

Poster presentation

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Evaluation of left ventricular wall motion in ischaemic heart disease pre- and post-cardiac surgery using cardiac MR

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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):P160 doi:10.1186/1532-429X-12-S1-P160

This abstract is available from: <http://jcmr-online.com/content/12/S1/P160>

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Introduction

Evaluation of cardiac mechanics has substantially improved with the advances in non-invasive cardiac MR and echocardiographic techniques.

Purpose

The purpose of this study was to obtain detailed three-dimensional left ventricular (LV) wall motion in patients with ischaemic heart disease (IHD) before and after coronary artery by-pass graft (CABG) surgery, using navigator gated high temporal resolution tissue phase mapping (TPM). The technique has a higher temporal resolution compared with standard TPM analysis [1,2] and has allowed visualization of new details of LV motion.

Methods

Cardiac gated, phase contrast measurements using respiratory navigator TPM were obtained on 19 patients with ischaemic heart disease (66 ± 7 years old) before and after CABG surgery and in a group of age-matched healthy subjects. LV motion patterns and time-to-peak velocities were obtained for radial, circumferential and longitudinal motion. Ventricular torsion rate and longitudinal strain rate were also derived for each group.

Results

Compared with healthy volunteers, patients with IHD had lower radial velocities, most pronounced at the LV apex, an altered pattern of ventricular rotation and signif-

icantly lower longitudinal velocities. Counter-intuitively, there was little change in the time to peak radial velocity between controls and patients with IHD, indicating that time to peak contraction is not a sensitive indicator of contractile dysfunction in the absence of conduction delay. The most pronounced differences in the two groups were peak diastolic longitudinal velocities and peak diastolic longitudinal strain rates. Lower peak systolic and diastolic torsion rates were also noted in patients with IHD. After CABG surgery, improved radial velocities, but reduced circumferential and longitudinal velocities, were observed. No changes in peak torsion or strain rates were recorded after surgery.

Conclusion

Tissue phase mapping allowed three-dimensional assessment of wall motion abnormalities in patients with IHD. It has also been possible to characterize LV remodeling using this method. Longitudinal recoil motion in diastole was the most affected parameter in patients with IHD. The results also suggest that postoperative changes after open cardiac surgery are limiting ventricular rotational and longitudinal motions, despite an increase in ventricular contractility due to revascularization.

References

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