

Poster presentation

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## SENC imaging in patients with PAH - New semiautomatic software to quantify average strain in the entire myocardium

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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):P77 doi:10.1186/1532-429X-12-S1-P77

This abstract is available from: <http://jcmr-online.com/content/12/S1/P77>

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### Introduction

Pulmonary arterial hypertension (PAH) is a heterogeneous and progressive disease characterised by elevated pulmonary arterial pressure and pulmonary vascular resistance as well as subsequent impairment of right ventricular function and asynchrony of the right and left ventricle. PAH is still a life threatening condition with poor outcome, at the same time rarely diagnosed in an early stage due to its unspecific symptoms and complex to follow up.

### Purpose

To further characterize PAH by SENC imaging and to evaluate a new assessment software.

### Methods

15 patients (age  $60 \pm 16$  years, 7 females) with idiopathic pulmonary hypertension were examined in a Philips Achieva 1.5 T MRI scanner using a 5 element coil. For further evaluation of interventricular dyssynchrony strain-encoded (SENC) imaging was performed in a regular 4-chamber view. The temporal resolution of the SENC images was 25 ms and covered systole and diastole. SENC images were analysed by a new software tool providing semi-automatic contour detection for LV and RV, automated contour tracking and coverage of the entire myocardium to calculate segmental average strain. Strain and time to peak strain was plotted for LV and RV free wall as well as for the septum. Differences in peak strain and time to peak strain were calculated for RV free wall vs. septum

as well as RV vs. LV free wall. These data were correlated with conventional, invasive right heart catheter measurements of mean and systolic pulmonary artery pressure

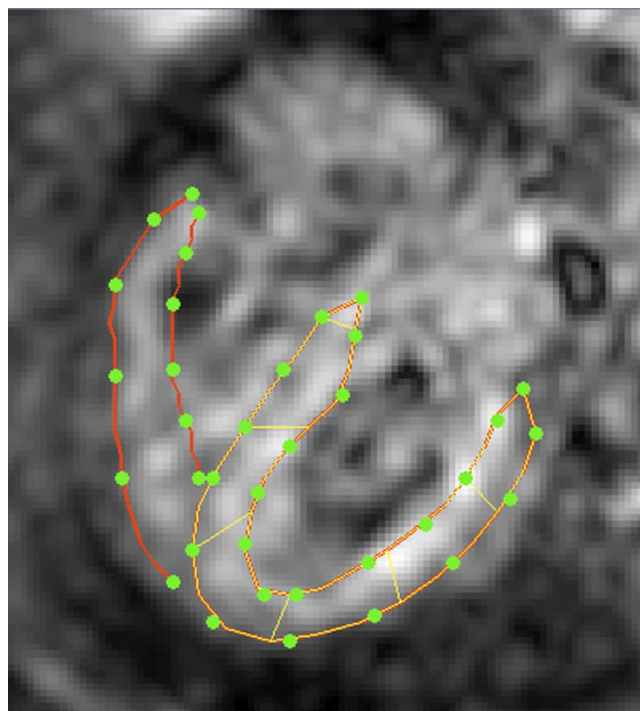
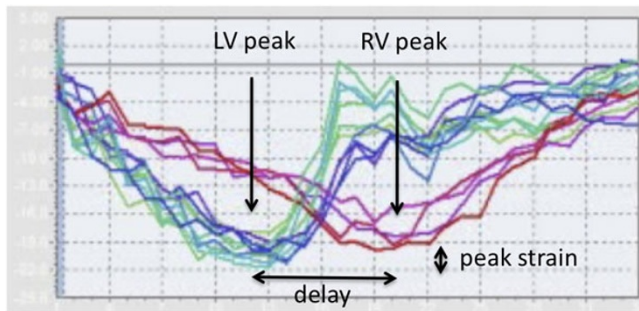


Figure 1



**Figure 2**

(PAPmean, PAPsyst.), pulmonary vascular resistance (PVR) as well as cardiac output (CO).

### Results

All patients showed significant PAH (PAPsyst.  $80 \pm 22$  mmHg, PAPmean  $49.7 \pm 14$  mmHg, PVR  $622 \pm 321$  dyn · s/cm<sup>5</sup>). SENC images were within excellent to good image quality and were evaluable by the new software. Significant correlations were found for the difference of peak strain between RV and LV free wall with pulmonary vascular resistance ( $R = 0.44$ ) as well as for the difference in time to peak strain of RV free wall and LV free wall with PAPsyst. ( $R = 0.46$ ), PAPmean ( $R = 0.39$ ) and CO ( $R = 0.36$ ).

### Conclusion

SENC imaging and strain measurements are valuable and reliable in patients with PAH and correlates significantly with conventional invasive parameters. Therefore SENC is a promising new tool that might potentially provide non-invasive evaluation of patients with PAH as well as new insights in the course and treatment guidance of the disease. However further studies need to be done in bigger patient groups to confirm our findings.

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