EXTENT OF DIFFUSE MYOCARDIAL FIBROSIS DETERMINES OUTCOME IN PATIENTS WITH HEART FAILURE AND PRESERVED EJECTION FRACTION

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Background: The underlying pathophysiology of heart failure with preserved ejection fraction (HFPEF) is incompletely understood, but myocardial fibrosis is believed to play a major role. Our aims were to use cardiac magnetic resonance (CMR) T1 mapping to quantify diffuse myocardial fibrosis, and to identify predictors of adverse outcomes in HFPEF.

Methods and Results: One hundred patients with suspected HFPEF were enrolled in this prospective, observational study. Confirmatory diagnostic tests, CMR imaging and T1 mapping were performed at baseline, and outcomes were monitored during a longitudinal phase (median 12.9 months). Sixty-one patients with confirmed HFPEF entered the longitudinal phase (mean age: 70.5 years; female: n=39), during which 14 had a cardiac event. Multivariable Cox regression identified CMR T1 time (indicating diffuse fibrosis; hazard ratio: 0.987 [95% confidence interval: 0.976-0.997]; P=0.015) and left atrial area (hazard ratio: 1.054 [1.005-1.105]; P=0.029) as independent predictors of cardiac events. Patients with T1 times below the median (<388.3 ms) were at significantly greater risk of cardiac events than the rest of the group (P=0.007). T1 times also correlated with pulmonary hemodynamic parameters (pulmonary vascular resistance: R=−0.36, P=0.004; right ventricular ejection fraction: R=0.28, P=0.005). Patients with T1 times <388.3 ms had higher trans-pulmonary gradients than the rest of the group (14.4 versus 10.4 mm Hg; P=0.045).

Conclusions: The extent of diffuse myocardial fibrosis - assessed by CMR imaging - can predict cardiac outcomes in HFPEF, and correlates with hemodynamic parameters reflecting 'out-of-proportion' pulmonary hypertension. Non-invasive CMR imaging provides important information for the evaluation of patients with HFPEF.