Journal of Cardiovascular Magnetic Resonance

Meeting abstract

1115 Assessment of myocardial T2* from pixel-by-pixel maps on a clinical MR system

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from 11th Annual SCMR Scientific Sessions
Los Angeles, CA, USA. 1–3 February 2008

Published: 22 October 2008

Journal of Cardiovascular Magnetic Resonance 2008, **10**(Suppl 1):A240 doi:10.1186/1532-429X-10-S1-A240

This abstract is available from: http://jcmr-online.com/content/10/S1/A240

Introduction

Measurement of myocardial T2* has become an accepted means for the diagnosis and follow-up of myocardial iron overload. The underlying studies were carried out in patients with thalassaemia major presenting with variable degrees of iron overload due to repeat transfusions and in small groups of healthy volunteers; these studies used customized pulse sequences, and T2* was derived from regions-of-interest using a commercial software package.

Purpose

The aim of our study was to establish normal values of myocardial T2* in a medium-sized cohort of healthy subjects on a standard clinical MR system from pixel-by-pixel maps using a non-commercial software tool.

Methods

Twenty healthy subjects (age 46 +/- 13.4 years, 16 male) without evidence of myocardial disease or a history of repeat blood transfusions underwent CMR on a 1.5 T clinical MR system (Avanto, Siemens Medical Solutions, Erlangen, Germany). Images were acquired in a mid-cavity short axis slice of the heart and in a transversal view of the liver, using a single breath-hold, ECG-triggered, multi-echo gradient echo pulse sequence as provided by the manufacturer (heart: 8 images with TE from 2.6 to 18.2 ms, matrix 256 × 192; liver: 12 images with TE from 1.0 to 16.5 ms, matrix 128 × 64. TR 200 ms, flip angle 20°, slice thickness 10 mm). T2* mapping was performed off-line using a free cross-platform software tool (MRmap). T2* was calculated from 2-parameter Levenberg-Marquardt curve fitting using y = A*exp(-TE/T2*). The software allowed for monitoring of the fitting quality by visualization of the fitting curve for each pixel (left Fig 1). Segmental myocardial T2* and hepatic T2* were assessed from the resulting T2* maps using a standard CMR analysis program (Mass 5.0, Medis, Leiden, Netherlands). Statistical analysis was performed by paired T tests and Pearson's correlation analysis using Analyse-it (Analyse-it Software, Leeds, UK).

Results

Evaluable T2* maps could be generated from all data sets (right Fig 1), and computation time was <30 s using a 2.0 GHz processor. Septal T2* (= mean of anteroseptal and inferoseptal segments; right Fig., black arrow heads) was higher than inferolateral T2* (27.9 +/- 3.4 vs. 23.1 +/- 5.2 ms; $p < 0.002$) and showed a narrower confidence interval of the mean (26.3 to 29.5 ms vs. 20.6 to 25.5, respectively). Liver T2* did not correlate with septal T2* (r = 0.21), but showed a similar normal range (27.2 +/- 5.9 ms, CI of mean 24.3 to 30.2 ms).

Conclusion

This study shows that measurements of myocardial T2* using a product pulse sequence and a free mapping tool are feasible and robust. Myocardial T2* should be assessed in the septum where measurements are less influenced by susceptibility artifacts from the great cardiac vein. Our results from healthy subjects confirm the find-

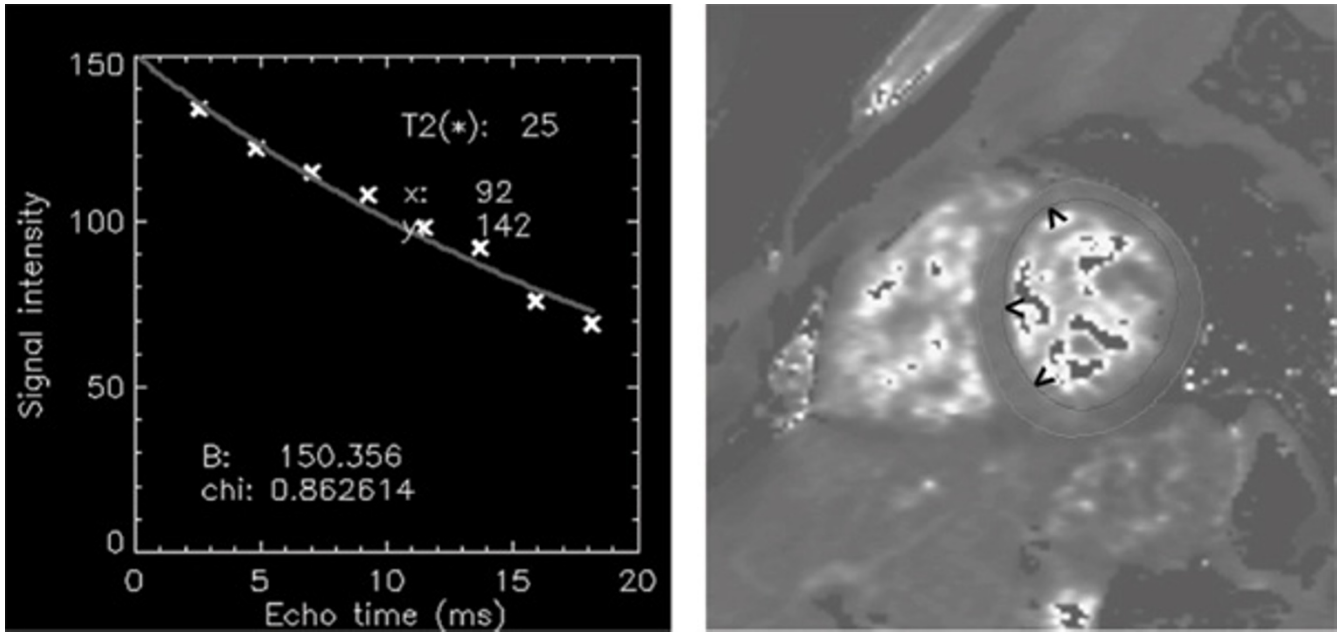

Figure 1

ing of previous studies from other groups where myocardial T2* below 20 ms was abnormal (95% lower limit in our study: 21.1 ms).