



Noninvasive liver steatosis quantification using MRI techniques combined with blood markers:

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Résumé en anglais

Aims: To evaluate the accuracy of different techniques of MRI steatosis quantification, based on histological grading and quantification of liver steatosis. **Patients and methods:** Twenty-three patients (21 with nonalcoholic fatty liver disease and two controls) were included. Steatosis was evaluated in liver specimens using histological grading (five grades) and steatosis area (% of liver surface) was computed using an inhouse automated image analysis. The following five MRI quantification techniques were performed: two-point Dixon, three-point Dixon, DUAL, spin echo method and a new technique called multi-echo gradient-echo (MFGRE). Interobserver (two observers) and intersite (three different liver sites) agreements were evaluated for the two best-performing methods. **Results:** Steatosis area was correlated with steatosis grade: R_s (Spearman coefficient)=0.82, P value of less than 0.001. The steatosis area was significantly different between S0-S2 and S3-S4 grades: 4.2 ± 2.4 versus $16.4 \pm 8.9\%$ ($P < 0.001$). Correlations between the MRI techniques and steatosis area (or grading) were: MFGRE, $R_s = 0.72$ (0.78); spin echo method, $R_s = 0.72$ (0.76); DUAL, $R_s = 0.71$ (0.76); two-point Dixon, $R_s = 0.71$ (0.75); three-point Dixon, $R_s = 0.67$ (0.77). Interobserver ($R_{ic} = 0.99$) and intersite ($R_{ic} = 0.97$) agreements were excellent for the liver steatosis measurement by MFGRE. The noninvasive diagnosis of the steatosis area was improved by adding blood markers like ALT and triglycerides to MFGRE (aR^2 : 0.805). **Conclusion:** MRI, and in particular the MFGRE method, provides accurate and automatic quantification for the noninvasive evaluation of liver steatosis, either as a single measurement or in combination with blood variables.

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