Abstract: P3556

**Segmental intramyocardial CMR Fast-SENC objectively quantifies cardiac dysfunction that causes symptoms based on NYHA classification before global longitudinal strain or ejection fraction**

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**Topic(s):**
Chronic Heart Failure – Diagnostic Methods: Imaging

**Citation:**

**Background:**

Global longitudinal strain (GLS) has become an alternative to ejection fraction (EF) in identifying reduced cardiac function. However, these global metrics are not able to characterize patients in which symptoms occur even while the heart compensates for regional dysfunction. More sensitive metrics are needed to detect subclinical regional dysfunction and determine the relationship to symptoms that may or may not be associated with cardiac causes. Fast-SENC intramyocardial strain (fSENC) is a unique cardiac magnetic resonance imaging (CMR) modality that measures intramyocardial contraction in 1 heartbeat per image plane. This prospective registry compares segmental fSENC to global metrics GLS and LVEF based on NYHA classification.

**Methods:**

A single center, prospective registry of MRI scans acquired with a 1.5T scanner were evaluated for conventional CMR diagnostics including biventricular EF, volumes and mass. In addition, fSENC scans were acquired and processed with the MyoStrain software to quantify intramyocardial LV & RV strain. Three short axis scans (basal, midventricular, & apical) were used to calculate strain in 16 LV & 6 RV longitudinal segments while three long axis scans (2-, 3- & 4-chamber) were used to calculate 21 LV & 5 RV circumferential segments. All metrics were compared based on NYHA classification.

**Results:**

A total of 977 scans in 779 patients were included in the study; this population included 210 myocarditis, 46 dilated cardiomyopathy, and 30 ischemic cardiomyopathy cases. Patients had an average (± stdev) age of 55 (17) yrs and BMI of 26 (5) kg/m2; 48% had arterial hypertension, 12% diabetes mellitus, 33% valve disease, 24% cancer, 7% atrial fibrillation, 13% pulmonary disease, 5% left bundle branch block, 35% hypercholesterolemia, and 24% coronary artery disease. Figure 1 shows the relationship between segmental strain, calculated as the percent of normal LV segments (longitudinal & circumferential) based on intramyocardial fSENC < -17%, versus GLS and LVEF. All metrics were compared based on NYHA classification.

**Conclusion:**

Segmental fSENC identified changes in NYHA classification well before changes in EF or GLS. Measuring segmental fSENC provides an objective view of symptomatic heart failure progression and can serve as surrogate endpoints for trials instead of purely relying on quality of life and subjective symptom perception.
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