Abstract: 4304

**Fast-SENC quantifies segmental right ventricular intramyocardial strain to assess subclinical RV dysfunction prior to changes in RV ejection fraction**

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

**Citation:**
Right ventricular ejection fraction (RVEF) identifies reduced right-side cardiac function in symptomatic patients. However, alternative metrics are needed to detect subclinical RV dysfunction before cardiac remodeling results in systemic damage. Fast-SENC intramyocardial strain (fSENC) is a unique cardiac magnetic resonance imaging (CMR) modality that measures intramyocardial RV contraction in 1 heartbeat per image plane. This prospective registry compares fSENC and RVEF based on ACC/AHA Heart Failure Stage.

Methods: A single center, prospective registry of MRI scans acquired with a 1.5T scanner were evaluated for conventional CMR diagnostics including RVEF. In addition, fSENC scans were acquired and processed with the MyoStrain software to quantify intramyocardial RV strain. Two short axis scans (basal & midventricular) were used to calculate strain in 6 longitudinal RV segments while two long axis scans (3-chamber & 4-chamber) were used to calculate 5 circumferential RV segments.

CMR and fSENC metrics were compared based on progression of heart failure in which the ACC/AHA Heart Failure stage was determined by CMR findings including LGE in cases in which contrast was injected. HF Stages B and C were separated into different degrees of structural heart disease with "." representing lower levels and "+" higher levels to provide better delineation of progression of heart dysfunction leading to heart failure.

Results:
A total of 977 scans in 779 patients were included in the study. 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% moderate or severe valvular heart disease, 25% cancer, 7% atrial fibrillation, and 24% coronary artery disease. Figure 1 shows the relationship between % normal RV myocardium (RV fSENC < -17%) and CMR RVEF in the y-axis versus modified ACC/AHA Heart Failure Stage in the x-axis respectively.

Conclusion:
Segmental fSENC detects subclinical RV dysfunction well before changes in RVEF. The ability to directly measure intramyocardial RV strain allows quantification various subclinical right heart diseases, the impact and monitoring of pharmacological therapies and device interventions on RV function.
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