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MRI, CT Scan, and Ultrasound in the Diagnosis of Nonalcoholic Fatty Liver Disease

Mazen Nouredin, MD, Cyrus Khoyilar, BS, Suzanne L. Palmer, MD

Department of Medicine, Division of Gastrointestinal and Liver Diseases, (for Nouredin and Khoyilar), Department of Radiology (for Palmer) USC Keck School of Medicine, Los Angeles, CA

To the Editor:

We read with great interest the World Gastroenterology Organisation global guidelines: nonalcoholic fatty liver disease and nonalcoholic steatohepatitis¹ (NASH) and would like to commend the authors for their straightforward overview of the epidemiology, diagnosis, and treatment of nonalcoholic fatty liver disease (NAFLD). In this response to the guideline, we would like to comment on the procedure set forth for the diagnosis of NAFLD. Although we largely agree with the methodology presented, we would like to respectfully suggest reconsideration of the diagnostic algorithm section described in figure 2. The guidelines suggest the use of computed tomography (CT) when ultrasound (US) imaging is not informative. CT has been shown to have limited sensitivity in measuring hepatic steatosis compared with US.² CT scan can be affected by other factors such as iron and fibrosis deposition. It has also been shown to be less accurate in detecting mild steatosis compared with more advanced steatosis.³ In addition, the use of radiation means that CT is unsuitable for use in children or for longitudinal follow-up in clinical trials and patient care. US is machine and operator dependent, has low positive predictive value, is affected by edema and extrahepatic adipose tissue, is difficult to perform in obese patients, and has limited sensitivity when steatosis is <30% on liver biopsy.^{2,4} Magnetic resonance spectroscopy (MRS) has been shown to be precise in quantifying liver steatosis and has become the reference standard; however, it has biases and is mainly used in research studies.⁵ Magnetic resonance imaging (MRI) has been proven to be accurate in detecting fat in the liver.^{6,7} MRI-determined proton density fat fraction (MRI-PDFF) is a novel technique that reduces the biases seen with MRS and has been shown to be highly correlated with MRS.^{8,9} It has been demonstrated that MRI-PDFF is accurate in quantifying liver fat.^{8,10} We recently showed that MRI-PDFF correlates highly with MRS in quantifying liver fat in patients enrolled in a clinical trial for nonalcoholic steatohepatitis.⁸ In contrast to MRS, MRI-PDFF is easier to apply, requires less time, is cheaper compared with MRS, and is now commercially available.⁷ Although underutilized, the fat fraction quantification is available on MR machines.

Thus, we propose the use of MRI and, in particular, MRI-PDFF, as an alternative to CT scans and US in NAFLD diagnosis. This will allow for accurate quantification of liver fat

and will be a useful tool for longitudinal follow-up. The cost of MRI is traditionally known to be higher than US. However, MRI-PDFF does not require contrast and can be performed in a short time. Indeed, Medicare data show an insignificant difference in price of this limited MRI in comparison with US.⁷ We do not believe that it is useful to expose patients to additional radiation by performing a CT scan when US imaging has already been shown to be uninformative and a more accurate means of diagnosing NAFLD is readily available.

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