

Poster presentation

Open Access

## Regional evolution of mechanical dyssynchrony in a closed-chest porcine model of myocardial infarction as assessed by cardiac magnetic resonance

Miguel Santaularia Tomas\*, Khaled Z Abd-Elmoniem, Tetsuo Sasano, Evertjan Vonken, Amr Youssef, Matthias Stuber, Harsh Agarwal, Sahar Soleimanifard, Eduardo Marbán, Jerry L Prince, Theodore P Abraham and Roselle Abraham

Address: Johns Hopkins, Baltimore, MD, USA

\* Corresponding author

from 13th Annual SCMR Scientific Sessions  
Phoenix, AZ, USA. 21-24 January 2010

Published: 21 January 2010

*Journal of Cardiovascular Magnetic Resonance* 2010, **12**(Suppl 1):P59 doi:10.1186/1532-429X-12-S1-P59

This abstract is available from: <http://jcmr-online.com/content/12/S1/P59>

© 2010 Tomas et al; licensee BioMed Central Ltd.

### Introduction

Mechanical dyssynchrony in the setting of an acute myocardial infarction (MI) is associated with adverse left ventricular remodeling and increased mortality.

### Purpose

We investigate the relationship between dyssynchrony and infarct location and their evolution over time in a closed-chest porcine model of MI.

### Methods

In six pigs, cine, late gadolinium enhancement, and tagged cardiac magnetic resonance imaging were performed at baseline (before MI) and early ( $10 \pm 2$  days) and late ( $34 \pm 10$  days) after balloon induced occlusion-reperfusion myocardial injury. Infarct, peri-infarct, and remote normal regions were defined as previously described. Cardiac morphology, function, location and extent of MI, and regional mechanics (circumferential strain ( $\epsilon_C$ )) were measured.

### Results

Baseline ejection fraction ( $52 \pm 5\%$ ) was significantly reduced both early ( $44 \pm 7\%$ ) and late ( $45 \pm 4\%$ ) post MI ( $p < 0.01$ ). Delayed enhancement was  $\sim 20\%$  of LV mass and peak  $\epsilon_C$  was significantly reduced in MI segments

(before  $-26 \pm 4$ , early  $-10 \pm 7$ , late  $-9 \pm 7\%$ ;  $p < 0.001$ ) and peri-MI (before  $-24 \pm 6$ , early  $-19 \pm 6$ , late  $-17 \pm 4\%$ ;  $p < 0.001$ ). Dyssynchrony index increased from 29 ms at baseline to 65 ms at early ( $p = 0.007$ ) and 98 ms ( $p = 0.002$ ) at late post-MI. Inter-segmental mechanical delay between peri-MI and MI versus normal segments at early post-MI stage were  $23 \pm 36$  ms and  $118 \pm 58$  ms, respectively ( $p < 0.0001$ ). Delays between peri-MI and MI segments versus normal segments in late post-MI stage were  $9 \pm 12$  and  $122 \pm 14$  ms, respectively.

### Conclusion

Mechanical dyssynchrony occurs early after acute MI and does not worsen with time despite further reduction in regional function. Delayed mechanical activation is restricted to MI segments and does not persist in peri-MI segments.