno VII-SSM dual cutoff model used the same criteria, but with a cutoff of SSM of less than 21 kPa to rule out, and greater than 50 kPa to rule in, clinically significant portal hypertension. This study is registered with PROSPERO, CRD42019127164.

Findings

Of the 44 records assessed for eligibility, 17 studies (with 1245 patients) were included in the meta-analysis. In the transient elastography cohort (n=600), the Baveno VII algorithm was validated for both ruling out (NPV 100%, 95% CI 64–100; sensitivity 100%, 95% CI 70–100) and ruling in (PPV 95%, 85–98; specificity 94%, 95% CI 87–97) clinically significant portal hypertension, but the proportion of patients with indeterminate results (grey zone) was 48% (95% CI 44–52); 57% (95% CI 52–62) of patients with clinically significant portal hypertension were included in the rule-in zone. The Baveno VII-SSM dual cutoff model had adequate NPV (98%, 95% CI 58–100; sensitivity 100%, 95% CI 91–100) and PPV (93%, 95% CI 84–97; specificity 89%, 95% CI 84–93), with 32% (95% CI 28–36) of patients in the grey zone; 76% (95% CI 72–80) of the patients with clinically significant portal hypertension were in the rule-in zone. The Baveno VII-SSM single cutoff model had a sensitivity of 93% (95% CI 85–97) and a NPV of 85% (95% CI 60–96) for ruling out, and a specificity of 86%

(95% CI 80–91) and a PPV of 92% (95% CI 83–95) for ruling in, clinically significant portal hypertension. 88% (95% CI 84–91) of patients with clinically significant portal hypertension were included in the rule-in zone and 9% (95% CI 7–12) of patients were in the grey zone. In the 2D-SWE cohort (n=225), all three algorithms could safely rule in clinically significant portal hypertension with adequate PPV (≥90%), but NPV was inadequate for ruling out clinically significant portal hypertension. Insufficient data were available to evaluate the performance of SSM assessed by p-SWE. Heterogeneity was low ($I2$<25%) for most estimates.



Interpretation

Algorithms combining Baveno VII criteria with SSM showed good performance and reduced the diagnostic grey zone for clinically significant portal hypertension compared with Baveno VII criteria alone. Future studies should evaluate whether SSM-based diagnosis allows for the identification of patients who would benefit from non-selective β-blocker treatment.

Σχόλιο:

Στο τελευταίο Lancet Gastroenterology & Hepatology συναντάμε αυτή τη μετανάλυση 17 μελετών και 1245 ασθενών, η οποία επιδιώκει να δώσει περισσότερες πληροφορίες σχετικά με την κλινική σημασία της ελαστογραφίας σπληνός (SSM) στη διάγνωση και έναρξη της θεραπείας της κλινικά σημαντικής πυλαίας υπέρτασης (CSPH).

Σε αυτή τη μεγάλη κοόρτη επικυρώθηκαν τα κριτήρια Baveno VII για τη διάγνωση της κλινικά σημαντικής πυλαίας υπέρτασης , αλλά έδειξαν μη βέλτιστη κλινική εφαρμογή, λόγω του υψηλού αριθμού ασθενών με απροσδιόριστα αποτελέσματα. Η συμπερίληψη της SSM στους αλγόριθμους διάγνωσης μείωσε σημαντικά το ποσοστό των ασθενών στην «γκρίζα ζώνη» και αύξησε τον αριθμό των ασθενών, που διαγιγνώσκονται ορθά με κλινικά σημαντική πυλαία υπέρταση.

Επομένως, το μοντέλο Baveno VII + SSM είναι ένας μη επεμβατικός αλγόριθμος, που θα μπορούσε να χρησιμοποιηθεί για τον εντοπισμό και τη μεγιστοποίηση του εντοπισμού των ασθενών με κλινικά σημαντική πυλαία υπέρταση, οι οποίοι τελικά θα μπορούσαν να ωφεληθούν με τη θεραπεία με καρβεδιλόλη.

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