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Accessibility
Reproducibility of slice-interleaved myocardial \( T_2 \) mapping sequences

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**Background**

Myocardial \( T_2 \) mapping sequence allows quantitative assessment of myocardial edema and inflammation. Commonly, a series of \( T_2 \) weighted images with steady-state free-precession (SSFP) are acquired after \( T_2 \) magnetization preparation (\( T_2 \)Prep) with different echo times. Conventionally, a single slice per breath-hold is acquired to image one single slice. Because inflammation/edema is often regional, multiple breath-holds are needed to cover the entire ventricle. The slice-interleaved \( T_2 \) mapping sequence was recently proposed to image multiple slices in a single scan by using a slice-selective \( T_2 \)Prep. While accuracy of this sequence to quantify \( T_2 \) was previously studied, the measurement reproducibility is not known. Therefore, we sought to investigate the reproducibility of myocardial \( T_2 \) mapping using the slice-interleaved \( T_2 \) mapping sequence.

**Methods**

Eleven healthy subjects (age: 33 ± 16 years, 6 males) were imaged on 2 different days with the same scan protocol using a 1.5T MRI scanner (Philips Achieva). On each day, slice-interleaved \( T_2 \) sequence was repeated twice. Subsequently, subjects were removed from the scanner and repositioned, followed by another 2 repetitions of the same scan. The following imaging parameters were used: In-plane resolution = 2.1 × 2.1 mm\(^2\), slice thickness = 8 mm, slice gap = 4 mm, Field of View = 320 × 320 mm\(^2\), TR/TE/\( \alpha \) = 2.8 msec. / 1.38 msec. /55°, SENSE-rate = 2.3, and acquisition window = 191 ms, bandwidth = 1879.7 Hz/pixel. Motion correction was performed between different images. \( T_2 \) maps were calculated using a 3-parameter fit model. The epicardial and endocardial contours in the left ventricle were manually drawn in 5 short axis-slices to calculate global and slice-based myocardial \( T_2 \) values. Coefficient of variation (CV) analysis for each slice was generated to assess the variability. Bland-Altman plots were used to test for significant differences between repetitions, sessions and days.

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Results
Figure 1 shows mean T2 values for different imaging sessions, averaged over all subjects and low CVs between subjects (7.2 ± 4.3%). There were low CVs between days (6.3 ± 4.0%) and between sessions (5.0 ± 4.3%). Fig. 2 shows Bland-Altman plots for T2 values between first scan of day 1 and day 2 (A), between first scan of session 1 and session 2 (B), and between scan 1 and 2 within each first session (C).

Conclusions
Slice-Interleaved T2 mapping sequence yields reproducible T2 measurements with highest CV of 7.2 ± 4.3% for between day scans.

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