Quantification of Hepatic Macrosteatosis in Living, Related Liver Donors: Comparison of the Accuracy of Breath-hold MR Imaging Techniques

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PURPOSE: To compare the accuracy of dual gradient echo magnetic resonance imaging (DGE-MRI),T2*-corrected chemical shift imaging(CSI), and T2-corrected multi-echo breath-hold T2-corrected proton magnetic resonance spectroscopy (BH ^{1}H-MRS) for the diagnosis and quantitative estimation of hepatic steatosis (HS) in potential liver donors using the histopathology as the reference standard.

MATERIALS AND METHODS: 51 potential liver donors were included. All patients were imaged with three kinds of breath-hold MR imaging techniques including DGE-MRI, T2*-corrected CSI using triple-echo spoiled gradient-echo sequence, and BH ^{1}H-MRS on a 3-T MR scanner. The three MR techniques and pathology values of macrosteatosis were correlated using the Spearman-correlation-coefficient. In 10 patients, T2*-corrected CSI and BH ^{1}H-MRS were examined to assess short-term reproducibility by using analysis of variance testing within subject and between separate imaging sessions.

RESULTS: The results of the hepatic-fat fraction estimated on T2*-corrected CSI (γ=0.719) and ^{1}H-MRS (γ=0.707) were better correlated with the histologic degree of macrosteatosis that those on DGE-MRI (γ=0.622, P<0.001). Combined use of ^{1}H-MRS and T2*-corrected CSI showed 100% sensitivity and 90% specificity for detecting HS, respectively. Analysis of variance of two imaging sessions with the T2*-corrected CSI and ^{1}H-MRS techniques indicated no significant variance in 10 subjects (p > 0.05).

CONCLUSION: Combined use of the T2*-corrected CSI and BH ^{1}H-MRS allowed a rapid and noninvasive diagnosis of HS in potential living liver donors; it can also help to avoid unnecessary biopsies in these patients.

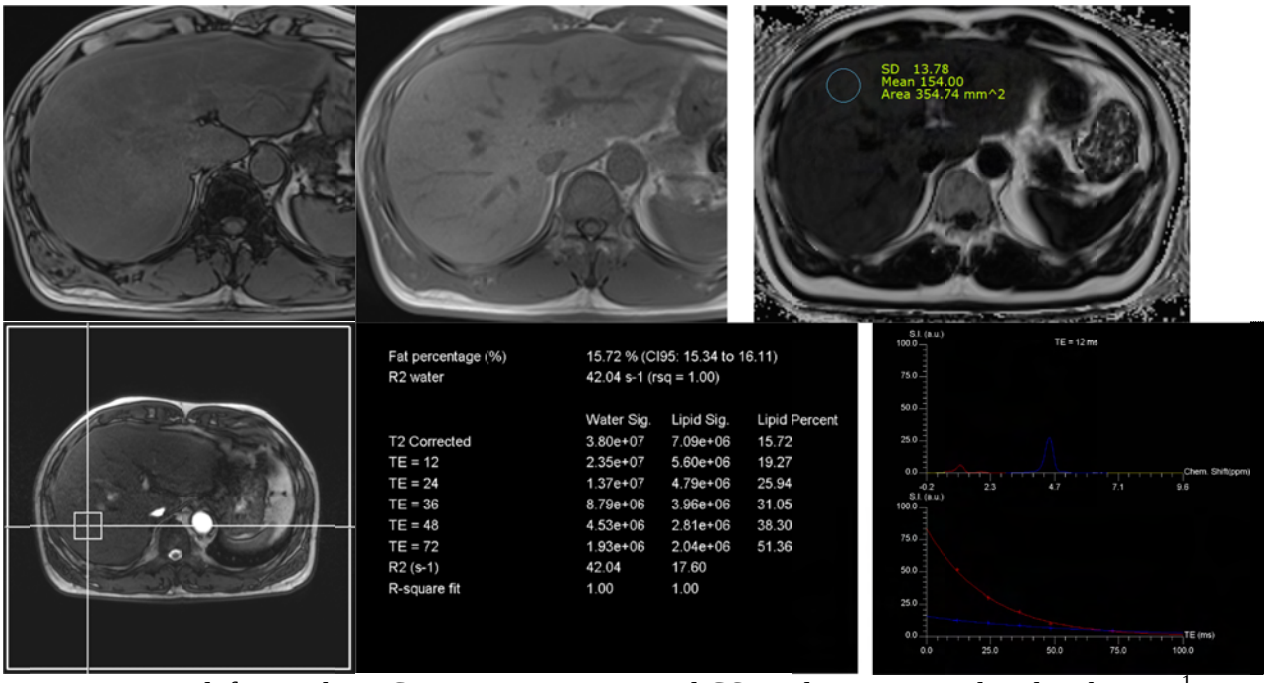

Figure 1. From left to right: DGE-MRI, T2*-corrected CSI and T2-corrected multiecho BH ^{1}H-MRS