



POSTER PRESENTATION

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# Assessment of longitudinal changes in strain using DENSE in patients with myocardial infarction

Christie McComb<sup>1,2\*</sup>, David Carrick<sup>3</sup>, Rosemary Woodward<sup>4</sup>, John D McClure<sup>1</sup>, Aleksandra Radjenovic<sup>1</sup>, John Foster<sup>1,2</sup>, Colin Berry<sup>1,3</sup>

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## Background

Myocardial infarction (MI) causes contractile dysfunction in the affected tissue, which can be assessed by using DENSE (Displacement ENcoding with Stimulated Echoes) to quantify myocardial strain[1,2]. The aim of this study was to investigate changes in strain revealed by DENSE between the occurrence of MI and a 6 month follow-up, and the relationships with other clinical measures.

## Methods

50 male patients (age  $56 \pm 10$  years) underwent CMR on a 1.5T Siemens Avanto within 7 days of MI, and 47 returned for a follow-up scan after 6 months. The protocol included cine, DENSE (2D) and late gadolinium enhancement (LGE) imaging. Cine images were used to assess cardiac function by calculating LV ejection fraction (LVEF) and end-systolic volume (LVESV). DENSE and LGE were compared using a single mid-ventricular short-axis slice, which was analysed both as a whole slice and after division into 6 AHA segments. The percentage of each segment which contained LGE was calculated using a threshold of mean +5SD of remote myocardium intensity. DENSE images were analysed to obtain a value for peak circumferential strain (Ecc). Segments in the baseline scans were grouped according to the extent of LGE (non-infarcted, <50% infarcted, >50% infarcted), and the change in peak Ecc between baseline and follow-up was evaluated using a one-way ANOVA with Tukey's post-hoc test. Individual patients were compared directly, and the correlations

between change in strain and (i) change in LGE (segments) and (ii) change in cardiac function (slices) were assessed.

## Results

Diagnostic images were obtained for 50 patients at baseline, and for 43 patients at follow-up. The results of the group comparisons and the individual patient comparisons are illustrated in Figure 1 and Figure 2 respectively.

## Conclusions

Strain recovery was disclosed by DENSE in infarcted tissue at 6 months post-MI. An increase in peak Ecc at follow-up is associated with a reduction in LGE, and improvement in

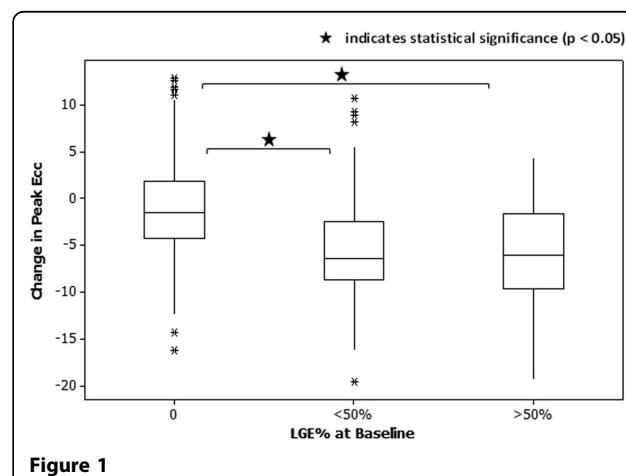
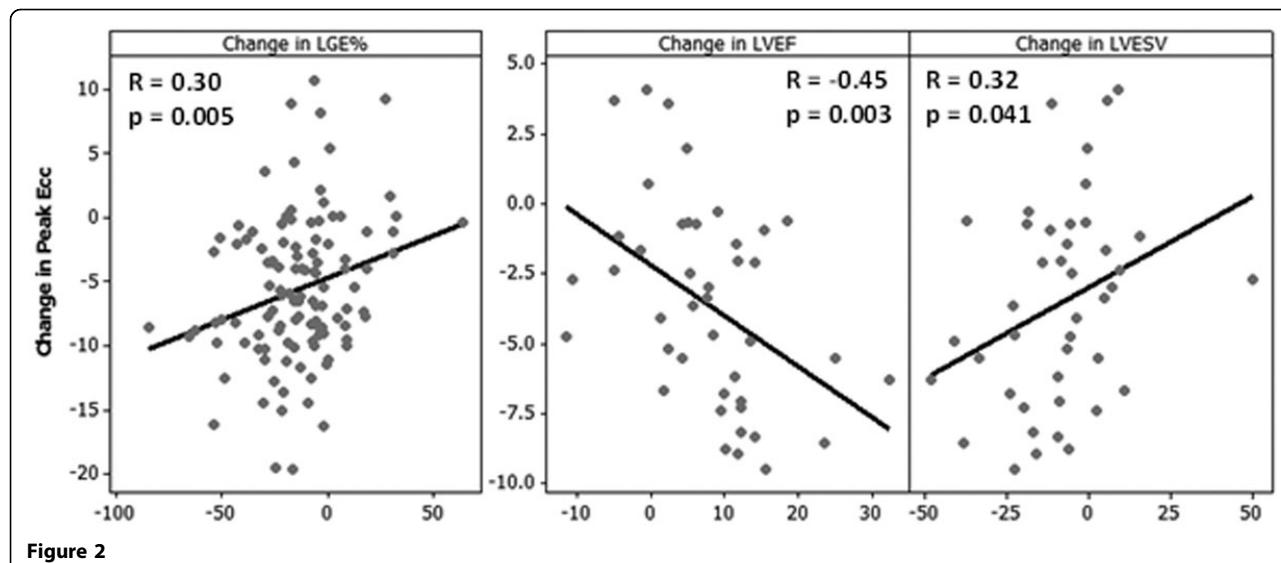


Figure 1

<sup>1</sup>BHF Glasgow Cardiovascular Research Centre, Glasgow, UK  
Full list of author information is available at the end of the article



**Figure 2**

LVEF and LVESV. Further work is required to take infarction in adjacent segments and slices into account, as this may provide a more precise insight into the relationship between myocardial strain, LGE and cardiac function.

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## Authors' details

<sup>1</sup>BHF Glasgow Cardiovascular Research Centre, Glasgow, UK. <sup>2</sup>Clinical Physics, NHS Greater Glasgow and Clyde, Glasgow, UK. <sup>3</sup>Cardiology, Golden Jubilee National Hospital, Glasgow, UK. <sup>4</sup>MRI, Golden Jubilee National Hospital, Glasgow, UK.

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