

Application of T2* map to the liver before and after SPIO administration: correlation with liver function

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Background and Purpose:

It has been known that iron accumulation is closely related to development of chronic liver diseases. Recently, the sequence and the software to generate T2* map with B0 correction was developed by Phillips Medical Systems (PMS) [1]. We applied this T2* map for the evaluation of the liver before and after the superparamagnetic iron oxide (SPIO) administration.

Materials and Methods:

MR equipment used was a 1.5T clinical unit (Intera Achieva, PMS). 12 patients (6 men and 6 women, mean age 60 years old) underwent SPIO-mediated MR imaging for the evaluation of possible liver tumors. 4 out of these 12 had normal liver function (N): 4, 3, and 1 had grade A (CPA), B (CPB), and C (CPC) liver dysfunction according to Child-Pugh classification. For all of these 12 patients, T2* map, calculated from the data obtained by multi-echo 2DFFE (TR/TE/FA=256/26/28, number of echo 29, ΔTE=1.8), was generated before and after SPIO administration. T2* values were measured for the liver parenchyma, excluding apparent vessels or tumors referring to other pulse sequence images. Results were correlated to liver function (N&CPA vs CPB&C).

Results:

T2* values before SPIO administration in N&CPA group was significantly larger (33.7±7.5 msec) than that in CPB&C group (19.6±4.3 msec) (unpaired t-test, p=0.013). T2* values after SPIO administration in N&CPA group was significantly smaller (9.2±0.7 msec) than that in CPB&C group (11.6±1.6 msec) (p=0.004) (Fig.s 1 and 2). Therefore, ΔT2* (T2* value difference between before and after SPIO) was significantly larger in N&CPA group than in CPB&C group.

Conclusion:

T2* values of the liver in patients with advanced liver dysfunction was lower than that in those with better liver function, probably representing excessive iron accumulation. After SPIO administration, the former was smaller than the latter, probably representing impaired Kupffer cell function in the former. T2* map can be a novel promising tool to evaluate diffuse liver disease.

Reference:

1. Dahnke H and Schaeffter T. Limits of Detection of SPIO at 3.0 T using T2* Relaxometry. Magnetic Resonance in Medicine 53:1202-1206 (2005)

Figure 1

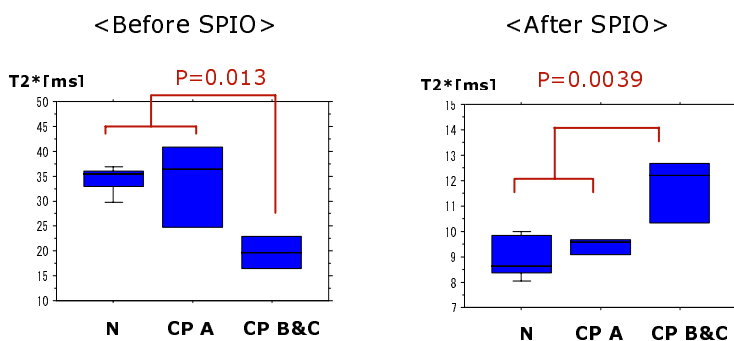


Figure 2

