Editorial

# Will the magnetic resonance imaging proton density fat fraction replace liver biopsy as the gold standard for detecting steatosis?

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*Comment on:* Middleton MS, Heba ER, Hooker CA, *et al.* Agreement Between Magnetic Resonance Imaging Proton Density Fat Fraction Measurements and Pathologist-Assigned Steatosis Grades of Liver Biopsies From Adults With Nonalcoholic Steatohepatitis. Gastroenterology 2017;153:753-61.

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Accompanied with the ongoing epidemics of obesity and metabolic syndrome arising from the westernization of lifestyles, the incidence of nonalcoholic fatty liver disease (NAFLD) has been getting higher worldwide in the last decades (1). The estimated number of NAFLD patients has reached about 80–100 million in the US, and the corresponding number of patients in Japan has been estimated at about 20 million (1-4). Liver biopsy is recommended as the reference standard method for grading steatosis and staging hepatic fibrosis (4,5). Hepatic steatosis is a histological hallmark of NAFLD, which is divided into NAFL without ballooning degeneration and NASH with ballooning degeneration (6,7). However, liver biopsy is associated with a risk of complications and is costly and time-consuming for both healthcare providers and patients (8). Furthermore, liver biopsies cannot be performed in many NAFLD patients worldwide. Therefore, the capability to diagnose hepatic steatosis correctly is important for clinical assessments.

To surmount these background factors and limitations, an innovative technology based on the magnetic resonance imaging (MRI) that estimates the proton density of the fat fraction (PDFF) of the liver has been developed. The PDFF, which is the fraction of MRI-visible protons bound to fat divided by all the protons in the liver (bound to fat and water), is an MRI-based method for the quantitative evaluation of hepatic steatosis. Middleton *et al.* reported the diagnostic performance of MRI-PDFF for grading hepatic steatosis in a multi-center study (9). They showed that MRI-PDFF changes were associated with changes in the histological steatosis grade. The results of their analysis revealed that a change in MRI-PDFF can be used to identify subjects with a reduced (AUROC of 0.81) or increased (AUROC of 0.81) steatosis grade.

It seems that MRI-PDFF measurements is an ideal means of evaluating hepatic steatosis, since this method is liver-specific and reproducible within patients; the methods has also been validated for various ethnicities (10-14). Additionally, PDFF can be easily repeated to monitor changes in steatosis. In summary, the development of reliable noninvasive methods for the assessment of liver steatosis and fibrosis has become essential to the treatment of NAFLD.

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## Footnote

*Conflicts of Interest:* The authors have no conflicts of interest to declare.

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