APICAL HYPOKINESIS IS A SENSITIVE MARKER OF EARLY RIGHT VENTRICULAR DYSFUNCTION IN PULMONARY HYPERTENSION.

ACC Poster Contributions
Georgia World Congress Center, Hall B5
Monday, March 15, 2010, 9:30 a.m.-10:30 a.m.

Session Title: MRI: CMR - Clinical
Abstract Category: MRI
Presentation Number: 1147-226

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Background: Accurate quantification of right ventricular (RV) systolic function is crucial in pulmonary hypertension (PH) because RV dysfunction is associated with poor prognosis. Studies using echocardiography have demonstrated that abnormal RV contractility in PH is more severe at the apex. We hypothesized that apical dysfunction occurs before global RV ejection fraction (RVEF) is reduced.

Methods: 167 patients with known or suspected PH underwent right heart catheterization and cardiac magnetic resonance (CMR) within a 2-week interval. PH was defined as mean pulmonary artery pressure (mPAP) >25 mmHg and normal RVEF as ≥ 50%. Patients were categorized into 3 groups: Normal RVEF without PH, normal RVEF with PH and abnormal RVEF with PH. On CMR images, the stack of RV short-axis views was divided into 2 halves, and basal and apical RVEF were calculated using Simpson’s method.

Results: RVEF was normal in 50 (30%) patients, 24 without PH and 26 with PH. Basal RVEF was similar but apical RVEF was lower and the ratio of basal-to-apical RVEF was significantly higher (1.1 ± 0.3 vs. 1.8 ± 0.7; P<0.01) in PH patients with preserved RVEF compared to normal RVEF patients without PH. In contrast, both apical and basal RVEF were reduced in PH patients with reduced RVEF (Figure).

Conclusions: RV apical hypokinesis is an early marker of RV dysfunction, which can be present before global RVEF decreases. Quantification of apical contractibility with CMR could be a useful measurement to early detect RV involvement in patients with PH.