

POSTER PRESENTATION

Open Access

Comparison of 3D and 2D acquisition of late gadolinium enhancement in patients with acute, subacute and chronic myocardial infarction

Robert Goetti^{1*}, Sebastian Kozerke², Olivio F Donati¹, Paul Stolzmann¹, Roberto Corti¹, Robert Manka¹

From 2011 SCMR/Euro CMR Joint Scientific Sessions
Nice, France. 3-6 February 2011

Purpose

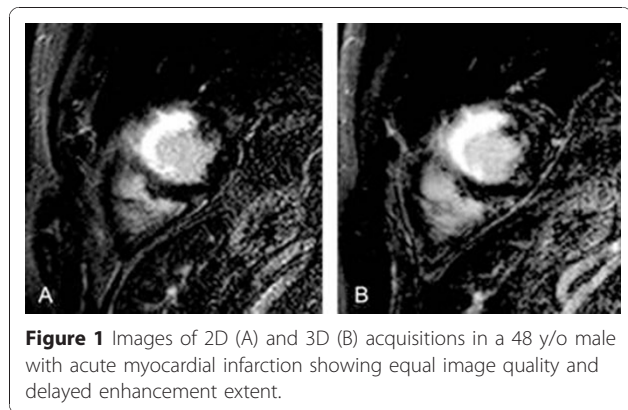
To assess a late gadolinium enhancement (LGE) imaging single breath-hold 3D inversion recovery sequence for the quantification of myocardial scar mass and transmural extent in comparison to a clinically established 2D acquisition sequence.

Methods

Ninety patients (84 men, age 54.4 ± 10.8 y, BMI 27.8 ± 4.5 kg/m²) with acute (n=30), subacute (n=30) and chronic (n=30) myocardial infarction were included in the study. All imaging was performed on a 1.5-T clinical MR system (Achieva, Philips Medical Systems, Best, the Netherlands). Spatial resolution was identical for 3D and 2D images (1.5×1.5 mm², slice thickness 8 mm, no slice gap). Image quality was graded on a five-point scale (1: excellent, 5: non-diagnostic). Quantitative analyses of myocardial mass (g), scar mass (g) and scar transmural extent (five-point scale: 0: 0%; 1: <25%; 2: <50%; 3: <75%; 4: 75%-100%) were performed. Intra- and interobserver agreement were assessed for 15 randomly chosen patients (5 of each group).

Results

Mean image quality was not significantly different in 3D (1.50 ± 0.675) and 2D (1.41 ± 0.669 ; $p=0.26$) datasets. Non-diagnostic image quality (score: 5) did not occur. Acquisition time was significantly shorter for 3D datasets (26.7 ± 4.4 sec vs. 367.7 ± 56.4 sec; $p < 0.001$). There were no significant differences between 2D and 3D datasets in mean myocardial mass (2D: 148.3 ± 35.1 g; 3D: 148.1 ± 34.6 g; $p=0.76$) and scar tissue mass (2D: 31.8 ± 14.6 g;



3D: 31.6 ± 15.5 g; $p=0.39$) with strong and significant correlation between 2D and 3D datasets regarding both myocardial mass ($r=0.982$; $p < 0.001$) and scar tissue mass ($r=0.980$; $p < 0.001$). Bland-Altman analysis showed a mean difference of 0.21 ± 6.64 g (range: -19.64 - 18.44 g) for myocardial mass and a mean difference of 0.26 ± 2.88 g (range: -7.15 - 7.74 g) for scar mass between 2D and 3D datasets. Agreement between the two acquisition techniques regarding scar transmural extent was excellent for the detection of non-viable segments (>50% scar tissue transmural extent; $\kappa = 0.81$) and was good ($\kappa = 0.75$) for the more detailed assessment using the five-point transmural extent score. Inter- and intra-observer agreements were good to excellent ($\kappa = 0.70-0.90$).

Conclusions

3D LGE imaging enables accurate quantitative evaluation of scar tissue mass and transmural extent with significantly shorter acquisition time compared to 2D LGE imaging.

¹University Hospital Zurich, Zurich, Switzerland
Full list of author information is available at the end of the article

Author details

¹University Hospital Zurich, Zurich, Switzerland. ²ETH Zurich, Zurich, Switzerland.

Published: 2 February 2011

doi:10.1186/1532-429X-13-S1-P154

Cite this article as: Goetti *et al.*: Comparison of 3D and 2D acquisition of late gadolinium enhancement in patients with acute, subacute and chronic myocardial infarction. *Journal of Cardiovascular Magnetic Resonance* 2011 **13**(Suppl 1):P154.

**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

