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Abstract

Background: Hypertrophic cardiomyopathy (HCM) is characterized by increased left ventricular wall thickness that is not fully explained by abnormal loading conditions. Patients with HCM frequently experience progressive heart failure and stroke due to atrial fibrillation, which strongly impact quality of life, and are at high risk of sudden cardiac death (SCD). The impact of quantitative pathological findings derived from endomyocardial biopsies (EMB) on clinical prognosis in patients with HCM remains unclear.

Methods: We retrospectively studied 55 consecutive HCM patients who underwent EMB. We quantified the collagen area fraction (CAF), the cardiomyocyte diameter, the nuclear area and circularity, and the number of myocardial infiltrating CD3+ cells using EMB samples by image analyzing software. The primary clinical endpoint was defined as a composite including cardiovascular death, admission due to heart failure and ventricular arrhythmia.

Results: During the median follow-up of 37.2 months, the primary endpoint was found in 12 patients. No significant difference in the risk score of 5-year sudden cardiac death was observed between the event-occurrence group and the event-free group. In the multivariable Cox proportional-hazard analysis, CAF [hazard ratio (HR) per 10% increase: 1.555, 95% CI: 1.014–2.367, $p = 0.044$] and the number of infiltrating CD3+ cells (HR per 10% increase: 1.231, 95% CI: 1.011–1.453, $p = 0.041$) were the independent predictors of the primary endpoint, while the myocardial diameter and the nuclear irregularity had no significant prognostic impact. Kaplan-Meier survival curves demonstrated that patients with both higher CAF and higher number of CD3+ cells had the worst prognosis (log-rank, $P < 0.001$).

Conclusions: The higher CAF and the higher number of infiltrating CD3+ cells quantified using EMB samples were the independent predictors of poor clinical outcomes in patients with HCM. Cardiomyocyte diameter and nuclear irregularity did not significantly impact the clinical prognosis.