The prognostic value of left ventricular entropy derived from native T1 mapping in patients with hypertrophic cardiomyopathy

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Background: The prognostic value of left ventricular (LV) entropy in hypertrophic cardiomyopathy (HCM) is unclear.

Objectives: This study aimed to assess the prognostic value of LV entropy from T1 mapping in HCM.

Methods: In this prospective study, 748 participants with HCM, who underwent cardiovascular MRI, were consecutively enrolled. LV entropy was quantified by native T1 mapping to estimate tissue heterogeneity. A multivariable Cox proportional hazards regression was performed to identify potential associations of LV entropy with sudden cardiac death (SCD) and cardiovascular death (CVD).

Results: Among the 748 participants (mean age, 51 ± 14.2 years; 454 men), 40 (5.3%) experienced SCD, and 65 (8.7%) experienced CVD during a median follow-up of 43 months. Participants with increased LV entropy (≥ 5.86) were more likely to suffer from SCD (P < 0.001 and P = 0.03) and CVD (P < 0.001 and P = 0.02) in the entire cohort and the subgroup with low late gadolinium enhancement (LGE) extent (<10%), respectively. In multivariable Cox analysis, following adjustment for the European Society of Cardiology predictors and the presence or absence of high LGE extent (≥10%), LV mean entropy was an independent predictor of SCD (hazard ratio [HR] 1.04, 95% CI 1.0 - 1.08, P = 0.03) and CVD (HR 1.06, 95% CI 1.04 - 1.09, P < 0.001). An SCD and CVD predictive model that encompassed a combination of LV entropy and LGE was developed, and an internal validation showed that the derived models retained good predictive ability with a C-index of 0.71 to 0.74 and 0.81 ± 0.03 for SCD and CVD, respectively.

Conclusions: LV mean entropy derived from native T1 mapping, reflecting myocardial tissue heterogeneity, was an independent predictor of SCD and CVD in participants with HCM and could help improve risk stratification.

Figure 1 Kaplan-Meier Analyses.
Figure 2: Incremental Value of LV entropy