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Poster presentation

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Cardiac magnetic resonance whole-heart two-dimensional single-breathhold and navigator-guided three-dimensional free-breathing quantification of infarct size are accurate alternative techniques to standard two-dimensional late gadolinium enhancement imaging

Manisha Bahl*, Otavio R Coelho-Filho, Shuaib M Abdullah and Raymond Y Kwong

Address: Brigham and Women's Hospital/Harvard Medical School, Boston, MA, USA
* Corresponding author

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Introduction

Although infarct size by late gadolinium enhancement (LGE) CMR imaging is a robust prognostic marker in patients with recent MI, long scan times and repeated breathholds associated with the current standard, single-slice 2D multiple-breathhold (SS2D), limit clinical use of this technique. Two new techniques, whole-heart 2D single-breathhold (WHOLE) and navigator-guided 3D free-breathing (3DNAV), offer the advantages of decreased scan time and higher spatial resolution without breathholding, respectively.

Purpose

Since the measurement of infarct size by these techniques has not been compared, we sought to test the hypothesis that the WHOLE and 3DNAV techniques provide accurate quantification of infarct size when compared to the standard SS2D technique.

Methods

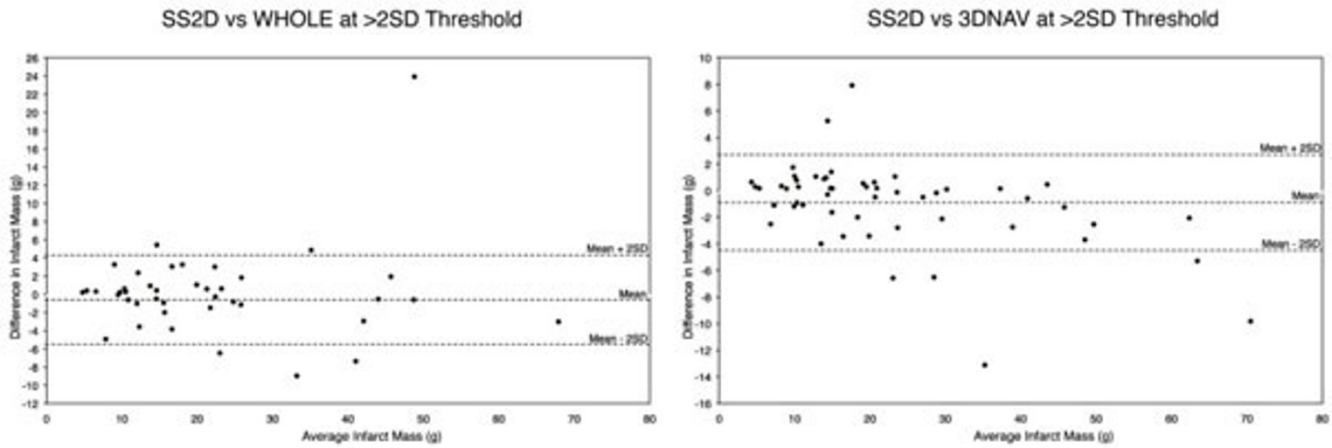
We prospectively enrolled 56 patients (43 men and 13 women, mean age 61 ± 10.7 years) to perform 3 T CMR (Siemens Trio) within eight weeks of revascularized acute MI. With each of the three techniques, LGE size was quantified in a blinded fashion using signal intensity criteria (1) at full width at half maximum (FWHM), (2) > 3SD, and (3) > 2SD beyond the mean signal intensity of normal myocardium.

Results

The mean peak troponin was 61.2 ± 65.4 ng/mL and the mean LVEF was 47.7 ± 11.0%. We found that myocardial infarct sizes obtained with the WHOLE and 3DNAV techniques are highly correlated with results obtained by the standard SS2D technique (r = 0.95-0.97 and r = 0.91-0.96, respectively), across the three common infarct sizing signal intensity threshold criteria. Bland-Altman analysis demonstrated excellent inter-technique agreement (Figure 1).

Conclusion

The WHOLE and 3DNAV techniques provide accurate quantification of infarct size when compared to the standard SS2D technique. Use of these techniques in the clinical setting could improve patient tolerability or spatial resolution.



Threshold	SS2D vs. WHOLE	SS2D vs. 3DNAV
FWHM	r=0.95, p<0.0001	r=0.91, p<0.0001
>3SD	r=0.95, p<0.0001	r=0.95, p<0.0001
>2SD	r=0.97, p<0.0001	r=0.96, p<0.0001

Figure 1