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Imaging

DIFFUSE INTERSTITIAL MYOCARDIAL FIBROSIS DETECTED BY T1 MAPPING IS INCREASED IN HYPERTROPHIC CARDIOMYOPATHY PATIENTS AND CORRELATES WITH LEFT VENTRICULAR SYSTOLIC AND DIASTOLIC DYSFUNCTION

Poster Contributions

Poster Sessions, Expo North

Sunday, March 10, 2013, 3:45 p.m.-4:30 p.m.

Session Title: Imaging: MRI V - CMR in Hypertrophic and Infiltrative Cardiomyopathies

Abstract Category: 19. Imaging: MRI

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Background: Interstitial myocardial fibrosis (IMF) is associated with worse clinical outcomes in hypertrophic cardiomyopathy (HCM). Cardiac magnetic resonance (CMR) T1-mapping can detect increases in extracellular volume as a surrogate of IMF. The purpose of this study was to non-invasively detect and quantify IMF in HCM with CMR T1-mapping and to examine its relationship with systolic and diastolic function

Methods: We analyzed 36 patients referred to 3T CMR to rule out HCM. A final diagnosis of HCM was established in 24 (66.6%); the remaining 12 patients without HCM served as controls. A previously validated Look Locker sequence was obtained 10 ± 3 min after infusion of 0.2 mmol/Kg of gadolinium. Myocardial T1 times of segments without visible late gadolinium enhancement (LGE) were quantified with a validated in-house custom-made software. Systolic strains were analyzed from the CMR cine images using feature tracking. E' and the E'/E' ratio, as surrogates of diastolic function and filling pressures, respectively, were assessed by transthoracic echocardiography

Results: HCM had the same age as controls (54.8 ± 16.6 vs 52.9 ± 16.7 , $p = \text{NS}$) but larger maximum wall thickness (20.9 ± 5.1 vs 11.1 ± 1.4 mm, $p < 0.01$). Mean postcontrast T1 time was significantly shorter in patients with HCM compared with controls (409 ± 50.9 vs 479.3 ± 25.3 ms, $p < 0.01$). Interestingly, in HCM, T1 time was also shorter in hypertrophic than in non-hypertrophic segments (390 ± 48.4 vs 420.4 ± 43.8 ms, $p < 0.01$). Despite no difference in LVEF between both (65.1 ± 9.6 in HCM vs $64.9 \pm 5.9\%$, $p = \text{NS}$), HCM patients had significantly impaired longitudinal strain (-13.1 ± 3.5 vs $-15.7 \pm 3.4\%$, $p < 0.05$) compared with controls. Importantly, T1 values correlated significantly with longitudinal strain ($r = -0.5$, $p < 0.05$) and circumferential strain ($r = -0.44$, $p < 0.05$). Further, T1 time correlated with echo derived diastolic function in HCM: E' ($r = 0.43$, $p < 0.05$), E'/E' ratio ($r = -0.45$, $p < 0.05$) and LA size ($r = -0.46$, $p < 0.05$)

Conclusions: In segments without LGE, HCM patients show reduced postcontrast T1 times compared with controls. Reductions in myocardial T1 time, likely related to underlying IMF, correlate with impaired systolic and diastolic function in HCM