Abstract Session -- Young Investigator Award session

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Discriminating between exercise induced cardiac remodeling and dilated cardiomyopathy using exercise cardiac MRI

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Aims

The imaging features of dilated cardiomyopathy (DCM) overlap with those of exercise-induced cardiac remodeling in physically active individuals. We hypothesize that exercise stress imaging has value in diagnosing DCM and may help discriminate between DCM and exercise-induced remodeling.

Methods: Normal reference ranges in peak exercise cardiac index (PeakCI) were defined in 100 healthy volunteers (48% males; 38 ± 11 years) using a validated exercise stress cardiovascular magnetic resonance (CMR; 1.5T Siemens Aera) protocol. Exercise stress CMR and genetic sequencing were performed in 60 patients (93% males; 34 ± 14 years) with clinically suspected DCM (dilated left ventricle and/or impaired systolic function). Patients with pathogenic gene mutations were defined as confirmed genotype and phenotype positive cardiomyopathy (G + P+). The primary outcome was defined as a composite of all-cause mortality or cardiac decompensation (heart failure or arrhythmic events).

Results: PeakCI demonstrated excellent discrimination between G + P+ cardiomyopathy and healthy volunteers (c-statistics 0.89; 95% CI: 0.82-0.96; P < 0.0001). PeakCI at 35th percentile had a sensitivity of 100% and specificity of 66% for the diagnosis of G + P+ cardiomyopathy (Figure A), providing further incremental value over clinical parameters (age, sex, dilated left ventricle and impaired systolic ejection fraction), change in exercise ejection fraction and longitudinal strain (P = 0.001). Over 14 ± 9 months of follow-up, patients with PeakCI less than 35th percentile had worse prognosis compared to those with higher exercise capacity (P = 0.02) (Figure B).

Conclusion: Exercise stress CMR differentiates individuals with genotype positive DCM from exercise-induced cardiac remodeling. The PeakCInormal ranges and DCM threshold established here provide added diagnostic and prognostic value that informs patient management.

Abstract 202 Figure. (A) PeakCI vs Gene; (B) Outcome analysis