

Meeting abstract

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I 126 Regional right ventricular function and timing of contraction in healthy volunteers using strain-encoded MRI at 3 tesla

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Introduction

As the importance of the right ventricle in many diseases has been realized, the need for quantitative assessment of the right ventricular free wall (RVFW) function and timing of contraction has become apparent. Strain-encoded (SENC) magnetic resonance imaging (MRI) is a new modality to assess left ventricular function. However, no data exists regarding the feasibility of this new technique in the characterization of the RVFW contraction pattern.

Purpose

To define regional RVFW strain and timing of contraction using SENC MRI at 3 T.

Methods

The study population included 9 healthy volunteers (7 men and 2 women, mean age 32 ± 1.7 years). RVFW was divided into three segments (anterior, mid and inferior) in each of three short axis slices (apical, mid, and basal) and into three segments (apical, mid, and basal) in four chamber view to allow for a detailed analysis. Maximal systolic transmural strain measurements were performed using Philips Achieva 3 T (breath-hold, $1.37 \times 1.37 \times 8$ mm³; FFE; flip angle 40°; temporal resolution 25 ms).

Results

The normal RVFW regional strain and time to peak strain was not uniform. Maximal systolic *longitudinal* strain values were highest at the apex (apex: $-18.6\% \pm 1.9$; mid: $-16.0\% \pm 2.0$; base: $-17.4\% \pm 3.0$, $P = 0.014$) as well as max-

imal systolic *circumferential* strain values (apex: $-20.3\% \pm 3.3$; mid: $-15.7\% \pm 2.6$; base: $-18.0\% \pm 0.8$, $P = 0.01$). Peak systolic *longitudinal* shortening occurred latest at the apex compared to the base and mid ventricle (apex: $344 \text{ ms} \pm 61$; mid: $278 \text{ ms} \pm 72$; base: $275 \text{ ms} \pm 63$, $P = 0.006$) and the peak systolic *circumferential* strain showed a borderline apex-to-base delay (apex: $262 \text{ ms} \pm 72$; mid: $321 \text{ ms} \pm 43$; base: $346 \text{ ms} \pm 40$, $P = 0.06$).

Conclusion

This study demonstrates a better understanding of normal right ventricular contraction pattern and can serve as a comparison for disease states. Myocardial strain measured by SENC may represent a highly objective method for quantifying regional right ventricular function.