

**Determination of the myocardial area at risk after
reperfused acute myocardial infarction with different
imaging techniques: cardiac magnetic resonance
imaging, multidetector computed tomography and
histopathological validation**

Nathan Mewton, Stanislas Rapacchi, Lionel Augeul, René Ferrera, Joseph Loufouat, Loic Boussel, Gilles Rioufol, Didier Revel, Michel Ovize, Pierre Croisille

► **To cite this version:**

Nathan Mewton, Stanislas Rapacchi, Lionel Augeul, René Ferrera, Joseph Loufouat, et al.. Determination of the myocardial area at risk after reperfused acute myocardial infarction with different imaging techniques: cardiac magnetic resonance imaging, multidetector computed tomography and histopathological validation. 2011 SCMR/Euro CMR Joint Scientific Sessions, Feb 2011, Nice, France. pp.09, 10.1186/1532-429X-13-S1-O9 . inserm-00663676

HAL Id: inserm-00663676

<https://www.hal.inserm.fr/inserm-00663676>

Submitted on 27 Jan 2012

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

ORAL PRESENTATION

Open Access

Determination of the myocardial area at risk after reperfused acute myocardial infarction with different imaging techniques: cardiac magnetic resonance imaging, multidetector computed tomography and histopathological validation

Nathan Mewton¹, Stanislas Rapacchi², Lionel Augeul³, René Ferrera³, Joseph Loufouat³, Loic Bousset¹, Gilles Rioufol¹, Didier Revel¹, Michel Ovize¹, Pierre Croisille^{4*}

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

Introduction

The myocardial area at risk (AAR) is a major determinant of infarct size. Which imaging technique is the most appropriate to accurately measure its size remains debated.

Purpose

The principal objective of this study was to compare the AAR defined with two different T2 weighted cardiac magnetic resonance (T2W CMR) imaging sequences (TIRM T2w blood suppressed TSE and ACUTE TSE-SSFP), the contrast-enhanced (ce-) CMR endocardial surface length (ESL) after 90-minutes of reperfusion and the arterial enhanced multi-detector computed tomography (MDCT) performed during occlusion with the reference histological AAR delineated after injection of uniprimer blue dye in reperfused myocardial infarction.

Methods

Fifteen closed-chest pigs underwent a 40-minutes coronary artery occlusion (angioplasty balloon inflation), followed by reperfusion. Three co-registered short-axis slices (base, mid-ventricle, apex) were obtained for each animal and each imaging technique for statistical analysis (Figures 1 and 2).

Results

The best fit with the reference histological AAR was obtained for the hypoenhanced area on arterial enhanced MDCT ($R^2=0.56$; $P<0.05$) with a small bias on Bland-Altman plots ($5.7\pm 11\%$ LV area). The AAR as defined by both T2W TIRM and ACUTE sequences or the ESL on ce-CMR significantly overestimated the size of the AAR by pathology with only a fair correlation ($R^2=0.37$, $R^2=0.40$ and $R^2=0.42$; $P<0.05$ respectively)

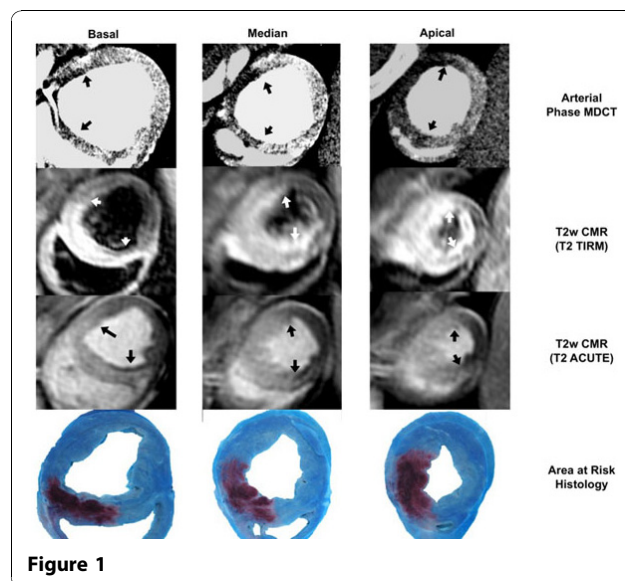


Figure 1

⁴Hôpital Cardiovasculaire Louis Pradel/ CREATIS-LRMN, CNRS UMR 5220 – INSERM U630 – Université Claude Bernard Lyon 1, Lyon, France
Full list of author information is available at the end of the article

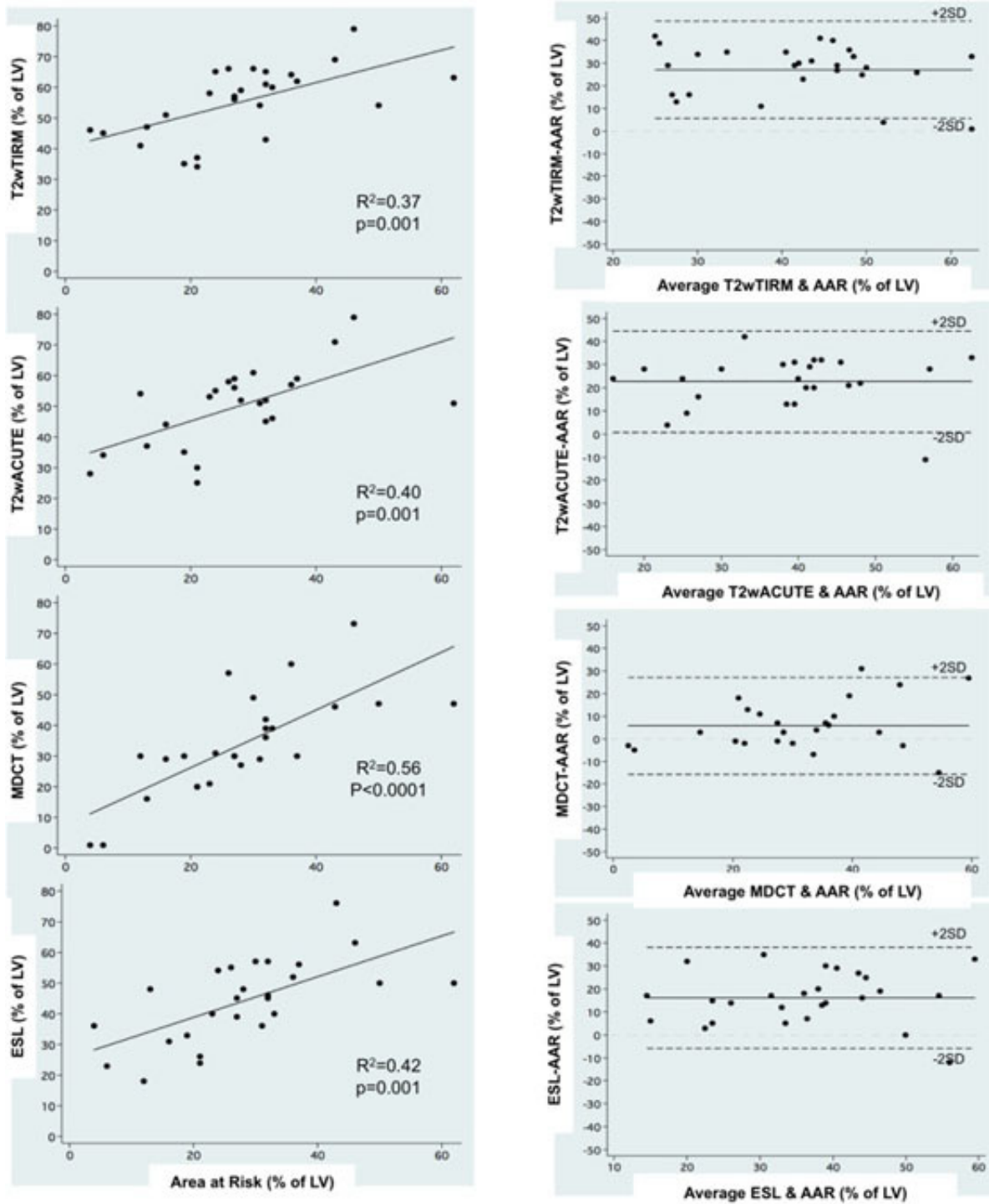


Figure 2

and important bias ($27.2 \pm 11.0\%$ LV area; $22.6 \pm 11.2\%$ LV area $16.0 \pm 11.3\%$ respectively).

Conclusions

Arterial enhanced MDCT performed at the time of occlusion was the most accurate method to assess the AAR, whereas T2wCMR and the contrast enhanced ESL performed 90 minutes after reperfusion significantly overestimated the AAR.

Author details

¹Hôpital Cardiovasculaire Louis Pradel, LYON, France. ²CREATIS-LRMN, CNRS UMR 5220 – INSERM U630 – Université Claude Bernard Lyon 1, Lyon, France. ³Inserm U886 Cardioprotection, Université Claude Bernard Lyon1, Lyon, France. ⁴Hôpital Cardiovasculaire Louis Pradel/ CREATIS-LRMN, CNRS UMR 5220 – INSERM U630 – Université Claude Bernard Lyon 1, Lyon, France.

Published: 2 February 2011

doi:10.1186/1532-429X-13-S1-O9

Cite this article as: Mewton *et al.*: Determination of the myocardial area at risk after reperfused acute myocardial infarction with different imaging techniques: cardiac magnetic resonance imaging, multidetector computed tomography and histopathological validation. *Journal of Cardiovascular Magnetic Resonance* 2011 **13**(Suppl 1):O9.

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

