

Poster presentation

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Do normal hemodynamics parameters in bariatric patients belie intrinsic myocardial dysfunction? A cardiovascular MRI study

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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):P194 doi:10.1186/1532-429X-12-S1-P194

This abstract is available from: <http://jcmr-online.com/content/12/S1/P194>

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Introduction

Classical teachings describe adverse cardiovascular (CV) outcomes in patients with BMI>30 such that refined bariatric surgical approaches have evolved attempting to reduce the observed morbidity and mortality of obesity. However, recently, numerous investigations report a paradoxically more normal CV risk profile as assessed by standard clinical tools such as echocardiography, nuclear or catheterization.

Purpose

We hypothesize that standard clinical assessments of LV and RV hemodynamics and volumetrics are not normal as detected in routine pre-op evaluations of bariatric pts via high resolution Cardiovascular MRI (CMR), especially when interrogated at the myocardial level.

Methods

Patients with BMI >35-48 (< 350 lbs and able to enter CMR bore) underwent standard imaging (GE, 1.5 T, WI) to assess LV/RV size, systolic and diastolic function. All pts then underwent RF myocardial tissue tagging to track intramyocardial strain. HARP (Diagnosoft, Palo Alto, CA) was used to deconvolute deformations into circumferential (Ecc) strain %S and torsion (°).

Results

Compared against 108 normals, 31/35 pts (age 21-65; 28 F) were able to complete the entire CMR protocol. While LV metrics (LV EF, LV end diastolic volume index (EDVI), LV mass, LV stroke volume) were in normal ranges, they were statistically different from normals ($P < 0.005$). However, all RV metrics (RV EF, RV EDVI, RV mass, RV stroke volume) were outside normal range *and* different from normal ($P < 0.005$). Ecc representing LV % strain was significantly less than a group of 30 normals in 88% of all myocardial segments (base to apex) compared to controls ($P < 0.005$). Similarly, LV torsion was less in pts vs. normals (11 ± 3 vs. $15 \pm 3^\circ$, $P < 001$).

Conclusion

Despite apparent historic normalcy of routine clinical metrics in bariatric patients, examination by high resolution CMR depicts substantially abnormal patterns of LV volumetrics and mechanical function. Moreover, RV volumetrics and mechanics not well visualized by standard imaging modalities are markedly depressed as compared to normals. Far from accepting the notion that obese pts have unexpectedly normal cardiac metrics based on a presumably 'normal' risk profile, interrogation by CMR supports abundant abnormalities in both LV, but particularly, RV metrics.