

POSTER PRESENTATION

Open Access

Dynamic changes of the extracellular matrix after acute tako-tsubo cardiomyopathy

Trevor Ahearn^{1*}, Baljit Jagpal², Donnie Cameron², Bernice K Ng³, Caroline Scally³, David M Higgins⁴, John Horowitz⁵, Michael P Frenneaux³, Dana K Dawson³

From 18th Annual SCMR Scientific Sessions
Nice, France. 4-7 February 2015

Background

We have recently demonstrated that cardiac energetic impairment and global myocardial edema persists for at least 4 months after an acute episode of Tako-tsubo cardiomyopathy (TTC). The aim of the current study was to evaluate the regional edema acutely and the status of the extracellular matrix at follow up

Methods

Eleven patients (10F, mean age 56±16yrs) with a clear diagnosis of ST-elevation TTC and emotional trigger were prospectively enrolled and underwent cardiac magnetic resonance acutely (day 0-3) and after 4 months on a Philips 3T Achieva scanner. Native 3-3-5 (MOLLI) T1 mapping was applied acutely, and both native and post-contrast T1 mapping were performed at 4 months follow-up. Eleven healthy controls underwent only native T1 mapping. T1 maps were: generated using in-house software - written in IDL (Exelis, Boulder CO, USA); quality controlled with chi-square maps; and imported into Segment (Medviso, Lund University, Sweden), where T1 values were generated for 16 segments. Extracellular volumes (ECV) were calculated for the follow-up scan using:

$$ECV = (1 - \text{hematocrit}) (\Delta R_{1\text{myocardium}} / \Delta R_{1\text{blood}})$$

Segments were grouped according to their wall motion (WM) on the acute scan (normal/abnormal).

Results

From the acute to the follow-up scan, the LVEF improved from 54±12% to 66±6%, whereas LV mass index decreased from 77±15 g/m² to 68±14 g/m², both p<0.05.

At the acute scan, native T1 of abnormal WM segments was significantly longer compared with T1 from normal WM segments (1270±95 vs 1225±43 ms, p<0.05) and both were significantly increased compared to healthy controls (1188±16, p<0.05).

At the follow-up scan, ECV was increased to a similar extent both in segments that were dysfunctional and those that were normally contracting in the acute phase (33% and 34% respectively, p=0.05).

Conclusions

We demonstrate oedema in both normal and abnormally contracting segments in patients with acute TTC and a similar degree of extracellular expansion at follow-up.

Funding

Tenovus Scotland. Grant number G13/10.

Authors' details

¹Medical Physics, NHS Grampian, Aberdeen, UK. ²ABIC, Aberdeen University, Aberdeen, UK. ³Cardiology, Aberdeen University, Aberdeen, UK. ⁴Philips Healthcare, Guildford, UK. ⁵Cardiology, Queen Elizabeth Hospital, Adelaide, SA, Australia.

Published: 3 February 2015

doi:10.1186/1532-429X-17-S1-P259

Cite this article as: Ahearn et al.: Dynamic changes of the extracellular matrix after acute tako-tsubo cardiomyopathy. *Journal of Cardiovascular Magnetic Resonance* 2015 **17**(Suppl 1):P259.

¹Medical Physics, NHS Grampian, Aberdeen, UK
Full list of author information is available at the end of the article