

Quantitative Evaluation of Hepatic Steatosis Using Advanced US Imaging Techniques

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Despite the availability of non-invasive methods to confirm the diagnosis of MAFLD, to classify steatosis and NASH, currently liver biopsy remains the gold standard. However, biopsy is obviously a procedure limited by several conditions: it is invasive, subject to sampling variability, observer-dependent and not free of clinical risk. These limitations make it impractical in the assessment of liver fat content in patients with uncomplicated MAFLD, which constitute the majority of cases. It is clear that there is a need for non-invasive and simpler methods to confirm or exclude the presence of steatosis as a first step in the diagnostic pathway, in light of the extremely high incidence and prevalence. Furthermore, accurate non-invasive quantification of steatosis is not only highly desirable at the time of diagnosis, but also during follow up, especially to monitor the impact of any interventions or events that occur. Such quantification would help in the periodic monitoring of steatosis patients in identifying those who are benefiting or not from lifestyle changes and/or drug therapies, where repeated liver biopsies over the follow-up period are at least difficult or usually impossible to obtain. To date, various non-invasive imaging methods have been used to evaluate adult patients with MAFLD, none of which are sufficiently accurate or validated for pediatric patients. Magnetic Resonance Spectroscopy MRS, and more recently Magnetic Resonance imaging proton density fat fraction MRI-PDFF, currently represents the only non-invasive diagnostic method used as a criterion for quantifying hepatic steatosis. Despite these limitations, actually US B-mode is the preferred first-line diagnostic imaging procedure suggested in patients with nonalcoholic fatty liver disease by the clinical practice guidelines of the European Association for the Study of the Liver (EASL) published in conjunction with the European Association for the Study of Diabetes and the European Association for the Study of Obesity. More recently, new liver stiffness assessment techniques have been investigated for their usefulness in the evaluation of hepatic steatosis, in a recent study, two Quantitative Ultrasound (QUS) parameters, tissue scatter-distribution imaging [TSI] and tissue attenuation imaging [TAI] of the liver parenchyma were derived from radiofrequency echo data and exhibited good diagnostic performance for predicting hepatic steatosis in patients with chronic liver disease. Even more recently other new techniques have been proposed to be used such as **USFF index** is estimated from both **Attenuation Coefficient (AC)** and the **Backscatter Coefficient (BSC)**. The resulting UDFF index is displayed in percent (%) and has a range of 0–100%. Indeed, why it is important to diagnose fatty liver, the Reasons for trend change from scatter & attenuation to fat fraction in the ultrasound fatty liver diagnosis, personal experience and Literature update will be provided.