

POSTER PRESENTATION

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Diffuse Myocardial Fibrosis detected by Multi-slice T₁ Mapping using Slice Interleaved T₁ (STONE) Sequence in Patients with Hypertrophic Cardiomyopathy

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Background

The presence of myocardial fibrosis is associated with worse clinical outcome in hypertrophic cardiomyopathy (HCM) patients. Due to the substantial variations in left ventricular (LV) wall thickness and fibrosis in HCM, volumetric coverage of entire LV myocardium is essential for the accurate assessment of myocardial fibrosis. Slice-interleaved T₁ (STONE) mapping sequence allows for the assessment of native T₁ time with complete coverage of LV myocardium. The aim of this study was to investigate whether STONE sequence is useful for the assessment of regional variability of LV native T₁ time in HCM patients.

Methods

Twenty-four septal HCM patients (56 ± 16 years) and 10 healthy adult control subjects (57 ± 15 years) were studied. Native T₁ mapping was performed using STONE sequence which enables acquisition of 5 slices in the short-axis plane within a 90 sec free-breathing scan. The sequence was acquired in a free-breathing ECG-triggered slice-selective bSSFP with the following parameters: 5 slices, in-plane resolution = 2.1x2.1 mm², slice thickness=8 mm, slice gap=4 mm, field of view=360x352 mm², TR/TE/α=2.8 msec/1.4 msec/70°, SENSE-factor=2, linear ordering, 10 linear ramp-up pulses and acquisition window=240 msec. We measured LV native T₁ time and maximum LV wall thickness in each 16 segments from 3 slices (basal-, mid- and apical-slice). Late gadolinium enhanced (LGE)

MRI was acquired to assess presence or absence of myocardial enhancement.

Results

In HCM patients, LV native T₁ time was significantly elevated compared to healthy controls, regardless of presence or absence of LGE (mean native T₁ time; LGE (+) segments (n = 27), 1139 ± 55 msec; LGE (-) segments (n = 351), 1118 ± 55 msec; healthy control (n = 160), 1065 ± 35 msec; p < 0.001 by one-way ANOVA, 6 segments were excluded from analysis due to artifacts). Among 351 segments without LGE, native LV T₁ time was diffusely elevated over the 16 segments (Figure). Significant positive correlation was found between LV wall thickness and native LV T₁ time (y=1013+8.7x, p < 0.001).

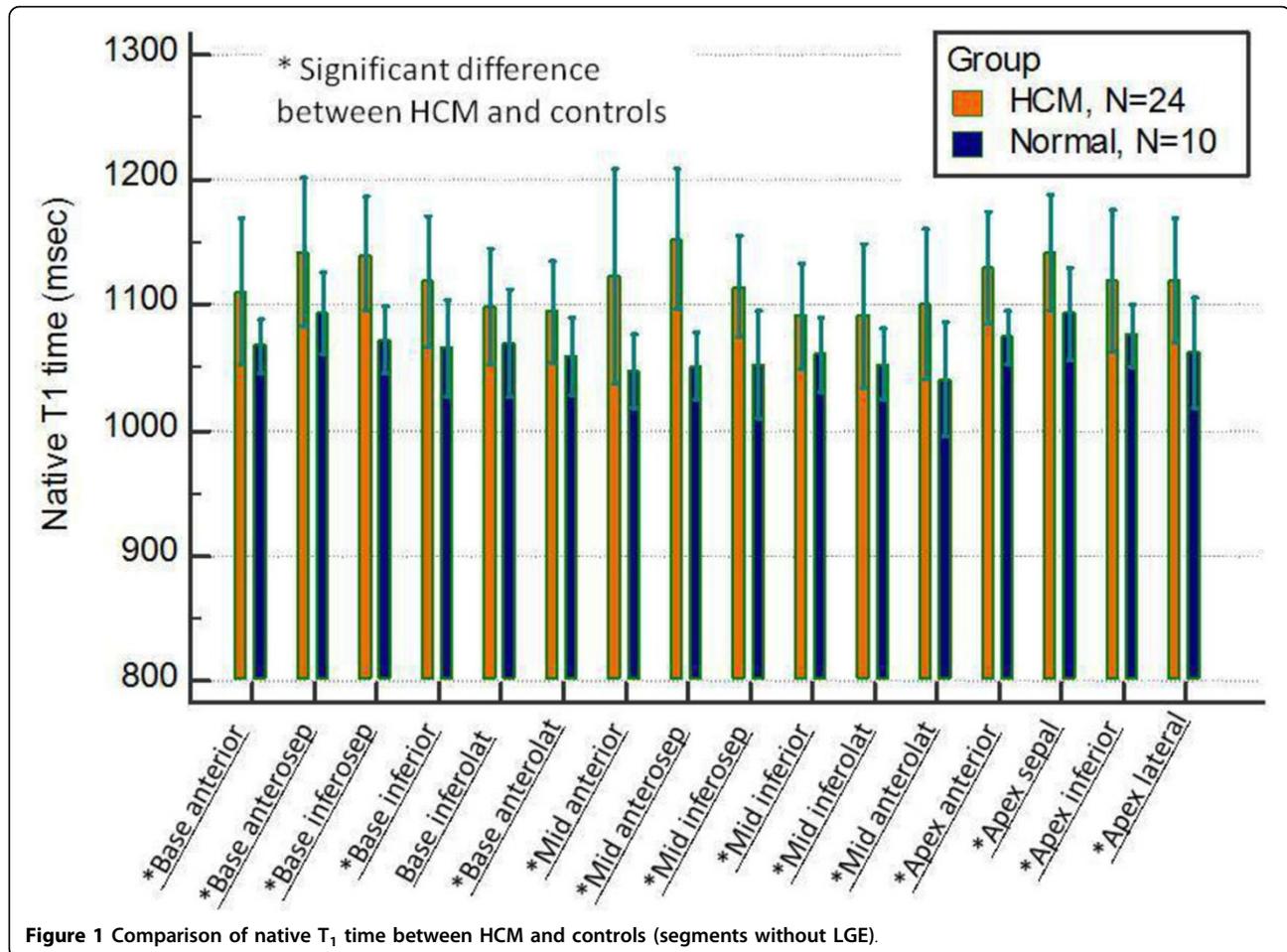
Conclusions

In HCM, substantial number of segments without LGE showed elevated native T₁ time, and native T₁ time was correlated with LV wall thickness. Slice-interleaved T₁ mapping by using STONE sequence could be advantageous to overcome limited cardiac coverage of conventional single-slice T₁ mapping technique and to accurately detect the diffuse myocardial fibrosis in HCM patients.

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