

Diagnostic accuracy of magnetic resonance elastography for the staging of fibrosis and diagnosis of steatohepatitis in patients with non-alcoholic fatty liver disease: a systematic review and meta-analysis

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INTRODUCTION

- Non-alcoholic fatty liver disease (NAFLD) is one of the most common chronic liver diseases in Western countries, often associated with obesity, type 2 diabetes mellitus (T2DM) and dyslipidaemia¹.
- In terms of reasons for liver transplantation, it is second only to alcohol-related disease in the USA².
- There is an unmet need for non-invasive biomarkers to replace liver biopsy and magnetic resonance-based methods, particularly magnetic resonance elastography (MRE) has shown promising results.

AIM

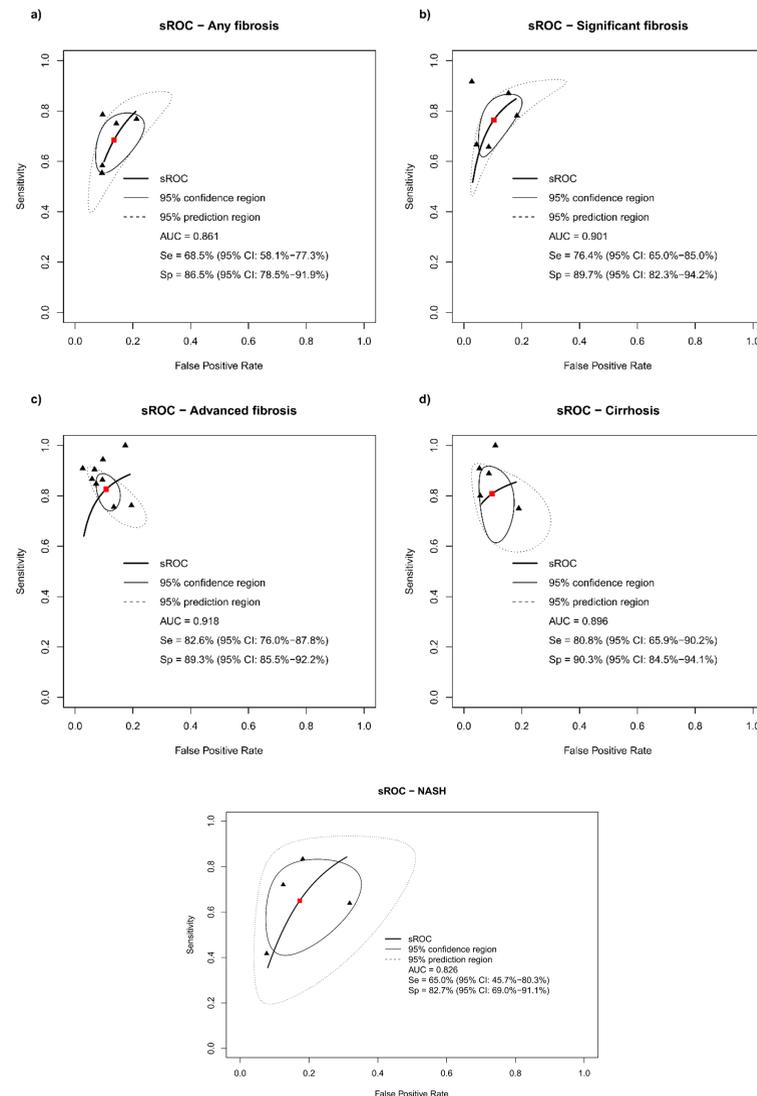
We evaluated the diagnostic accuracy of magnetic resonance elastography (MRE) for staging fibrosis and diagnosing non-alcoholic steatohepatitis (NASH) in NAFLD patients.

METHODS

- An electronic search of PubMed, EMBASE and Cochrane Library was conducted in March 2018 and updated in January 2019, and full-text papers and conference abstracts examining the diagnostic test accuracy of MRE were included.
- Studies reporting on adult populations with biopsy-proven NAFLD using the NASH CRN histological scoring system and MRE performed within 6 months of biopsy were included.
- Classification tables for diagnosing dichotomised fibrosis groups (any fibrosis – $\geq F1$, significant fibrosis – $\geq F2$, advanced fibrosis – $\geq F3$, cirrhosis – $F4$) and NASH were reconstructed from reported diagnostic accuracy metrics for each study.
- Summary ROC curves (sROC), sensitivities, specificities, 95% confidence regions, and 95% prediction regions were produced using a bivariate logitnormal model.
- The minimum acceptable performance level was defined as **80% for both sensitivity and specificity**.
- Risk of bias was assessed using the QUADAS-2 tool.

RESULTS

- 10 studies (990 patients, 40% male, mean age range: 35-57 years) provided sufficient data for meta-analysis. 9 prospective, 9 single-centre studies.
- 8 studies were performed in the USA, 1 in Brazil and 1 in Japan.
- 9 studies reported a mean or median BMI $> .30$ kg/m².
- 7 studies reported the proportion of patients with diabetes (average prevalence 38%).
- 6 studies did not report on the technical failure rates; none of the studies reported on rates of subjects excluded due to contraindications to MR.
- Only one study, that used predefined cut-offs, was scored as having low risk of bias in all four domains (patient selection, index test, reference standard, flow and timing). The rest of the studies had high risk of bias in at least one domain.
- All studies used the Youden index to obtain the optimal MRE liver stiffness cut-off to diagnose liver fibrosis stages and NASH.



CONCLUSIONS

- In patients where liver stiffness can be successfully measured using MRE, the test has **good diagnostic accuracy for fibrosis and NASH** in the context of cut-offs not being pre-specified.
- The use of MRE for the detection of **advanced fibrosis ($\geq F3$) and cirrhosis (F4) reached our pre-defined minimum acceptable performance**.
- Intention-to-diagnose analyses** and validation of **pre-specified cut-offs** are lacking from the literature and these areas should be the focus of future studies.

ACKNOWLEDGEMENTS

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