

POSTER PRESENTATION

Open Access

# Reproducibility of slice-interleaved myocardial $T_2$ mapping sequences

Steven Bellm<sup>1\*</sup>, Tamer Basha<sup>1</sup>, Long Ngo<sup>1</sup>, Sophie Berg<sup>1</sup>, Kraig V Kissinger<sup>1</sup>, Beth Goddu<sup>1</sup>, Warren J Manning<sup>1,2</sup>, Reza Nezafat<sup>1</sup>

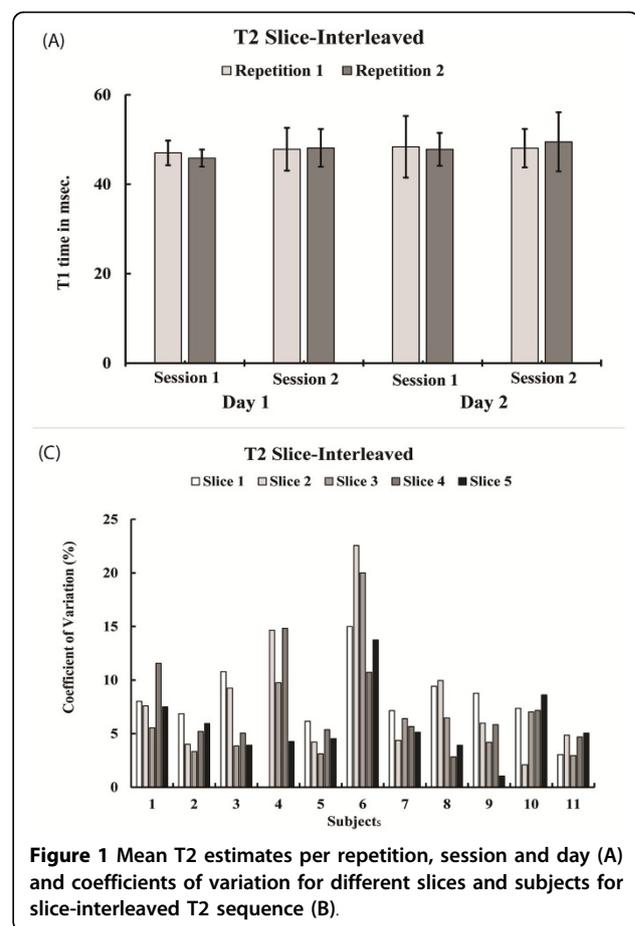
From 19th Annual SCMR Scientific Sessions  
Los Angeles, CA, USA. 27-30 January 2016

## 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:  $33 \pm 16$  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 =  $2.1 \times 2.1 \text{ mm}^2$ , slice thickness = 8 mm, slice gap = 4 mm, Field of View =  $320 \times 320 \text{ mm}^2$ , TR/TE/ $\alpha$  = 2.8 msec. / 1.38 msec. /  $55^\circ$ , 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

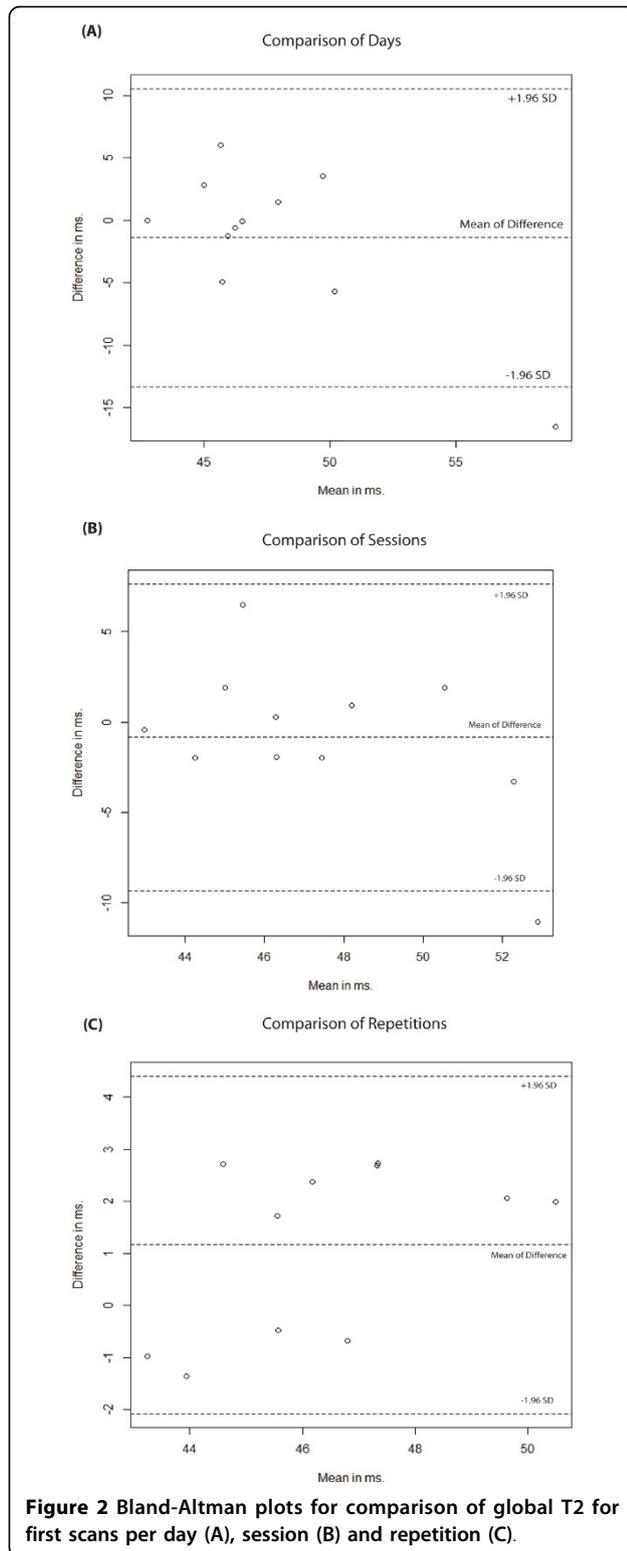


**Figure 1** Mean  $T_2$  estimates per repetition, session and day (A) and coefficients of variation for different slices and subjects for slice-interleaved  $T_2$  sequence (B).

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.

<sup>1</sup>Medicine, Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, MA, USA

Full list of author information is available at the end of the article



## Results

Figure 1 shows mean T<sub>2</sub> values for different imaging sessions, averaged over all subjects and low CVs *between subjects* ( $7.2 \pm 4.3\%$ ). There were low CVs *between days*

( $6.3 \pm 4.0\%$ ) and *between sessions* ( $5.0 \pm 4.3\%$ ). Fig. 2 shows Bland-Altman plots for T<sub>2</sub> 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 T<sub>2</sub> mapping sequence yields reproducible T<sub>2</sub> measurements with highest CV of  $7.2 \pm 4.3\%$  for between day scans.

## Authors' details

<sup>1</sup>Medicine, Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, MA, USA. <sup>2</sup>Radiology, Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, MA, USA.

Published: 27 January 2016

doi:10.1186/1532-429X-18-S1-P54

**Cite this article as:** Bellm *et al.*: Reproducibility of slice-interleaved myocardial T<sub>2</sub> mapping sequences. *Journal of Cardiovascular Magnetic Resonance* 2016 **18**(Suppl 1):P54.

**Submit your next manuscript to BioMed Central and take full advantage of:**

- Convenient online submission
- Thorough peer review
- No space constraints or color figure charges
- Immediate publication on acceptance
- Inclusion in PubMed, CAS, Scopus and Google Scholar
- Research which is freely available for redistribution

Submit your manuscript at  
www.biomedcentral.com/submit

