

Poster presentation

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Is the 12-lead electrocardiogram of value in the prognostic assessment of patients with hypertrophic cardiomyopathy?

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Background

Extreme magnitude of left ventricular hypertrophy (LVH) is an established risk factor for sudden death in hypertrophic cardiomyopathy (HCM), while myocardial scarring identified by contrast-enhanced cardiovascular magnetic resonance (CMR) may aid in risk stratification strategies. However, whether 12-lead ECG patterns are reliable for assessing magnitude of LVH or myocardial scarring by CMR in patients with HCM is unresolved. Therefore, we sought to determine the clinical utility of the ECG in a large HCM cohort with respect to these two clinical markers, using CMR, a high resolution 3-dimensional imaging technique.

Methods

Cine and late gadolinium enhancement (LGE) CMR images and 12-lead ECG were obtained in 319 consecutive HCM patients (42 ± 17 years; 71% male). ECG parameters included total voltage score, voltage criteria (ie., Romholt-Estes, Sokolow-Lyon and Cornell score) and Q waves were compared to CMR findings of maximal LV wall thickness, LV mass index and the presence of LGE.

Results

Among the 319 HCM patients, 225 (70%) met more than 1 voltage criteria for LVH while 94 (30%) did not. A statistically significant, although weak relationship was evi-

dent between the commonly used ECG criteria for LVH and both LV wall thickness ($R = 0.25$, $P < 0.001$) and LV mass index ($R = 0.29$, $P < 0.001$). 3 of 20 patients (15%) with massive LVH (wall thickness >30 mm) and 47 of 211 (22%) with substantially increased LV mass index ($>3SD$) did not meet any of the ECG criteria for LVH. In addition, ECG criteria in patients with mild hypertrophy (wall thickness 15-19 mm) did not identify LVH in 52 of 122 patients (42%) (figure 1). There was a significant but weak correlation between total voltage score and both LV wall thickness ($R = 0.25$; $P < 0.001$) and mass index ($R = 0.33$; $P < 0.001$).

Furthermore, no relationship was evident between the presence or extent of LGE and pathologic Q waves ($p = 0.18$ and 0.72 , respectively); 13 of 23 patients (57%) with LGE occupying $>15\%$ of LV were without Q waves, Figure 1.

Conclusion

In HCM, the 12-lead ECG is not reliable for predicting massive LVH or myocardial scarring, has limited power in risk stratification, and is not sufficiently reliable for predicting prognosis.

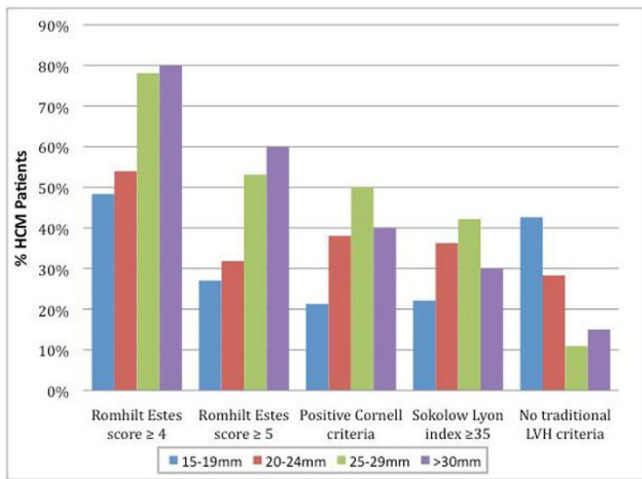


Figure 1
Relation between LV wall thickness and ECG hypertrophy criteria in 319 patients with HCM.

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