

WALKING POSTER PRESENTATION

Open Access

Initial experience for first pass cardiac perfusion with iterative reconstruction in patients

Laura Iacuzio^{1*}, Stéphane Rusek¹, Solenne Tutenuit¹, Michael O Zenge², Christoph Forman², Michaela Schmidt², Karen Mkhitarian²

From 18th Annual SCMR Scientific Sessions
Nice, France. 4-7 February 2015

Background

MR stress perfusion is a non-invasive, reliable and safe test for ischemic heart disease [1]. Recent publications reported sensitivity and specificity of 89% and 80% respectively [2]. Image quality improvements seem to be essential for improving the predictive value of the method. This leads to the dilemma of finding a compromise between high spatial resolution and sufficient SNR. Lately iterative reconstruction demonstrated great promise in improving SNR [3]. The aim of the current study was to compare cardiac perfusion in 24 patients reconstructed with product and a novel prototype iterative reconstruction.

Methods

24 patients (mean age 62 ±15) were examined on a 1.5T clinical MR scanner (MAGNETOM Aera, Siemens AG, Erlangen, Germany) using a saturation prepared TFL product sequence with the following parameters: TR/TE=331/1.4ms ; Flip angle = 12°; BW = 668Hz/Px; Voxel size=0.8×0.8×10.0 mm (inplane interpolated); FOV=290mm²; Matrix = 170×192; Slice thickness=10mm; Acceleration=2; Inversion time= 180ms; Phase oversampling=60%; Motion correction.

Pharmacological stress was applied using Adenosine (Adenoscan[®], Sanofi-Synthelabo). Gadolinium-based contrast agent (Magnevist, Bayer Schering Pharma) was

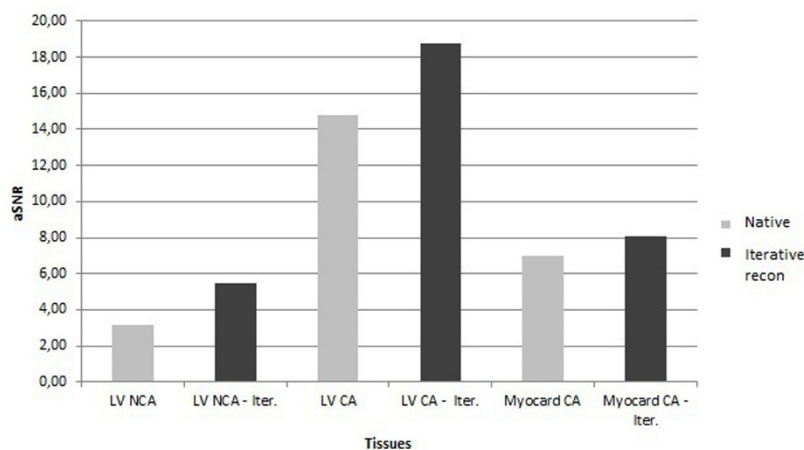


Figure 1 aSNR in different tissues (myocardium and left ventricle cavity without (NCA) and with Contrast Agent (CA)). Product vs. iterative reconstruction.

¹MR service, Centre Cardio Thoracique Monaco, Monte Carlo, Monaco
Full list of author information is available at the end of the article

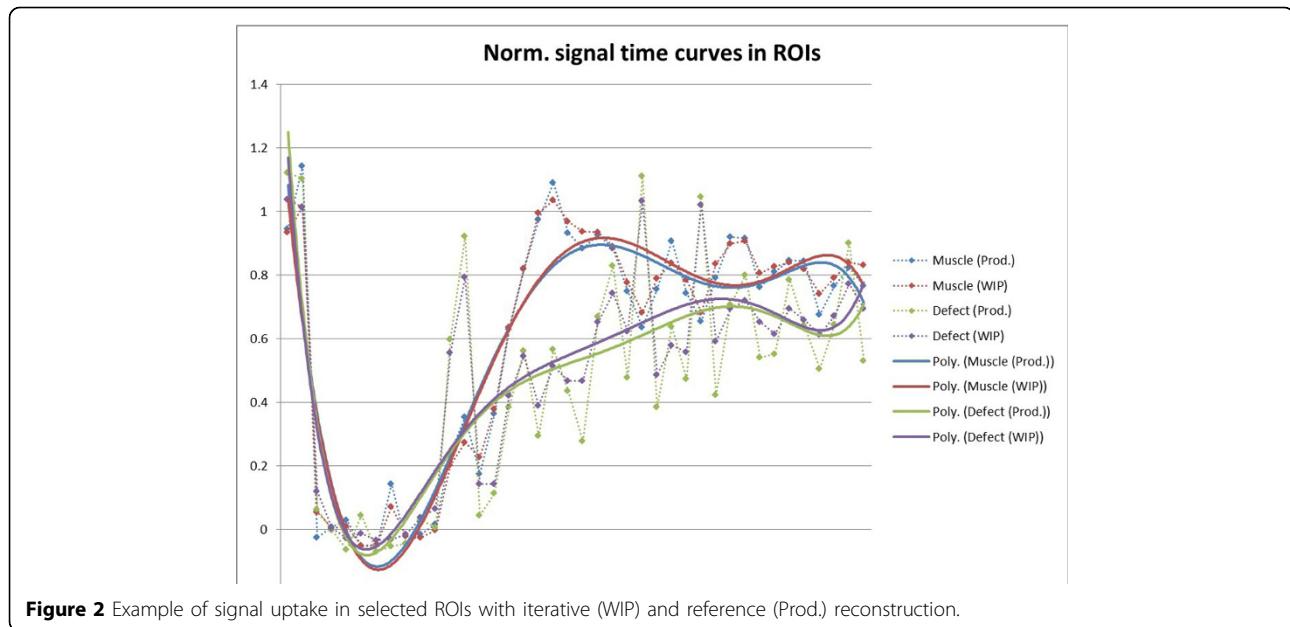


Figure 2 Example of signal uptake in selected ROIs with iterative (WIP) and reference (Prod.) reconstruction.

administered and MRI was performed over 4 slices in short-axis orientation in breath-hold.

Image reconstruction was run twice online at the scanner: 1) with the product image reconstruction and 2) a regularized SENSE-type iterative reconstruction [4] (60 iterations, regularization 0.008). Apparent signal-to-noise ratios (aSNR) [5] were calculated in multiple regions of interest in the left ventricle and myocardium. In addition, normalized semi-quantitative upslope curves were qualitatively compared for both methods.

Results

The quantitative results of aSNR in Figure 1 confirm the overall improvement of the image quality over all patients. Temporal filtering introduced by the regularized reconstruction seems to be negligible as the semi-quantitative upslope curves showed generally good concordance. Figure 2.

Conclusions

Iterative image reconstruction shows great image quality improvements over the conventional reconstruction. In the future, SNR improvements can be invested in increasing the spatial resolution which might help to better avoid e.g. the dark rim artifact.

Funding

None.

Authors' details

¹MR service, Centre Cardio Thoracique Monaco, Monte Carlo, Monaco.

²Siemens AG, Erlangen, Germany.

Published: 3 February 2015

References

1. Nandalur KR, et al: *J Am Coll Cardiol* 2007, **50**:1343-53.
2. Hamon M, et al: *J Cardiovasc Magn Reson* 2010, **12**:29.
3. Adluru G, et al: *MRM* 2007, **57**:1027-36.
4. Liu J, et al: *ISMRM* 2012, 178.
5. Chung, et al: *IEEE CIS* 2004, 365-60.

doi:10.1186/1532-429X-17-S1-Q109

Cite this article as: Iacuzio et al.: Initial experience for first pass cardiac perfusion with iterative reconstruction in patients. *Journal of Cardiovascular Magnetic Resonance* 2015 **17**(Suppl 1):Q109.

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

