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Response to letter: Multiparametric magnetic resonance imaging in patients with nonalcoholic fatty liver disease

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We appreciate the interest in our review article on multiparametric magnetic resonance (MR) methods in patients with nonalcoholic fatty liver disease¹ (NAFLD) and value the authors' letter expressing their concern that, based on the currently available evidence, it is not clear which role iron-corrected T₁ mapping (cT₁) may play in the management of NAFLD.

Our primary goal was to review the utility and limitations of multiparametric quantitative imaging of the liver for the diagnosis and management of patients with NAFLD. We agree that liver fibrosis stage is shown to be an important predictor for overall and disease-specific mortality in patients with NAFLD.² Liver biopsy is the reference standard for assessment of fibrosis but has an inherent risk of complications, therefore noninvasive biomarkers are needed. For the quantification of fibrosis with MR, we chose to discuss magnetic resonance elastography (MRE), a method that is already extensively studied, and cT₁ as a relatively novel MR method. The authors raise an important point: cT₁ alone is not suitable for the assessment of fibrosis grade of the liver. Contrary to what has been alleged in their letter to the editor, we fully agree with this statement and in our review this limitation is briefly addressed.

Studying the present literature carefully, we concluded that cT₁ shows potential to distinguish simple steatosis from nonalcoholic steatohepatitis (NASH) and cirrhosis.^{3,4} However, a major limitation of cT₁ is the difficulty to distinguish between active inflammation and fibrosis in the liver, because both processes increase the liver T₁ relaxation time. In our proposed clinical algorithm, we show clearly that elevated cT₁ values are indicative for fibrosis and/or inflammation and not fibrosis alone. It should be noted that cT₁ shows good diagnostic accuracy for identifying patients with NASH and fibrosis.⁵ Furthermore, while cT₁ cannot dissociate the signal from inflammation and fibrosis, it does remain linearly related to both. The same cannot be said for MRI proton density fat fraction, which decreases with increasing fibrosis,⁶ highlighting the potential of cT₁ as a NASH specific biomarker.

We agree that further studies are necessary to fully assess the diagnostic potential of cT₁ in the evaluation of patients with suspected high-risk NAFLD. It is interesting to await the results of the Radical 1 study,⁷ a multicenter randomized controlled phase 4 trial, designed to investigate the use of multiparametric MR methods as a standardized diagnostic test in comparison to routine methodical assessment for patients with suspected NAFLD in Europe.

In summary, we agree that cT₁ alone cannot yet differentiate between various stages of liver fibrosis and inflammation. MRE is highly accurate in the detection of fibrosis; however, the need for additional hardware limits its wide application in clinical practice. Therefore, it is necessary to discuss the utility and limitations of novel techniques, such as cT₁, for the assessment of patients with suspected NAFLD. We will await the results of further studies to assess the role of cT₁ in the management of NAFLD.

Conflict of interest

The authors declare no conflict of interest.

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Level of Evidence: 5

Technical Efficacy Stage: 2