

POSTER PRESENTATION

Open Access

Myocardial iron quantification using T2-prepared SSFP parametric images at 3 Tesla

Gabriel C Camargo^{1*}, Tamara Rothstein¹, Flavia P Junqueira¹, Peter Kellman², Andreas Greiser⁴, Ralph Strecker³, Elsa Fernandes¹, Joao A Lima⁵, Ronaldo SL Lima¹, Ilan Gottlieb¹

From 16th Annual SCMR Scientific Sessions
San Francisco, CA, USA. 31 January - 3 February 2013

Background

Quantification of myocardial iron overload is critical for the management of patients with hemochromatosis. The effects of excess iron over T2 and T2* relaxation times are well known and both measures strongly correlate with iron concentration. Due to its lower sensitivity to B0 inhomogeneities, T2 has theoretical advantages over T2*, but the latter became the clinical standard as it can be easily obtained in a fast one breath-hold ECG gated multi-echo GRE sequence. T2* is especially challenging at 3T due to greater B0 inhomogeneities at higher field strengths. We aimed to validate a recently developed T2-prepared SSFP sequence that quantifies myocardial T2 times at 3T, compared to standard GRE based multi-echo T2* times at 1.5T.

Methods

A total of 15 normal volunteers and 7 chronic anemia patients (with a myocardial T2* measure <20 ms in the last 2 years, five of these on iron chelating therapy) were prospectively enrolled. Myocardial T2* and T2 times were quantified in the same day, the former using a breath-hold multi-echo GRE sequence at 1.5T (Symphony, Siemens, Erlangen, Germany) and the latter using a recently developed T2 mapping technique based on a breath-hold T2-prepared SSFP sequence at 3T (Verio, Siemens, Erlangen, Germany). All ROIs were placed at mid-interventricular septum, carefully avoiding the blood pool (Figure 1). All analyses were blinded.

Results

All patients had regular heart rhythm and all MRI exams showed diagnostic image quality. Volunteers and

patients had significantly different mean myocardial T2* (27.2 ms +/- 3.9 vs. 15.4 ms +/- 6.3 p<0.05 respectively) and T2 times (44.9 ms +/- 2.2 vs. 37.9 ms +/- 6.6 p<0.05 respectively). 3T T2 times strongly correlated with 1.5T T2* times (r=0.91 and Figure 2). C-statistic of 3T T2 times for the prediction of a 1.5T T2* <20 ms was 0.97. Using the 3T T2 cut-off of 40 ms and the standard 1.5T T2* of 20 ms, sensitivity and specificity for 3T T2 were 80% and 100% respectively.

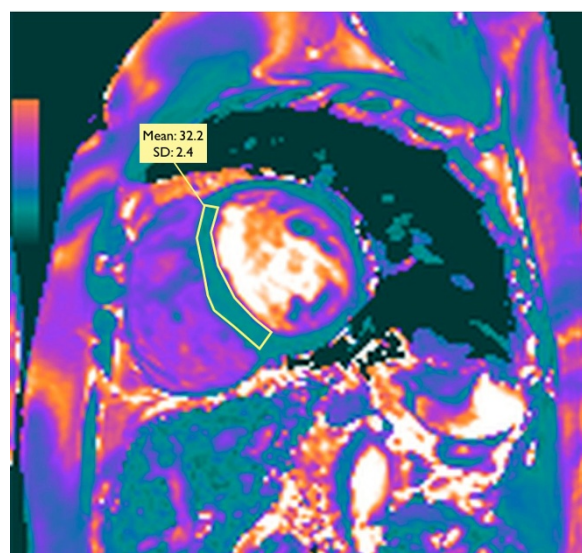
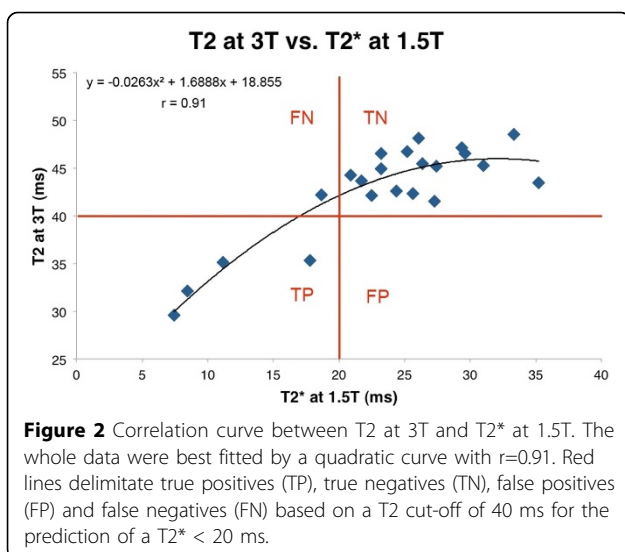


Figure 1 T2 map at 3T of a patient with iron overload showing reduced T2 time within the interventricular septum (32.2 ms), in agreement with a significantly reduced T2* time at 1.5T (8.5 ms - not shown).

¹CDPI - Clínica de Diagnóstico por Imagem, Rio de Janeiro, Brazil
Full list of author information is available at the end of the article



Conclusions

Our results show that myocardial T2 values obtained with a T2-prepared SSFP parametric sequence can potentially serve as a valuable tool for quantification of iron overload at 3T.

Funding

Internal.

Author details

¹CDPI - Clínica de Diagnóstico por Imagem, Rio de Janeiro, Brazil.

²Laboratory of Cardiac Energetics, National Institutes of Health, Bethesda, MD, USA. ³Siemens LTDA, São Paulo, Brazil. ⁴Siemens Healthcare, Erlangen, Germany. ⁵Medicine/Cardiology, Johns Hopkins University, Baltimore, MD, USA.

Published: 30 January 2013

doi:10.1186/1532-429X-15-S1-P138

Cite this article as: Camargo et al.: Myocardial iron quantification using T2-prepared SSFP parametric images at 3 Tesla. *Journal of Cardiovascular Magnetic Resonance* 2013 **15**(Suppl 1):P138.

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

