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POSTER PRESENTATION

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The diagnostic performance of non-contrast T1-mapping in patients with acute myocarditis on cardiovascular magnetic resonance imaging

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Summary

Non-contrast T1-mapping using ShMOLLI can serve as a novel CMR diagnostic criterion in patients presenting with suspected acute myocarditis.

Background

The accurate diagnosis of acute myocarditis on cardiovascular magnetic resonance imaging (CMR) often requires multiple modalities, including T2-weighted (T2w), early and late gadolinium imaging. T1-mapping is an emerging technique which is also sensitive to acute changes in free water content. We hypothesized that non-contrast T1-mapping using the novel Shortened Modified Look-Locker Inversion Recovery (ShMOLLI) sequence can serve as a new diagnostic criterion for acute myocarditis.

Methods

We studied 23 patients with suspected acute myocarditis and 17 healthy controls. All patients presented with chest pain and troponin I > 0.04 ug/L. CMR within 7 days included (1) T2w short-TI inversion recovery (STIR);(2) ShMOLLI T1-mapping; and (3) phase-sensitive late gadolinium enhancement (LGE) (Fig 1). T2 signal intensity (SI) relative to skeletal muscle (T2 SI ratio) and absolute T1 values per-subject were analyzed.

Results

All patients had a CMR diagnosis of acute myocarditis based on both positive T2-STIR and typical LGE pattern. Compared to controls, both mean T1 and T2 SI ratio in patients were significantly higher (T1=1036 ±71ms vs. T1=938±19; T2 SI ratio=1.77±0.24 vs. 1.52 ±0.10, p<0.0002 for both). Receiver operator characteristics analysis showed excellent diagnostic performance for both methods: the area-under-the-curve for ShMOLLI T1-mapping=0.96 and STIR=0.93 (p=0.3, Fig 2). The equal sensitivity and specificity points were T1=87% (T1=958ms) and T2=83% (T2 SI ratio=1.63).

Conclusions

Non-contrast T1-mapping using ShMOLLI has a high diagnostic performance for acute myocarditis and may be used as a novel additional CMR diagnostic criterion.
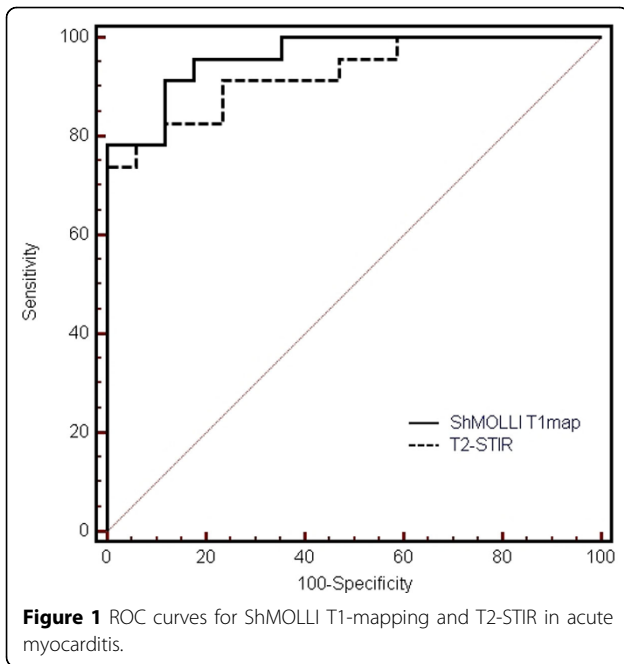
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Figure 1 ROC curves for ShMOLLI T1-mapping and T2-STIR in acute myocarditis.

Figure 2 Acute myocarditis. (Top) STIR demonstrating increased signal intensity in the mid lateral wall. (Middle) ShMOLLI T1-map demonstrating increased T1 values (1100-1200 ms) in the lateral wall. (Bottom) LGE imaging demonstrating mid-wall enhancement in the lateral wall.