Quantification of SPIO enhancement measured by T2 and T2* mapping in chronic liver disease: a preliminary report

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Purpose: To quantify the influence of chronic liver disease on the accumulation of SPIO using T2 and T2* mapping on pre-contrast and SPIO-enhanced MRI.

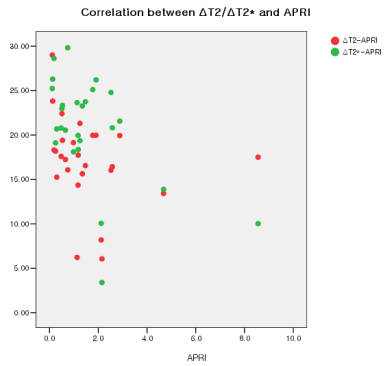
Method and Materials: Seven non-cirrhotic patients and 20 patients with chronic liver disease (15 Child-Pugh class A and 5 Child-Pugh class B or C) were enrolled in this study. MR with T2 and T2* mapping was performed using multi-echo fast-field-echo (MEFFE) sequence in each patient before and after SPIO administration. T2 and T2* value was obtained. ΔT2 ($T2_{pre}$-$T2_{spio}$) and ΔT2* ($T2^*_{pre}$-$T2^*_{spio}$) was calculated from MR images and compared between three groups (control, Child-Pugh A, and Child Pugh B and C) using student t test. Correlations between these values and biomarkers such as albumin, prothrombin time(PT), and aspartate aminotransferase-to-platelet ratio index (APRI) were calculated by Pearson correlation tests.

Results : The value of ΔT2 was higher in control group patient (21.0 ms) than that in patient with chronic liver disease (16.0 ms) with statistical significance (P=0.016). ΔT2* was also higher in control group patient (24.4 ms) than patient with chronic liver disease (19.8 ms), but without statistical significance (p=0.074). Among patients with chronic liver disease, ΔT2* was significantly different between Child-Pugh class A (22.2 ms) and Child-Pugh class B and C (12.5 ms) (p=0.001). ΔT2 was correlated with total bilirubin (Pearson correlation = -0.544, p=0.013) and PT (Pearson correlation = -0.776, p=0.002) of patients. ΔT2* was correlated with total bilirubin (Pearson correlation = -0.638, p=0.002), albumin (Pearson correlation = 0.566, P=0.009), PT (Pearson correlation = -0.697, p=0.001), and APRI (Pearson correlation = -0.465, p=0.039).

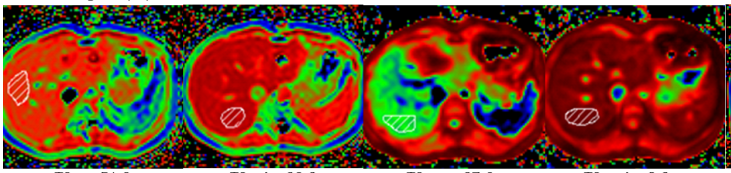
Conclusion : Quantification of SPIO enhancement with T2 and T2* mapping can be helpful for evaluating chronic liver disease.

	$T2_{pre}$	$T2_{SPIO}$	ΔT2	$T2^*_{pre}$	$T2^*_{SPIO}$	ΔT2*
Control group patient (n=7)	55.5	34.4	21.0 §	31.6	7.2	24.4 §
Patient with chronic liver disease(n=20)	55.2	39.3	16.0 §	27.3	7.6	19.8 §
Child-Pugh class A (n=15)	56.4	39.5	16.9 §	29.2	7.0	22.2 §
Child-Pugh class B & C (n=5)	51.7	38.5	13.2 §	21.8	9.3	12.5 §

§ : Statistically difference (p<0.05)



Control group patient



Patient with chronic liver disease