

ORAL PRESENTATION

Open Access

# Myocardial salvage by T2W-CMR: direct comparison to a non-destructive, high resolution, 3-dimensional ex-vivo assessment of the area at risk simultaneous with infarction

Lowie M Van Assche\*, Christoph J Jensen, David Wendell, Michele Parker, Han W Kim, Raymond J Kim

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

## Background

The amount of myocardial salvage is a critical determinant of prognosis in acute myocardial infarction (AMI). T2W-CMR in combination with DE-CMR is thought to be a promising method that could presumably measure salvage. However, direct comparisons with the appropriate reference standard are limited. Additionally, even if a pathology reference standard is present, co-registration with in-vivo imaging is problematic. We recently validated a new ex-vivo CMR protocol against the reference standard of microspheres and TTC that provides 3D, non-destructive, high-resolution maps of the AAR simultaneously with infarction[1]. Because this map delineates both the AAR and infarction, salvage can be easily measured in a single image, rather than being calculated from 2 datasets. Additionally, the 3D map allows for direct matching of in-vivo DE to ex-vivo CMR and thereby further minimizing the potential for misregistration from in-vivo DE and more importantly in-vivo T2. Therefore, we sought to compare in-vivo calculated salvage to the directly measured salvage by ex-vivo CMR.

## Methods

12 canines underwent variable coronary occlusion of the LAD (45-75min) followed by reperfusion to create a range of myocardial salvage. CMR was performed 5-days post-AMI. T2W-CMR was performed using an optimized DIR-TSE sequence with reduced inter-echo spacing and significantly improved image homogeneity [2]. Following

in-vivo imaging, the 3D ex-vivo protocol was performed delineating viable AAR (dark), infarcted AAR (bright) and normal myocardium (grey). Ex-vivo CMR slices were directly matched to in-vivo DE images. In-vivo salvage was calculated by subtracting infarct size by DE from T2-hyperintensity size by TSE and expressed as a percentage of T2-hyperintensity size. For ex-vivo CMR, salvage was directly measured on the matched slices and expressed as a percentage of the AAR.

## Results

A total of 51 slices were analyzed. Mean calculated salvage by in-vivo CMR was significantly lower than mean measured salvage by ex-vivo CMR. (3.2% vs 63.6%, respectively,  $p < 0.0001$ ). Figure 1 shows no correlation between in-vivo and ex-vivo CMR ( $r = -0.08$ ,  $p = 0.55$ ). Conversely, there was a significant correlation between T2 size by in-vivo CMR and scar size by the ex-vivo protocol ( $r = 0.93$ ,  $p < 0.0001$ ). Figure 2 shows examples of in-vivo T2 and DE slices compared with directly matched ex-vivo CMR.

## Conclusions

In-vivo calculated salvage did not correspond with directly measured salvage on matched ex-vivo slices. Instead, there was a strong correlation between in-vivo T2 size and ex-vivo scar size.

## Funding

Funded in part by 5R01HL064726-07.

Figure 1

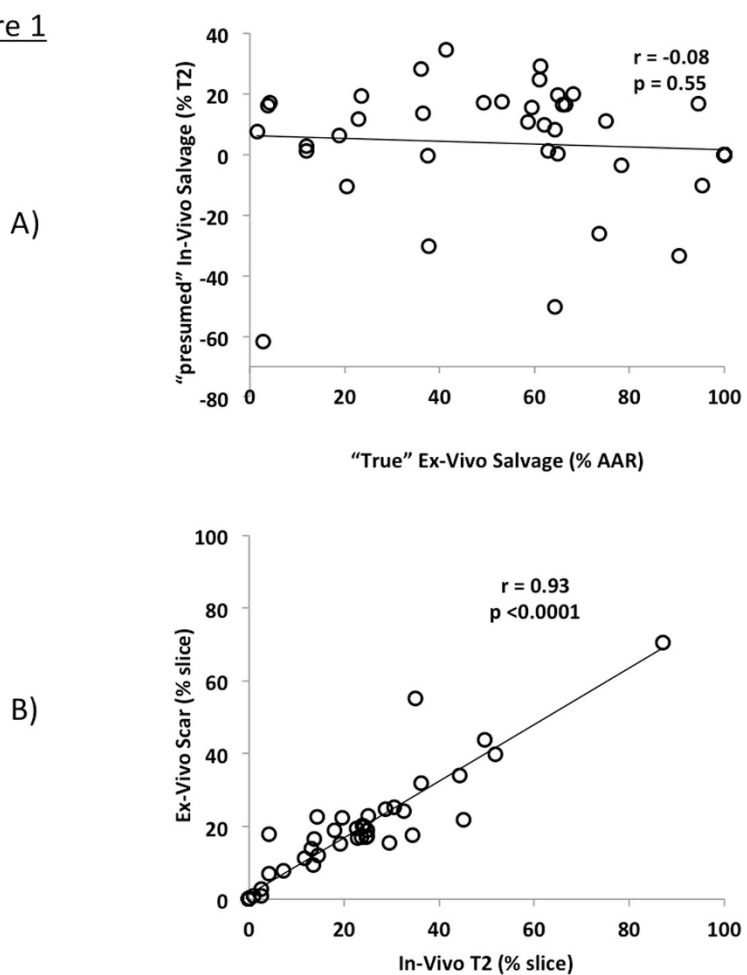


Figure 1

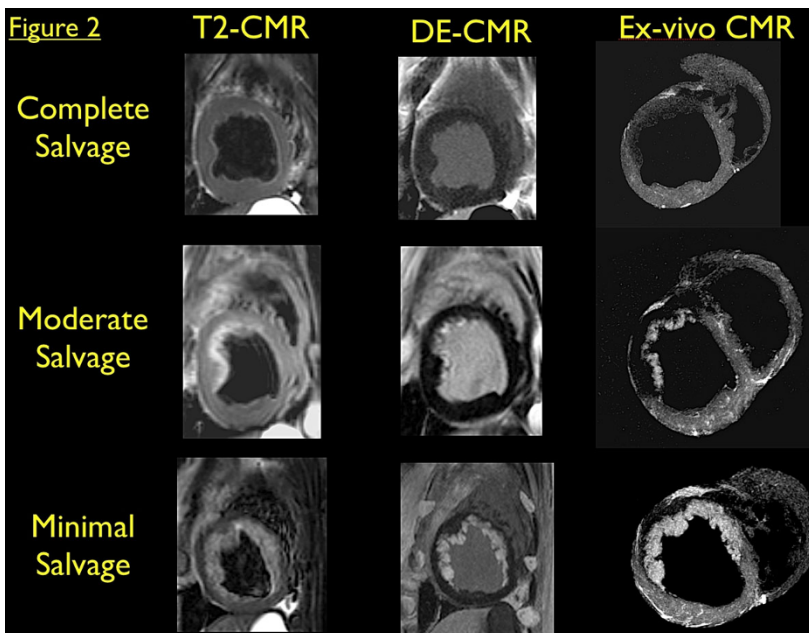


Figure 2

Published: 30 January 2013

#### References

1. *JCMR* 2012, **14**(1), Abstract O7.
2. *JCMR* 2012, **14**(1), Abstract O113.

doi:10.1186/1532-429X-15-S1-O15

**Cite this article as:** Van Assche *et al.*: Myocardial salvage by T2W-CMR: direct comparison to a non-destructive, high resolution, 3-dimensional ex-vivo assessment of the area at risk simultaneous with infarction. *Journal of Cardiovascular Magnetic Resonance* 2013 **15**(Suppl 1):O15.

**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](http://www.biomedcentral.com/submit)

