Abstract: P5261

Feature tracking by CMR: left ventricular dysfunction predicts outcome in heart failure with preserved ejection fraction

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Topic(s): Cardiac Magnetic Resonance

Citation: Objectives. To investigate the association between global longitudinal strain (GLS) using feature tracking (FT) cardiovascular magnetic resonance imaging (CMR) and prognosis in patients with heart failure and preserved ejection fraction (HFpEF).

Background. Echocardiography-based studies have demonstrated that in HFpEF left ventricular (LV) strain analyses can detect impaired systolic function despite preserved ejection fraction and might also predict outcome. CMR also allows strain analysis using FT and is furthermore the gold standard for assessment of ventricular volumes and ejection fractions. In addition, T1-mapping allows non-invasive tissue characterization. However, the prognostic relevance of FT-CMR is unknown. In addition right ventricular (RV) FT-CMR is poorly investigated.

Methods. Consecutive patients with confirmed diagnosis of HFpEF underwent CMR on a 1.5T scanner. We used dedicated software (cvi42, Circle Cardiovascular Imaging Inc.) for global longitudinal left ventricular strain (LV-GLS) in a 3D and global longitudinal RV strain (RV-GLS) in a 2D model using feature tracking (FT). In addition, we performed uni- and multivariable Cox regression using a combined endpoint of heart failure hospitalizations, and cardiovascular death to determine the prognostic relevance of FT-CMR.

Results. We included a total of 131 HFpEF patients (70.4±8.6 years old, 70.2% female). Median LV-GLS by FT-CMR was -8% [IQR: -10% to 5%] and median RV-GLS was -11.9% [IQR: -16.57% to -12.23%]. LV and RV GLS values were significantly correlated with LV and RV ejection fractions (r=-0.463, p<0.001 for LV, and r=-0.306, p=0.001 and RV, respectively). 77 (58.8%) events were recorded during a follow-up of 42.0±31.4 months. Patients with an LV-GLS worse than the median (-8%) showed a significantly reduced event-free survival rate (log-rank, p=0.009). In a multivariable Cox-regression model correcting for the strongest clinical variables, including age (HR 1.018 [0.985-1.052], p=0.290), GFR (HR 0.987 [0.975-1.000], p=0.055), diabetes (HR 1.696 [1.028-2.799], p=0.039), and 6-min-walking distance (HR 0.997 [0.995-0.999], p=0.014), LV-GLS remained significantly associated with outcome (HR 1.093 [1.039-1.150], p=0.001) while RV-GLS had no effect on outcome (p>0.05).

Conclusions. In patients with HFpEF, LV-GLS but not RV-GLS by FT-CMR is significantly associated with cardiovascular events.
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Conclusions. In patients with HFpEF, LV-GLS but not RV-GLS by FT-CMR is significantly associated with cardiovascular events.

log-rank, p = 0.023