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Diagnostic accuracy of a novel electrocardiographic criterion for the diagnosis of left ventricular hypertrophy in hypertrophic cardiomyopathy

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Introduction: The 12-lead electrocardiogram (ECG) is a fundamental initial diagnostic modality for the early evaluation of a patient suspected of having hypertrophic cardiomyopathy (HCM). ECG criteria for the diagnosis of left ventricular hypertrophy (LVH) typically have low sensitivity and high specificity. Recently, a novel ECG criterion (Peguer-Lo Presti, PLP) with higher sensitivity (62%) and similar specificity (90%) was developed in a cohort of hypertensive patients, but its accuracy in patients with HCM has not been tested. We hypothesized that Peguero-Lo Presti criterion would improve upon the sensitivity of other criteria, while maintaining high specificity, for the diagnosis of LVH in patients for with HCM.

Methods: We retrospectively analyzed 215 consecutive patients who underwent cardiac magnetic resonance (CMR) between 2010 and 2018 for suspected HCM. All patients aged 18 years or older, who had CMR-confirmed HCM and an ECG without confounders (complete left or right bundle branch block or paced ventricular rhythm) were included for analysis (n=88). Left ventricular mass (LVM) index and maximum wall thickness were derived from CMR analysis. The PLP criteria was defined as the sum of the deepest S wave (SD) in any lead and the S wave amplitude of lead V4 (SV4). Cornell voltage (CL) and Sokolow-Lyon (SL) were used for comparison. We randomly selected 88 gender-matched patients who performed an ECG and CMR for other clinical reasons and who had no structural heart disease or LVH for use as controls. The DeLong and McNemar's test were used to compare ROC area under the curve (AUC) and sensitivity and specificity, respectively, between the three criteria.

Results: 88 patients with HCM (63% male, mean age 56.7±15 years) were analyzed. The mean maximum wall thickness was 19.9±4.4mm and mean indexed LVM was 89.7±27g/m². 34 patients (38.6%) had increased indexed LVM and 77 (87.5%) had at least one segment with late gadolinium enhancement (LGE). Discrimination by AUC was highest for PLP (0.85 [95% CI 0.8–0.9]), compared to CL (0.79, p=0.03) and SL (0.73, p=0.02). Using literature cut-offs, the sensitivity of PLP (60% [95% CI 50–70%]) was significantly higher compared to CL (40% [95% CI 30–50%, p<0.001) and SL (41%, [95% CI 31–51%, p=0.01), whilst maintaining high specificity (PLP 96%; CL 98%; SL 94%). After adjusting for LVM, the amount of LGE had a positive correlation with PLP amplitude (Spearman's rho=0.6, coef=-2.4, p=0.01), but not Cornell or Sokolow. The sensitivity of PLP was significantly higher than CL and Sokolow in patients with LGE (61% vs 44% vs 43%, p<0.05).

Conclusion: The Peguero-Lo Presti criteria demonstrated higher sensitivity and similar specificity when compared to the Cornell and Sokolow-Lyon criteria for the diagnosis of LVH in a cohort of patients with hypertrophic cardiomyopathy. Therefore, they could become the standard ECG diagnostic criteria in patients suspected of having LVH and HCM.