STRAIN BY FEATURE TRACKING PREDICTS CLINICAL OUTCOME IN PEDIATRIC PATIENTS WITH HYPERTROPHIC CARDIOMYOPATHY

Poster Contributions
Poster Sessions, Expo North
Saturday, March 09, 2013, 3:45 p.m.-4:30 p.m.

Session Title: Congenital Cardiology Solutions: Congenital Imaging
Abstract Category: 13. Congenital Cardiology Solutions: Pediatric
Presentation Number: 1160-116

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Background: In hypertrophic cardiomyopathy (HCM), left ventricular strain by speckle tracking echocardiography is decreased in areas of hypertrophy. Data are not available on strain measurement by feature tracking on cardiovascular magnetic resonance (CMR), or its relation to clinical outcome in pediatric patients.

Methods: This single center, retrospective study included all patients under 21 years with clinical diagnosis of HCM and CMR from 2007-2012, compared to controls with normal left ventricular ejection fraction (LVEF) and no congenital heart disease, left ventricular hypertrophy, or genotype associated with cardiomyopathy. Using a 16-segment model, hypertrophied segments were identified by agreement of two experienced readers blinded to outcome. Strain was evaluated by segment, using feature tracking software (TomTec, Unterschleissheim, Germany), averaged over 16 segments for global radial (GRS) and circumferential (GCS) strain, and compared using repeated measures analysis of variance. The composite outcome was death, non-sustained ventricular tachycardia, or ventricular fibrillation.

Results: Thirty patients with HCM (14.1±3.2 years), with 11 (37%) confirmed by genotype and 24 (80%) with hypertrophy, and 24 controls (15.6±2.8 years) were included. LVEF was higher in HCM patients (65.4±5.8 vs. 59.4±3.0%, p <0.0001), with greater GCS (-29.3±4.6 vs. -26.7±2.7, p=0.01) and similar GRS (61±20 vs. 54±11, p=0.15). However, compared to controls, phenotypic HCM patients had decreased GRS (32.3±5.0 vs. 54.3±3.7, p=0.002) and basal circumferential strain (-22.6±1.5 vs. -26.8±0.9, p=0.03). Phenotype negative HCM patients had greater GRS (69.2±3.5 vs. 54.3±3.7, p=0.01) and GCS (30.5±0.8 vs. -26.7±0.8, p=0.003) compared to controls. After median follow-up of 1.2 years, 7 patients (23%) with the composite outcome had decreased GRS (median 39.7 vs. 65.4, p=0.01) and a trend toward decreased GCS (median -25.8 vs. -29.6, p=0.06) compared to those without negative outcome.

Conclusions: In pediatric HCM patients, strain by feature tracking may be an important marker of phenotype and clinical outcome. Further study is necessary to evaluate longitudinal changes in this population.