

Correlates of Epicardial Ejection Fraction, Endocardial Ejection Fraction, and Myocardial Strain in Hypertrophic Cardiomyopathy using Cardiac Magnetic Resonance

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Left ventricular ejection fraction (LVEF) is the most common clinical method to evaluate and monitor cardiac function. LVEF has a limited value in predicting mortality and functional capacity in hypertrophic cardiomyopathy (HCM). LV epicardial ejection fraction (LV EpEF) is a novel method of evaluating ventricular function in HCM for whom LVEF has had a poor prognostic performance. LVEF has a limited value in predicting mortality and functional capacity in hypertrophic cardiomyopathy (HCM). LV epicardial ejection fraction (LV EpEF) is a novel method of evaluating ventricular function in HCM. 71 subjects, including 51 HCM and 20 normal controls were retrospectively studied between 2005 and 2021. CMR images were analyzed by Circle (CVI 42 Client 5.6.4), including LV endo- and epicardial volumes, LVEF, LV EpEF, myocardial mass, and GCS (global circumferential strain). All measurements were compared by using Student t-test in HCM and control groups and were correlated to adverse outcomes in HCM group. The combined clinical adverse outcomes were identified by chart review, including need for implantable cardioverter defibrillator therapy, sustained ventricular tachycardia/fibrillation, need for surgical myectomy, heart failure symptoms (worsening NYHA class), unplanned cardiovascular admission, heart transplant, sudden cardiac death, and all-cause mortality. Mean patient age was 20.8 ± 14.3 , and controls 18.3 ± 9.5 yrs. LVEF was higher in HCM compared to controls (63.3 ± 7.6 vs. $59.3 \pm 3.6\%$, $p=0.003$). LV mass was significantly higher in HCM than controls (133.9 ± 53.3 vs. 82.3 ± 30.9 g, $p<0.001$), LV EpEF was significantly lower in HCM than controls (29.3 ± 7.6 vs. $38.5 \pm 3.6\%$, $p<0.001$), whereas LV GCS in HCM was not different from controls (-16.0 ± 2.4 vs. $-16.7 \pm 1.9\%$, $p=0.2238$). Both LVEF and LV EpEF carried significant negative associations with adverse event (LVEF Odds Ratio 0.889 (0.802-0.987), $p=0.027$ vs. LV EpEF 0.837 (0.746-0.939), $p=0.0024$), however area under ROC curve is better using LV EpEF (0.6734 vs. 0.7677). LV GCS was a positive predictor of adverse event (Odds Ratio 1.744 (1.249-2.519), $p=0.0014$, the area under the ROC curve 0.7946) (**Figure**). Suggested cut offs based on the ROC curves were 61.8%, 29.0%, and -15.1% respectively for LVEF, LV EpEF and LV GCS. Epicardial Ejection Fraction is a novel and easy to perform method to analyze cardiac function. LV EpEF may be used as a predictor of adverse event in HCM, which is comparable to LV GCS and applicable in echocardiography.