

POSTER PRESENTATION

Open Access

# Mechanical effects of midwall fibrosis in non-ischemic dilated cardiomyopathy

Robin J Taylor<sup>1,2\*</sup>, Fraz Umar<sup>1,2</sup>, Lai Sze Lin<sup>1,2</sup>, Amar Ahmed<sup>1,2</sup>, William E Moody<sup>1,2</sup>, Berthold Stegemann<sup>3</sup>, John N Townend<sup>1,2</sup>, Richard P Steeds<sup>1,2</sup>, Francisco Leyva<sup>1,2</sup>

From 17th Annual SCMR Scientific Sessions  
New Orleans, LA, USA. 16-19 January 2014

## Background

In patients with non-ischemic dilated cardiomyopathy (NIDCM), mid-wall fibrosis (MWF) is associated with a higher risk of hospitalizations and death from pump failure and sudden cardiac death. The mechanical effects of MWF remain unexplored. Strain measures derived from feature tracking-CMR (FT-CMR) have been validated against myocardial tagging.

## Methods

Patients ( $n = 84$ , age:  $57.7 \pm 14.7$  yrs, [mean  $\pm$  SD], LVEF:  $25.7 \pm 11.1\%$ ) with newly diagnosed NIDCM underwent late gadolinium enhancement CMR (inversion-recovery technique 10 min after the administration of gadolinium-DTPA (0.1 mmol/kg). Peak systolic circumferential ( $E_{cc}$ ) and radial ( $E_{rr}$ ) strain were assessed using FT-CMR of the mid-cavity LV short-axis cine and peak systolic longitudinal strain ( $E_{ll}$ ) was assessed from the horizontal long axis cine.

## Results

Patients with MWF ( $n = 21$ ) had a similar LVEF to patients without ( $n = 63$ ) ( $22.1 \pm 11.7$  vs  $26.9 \pm 10.9\%$ ,  $p = 0.85$ ). Patients with MWF had reduced  $E_{cc}$  ( $-5.9 \pm 2$  vs  $-9.4 \pm 4.9\%$ ,  $p = 0.001$ ), but similar  $E_{rr}$  ( $12.5 \pm 7.9\%$  vs.  $15.9 \pm 9.4\%$ ,  $p = 0.31$ ) and  $E_{ll}$  ( $-7.7 \pm 3.5\%$  vs  $-9.0 \pm 6.0\%$ ,  $p = 0.18$ ). In patients with similar LVEF,  $E_{cc}$  was consistently lower in those with MWF compared to those without, across a broad range of myocardial function. As shown below, MWF has the effect of altering the relationship between  $E_{cc}$  and LVEF (see Figure 1).

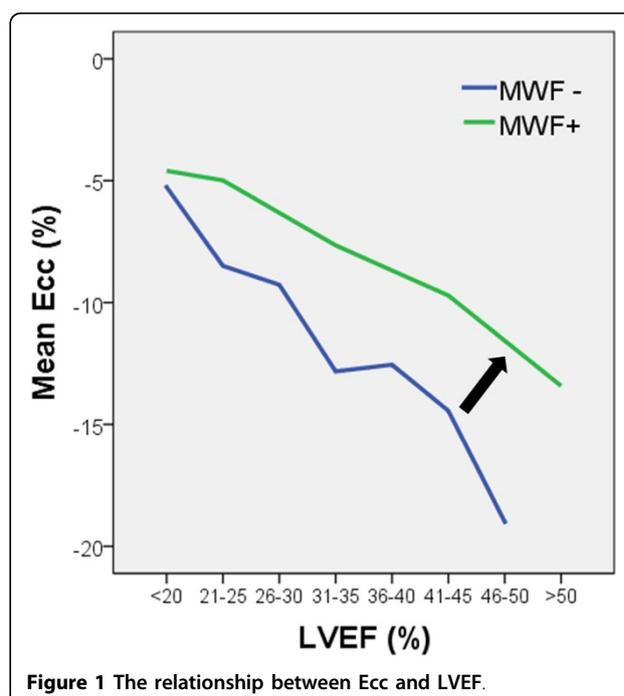


Figure 1 The relationship between Ecc and LVEF.

## Conclusions

In patients with NICM and comparable LVEF, MWF is associated with impaired myocardial contraction in a circumferential direction. These findings are likely to be useful in the prognostic stratification of patients with NICM. They may also account for the recently recognised negative effects of MWF in patients undergoing CRT.

<sup>1</sup>Centre for Cardiovascular Sciences, University of Birmingham, Birmingham, UK

Full list of author information is available at the end of the article

## Funding

None.

## Authors' details

<sup>1</sup>Centre for Cardiovascular Sciences, University of Birmingham, Birmingham, UK. <sup>2</sup>Department of Cardiology, Queen Elizabeth Hospital, Birmingham, UK. <sup>3</sup>Bakken Research Center, Medtronic Inc, Maastricht, Netherlands.

Published: 16 January 2014

doi:10.1186/1532-429X-16-S1-P308

**Cite this article as:** Taylor et al.: Mechanical effects of midwall fibrosis in non-ischemic dilated cardiomyopathy. *Journal of Cardiovascular Magnetic Resonance* 2014 **16**(Suppl 1):P308.

**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)

