ECHO Criteria for LVH Clarified in Jamaican Adults

Written by **Brian Hoyle**

Kurlene Cenac, MD, Instituto Superior de Ciencias Médicas, Santa Clara, Cuba, discussed a study that has clarified the diagnosis of left ventricular hypertrophy (LVH) in Jamaican adults. LVH, which is frequent in patients with hypertension, can increase the risk for cardiovascular disease. LVH has been diagnosed by echocardiography (ECHO) in patients with normal results on electrocardiography (ECG). ECHO uses transthoracic or transesophageal ultrasonography to measure the left ventricular end-diastolic diameter, posterior wall thickness, and interventricular septal thickness. Although ECHO is more accurate at diagnosing LVH, it is not always readily accessible. On the other hand, ECG, which is widely available, often does not correlate with ECHO findings.

The study was undertaken to evaluate the agreement between LVH detected using ECG and ECHO, assess the association between symptoms defined by New York Heart Association (NYHA) functional class and LVH detected by ECG or ECHO, assess ECG and clinical characteristics that predict ECHO-apparent diastolic dysfunction, and assess the sensitivity, specificity, and positive predictive value (PPV) of established criteria for LVH detection (Table 1).

Table 1. Diagnostic Criteria for LVH[a]

Sokolow-Lyon criteria
■ S wave in lead V1 or V2 + R wave in lead V5 or V6 > 35 mm OR ■ R in lead V5 or V6 > 26 mm OR ■ R in lead aVF > 20 mm OR ■ R wave in lead aVL > 11 mm
Cornell criteria
■ S wave in lead V3 + R wave in lead aVL ≥28 mm in men, ≥20 mm in women
Framingham score
■ R wave in lead I + S wave in lead III > 2.5 mV OR ■ S wave in lead V1 or V2 + R wave in lead V5 or V6 > 3.5 mV OR ■ S wave in lead V1, V2, or V3 > 2.5 mV OR ■ R wave in lead V4, V5, or V6 > 2.5 mV
PLUS
■ Left ventricular pattern (1-mm ST-J point depression ≥1 mm + inverted T wave in lead V5)
Romhilt-Estes criteria

■ Any limb R wave or S wave ≥20 mm OR S wave in lead V2 ≥30 mm OR R wave in lead V5 or V6 ≥30 mm (score of 3)
■ ST-T-wave changes typical of LVH
  • Taking digitalis (score of 1)
  • Not taking digitalis (score of 3)
■ Left atrial abnormality, P-terminal force in lead V1 ≥1 mm deep with duration of 40 ms (score of 1)
■ Left-axis deviation ≥−30° (score of 2)
■ QRS duration ≥90 ms/100 to 110 mm (score of 1)
■ Intrinsicoid deflection in lead V5 or V6 ≥50 ms (score of 1)

LVH=left ventricular hypertrophy.

[a]Total score ≥5 indicates definite LVH. Total score of 4 indicates probable LVH.

The cross-sectional study assessed ECG and ECHO data from 161 patients (57 men, 104 women; 94% black) aged 21 to 80 years who underwent ECG and ECHO at 2 health centers in Jamaica from July to October 2013. On the basis of body mass index, 35% of the participants were underweight or normal weight (< 19–24.9 kg/m²), 34% were overweight (25–29.9 kg/m²), and 31% were obese or morbidly obese (≥ 30 kg/m²). Except for hypertension, the prevalence of preexisting conditions was low. NYHA classes I, II, III, and IV comprised 80, 43, 16, and 22 participants, respectively.

ECG had low sensitivity and higher specificity in the detection of LVH. The Sokolow-Lyon criteria were the most sensitive for detecting LVH (44%), followed by the Romhilt-Estes (37%), Cornell (30%), and Framingham (25%) criteria. The Framingham criteria were most specific (97%), followed by the Romhilt-Estes (92%), Cornell (93%), and Sokolow-Lyon (83%) criteria. The presence of LVH according to the ECG criteria and ECHO varied, with the latter being superior (Figure 1).

The Framingham criteria had the highest PPV, followed by the Romhilt-Estes, Cornell, and Sokolow-Lyon criteria (Figure 2).

ECHO detection of LVH did not differ appreciably by sex or age. Age was more influential for ECG-based detection of LVH with the Sokolow-Lyon and Romhilt-Estes criteria.

Study limitations included the limited patient pool, inability to reach a target sample size that would be representative given the estimated 18% prevalence of LVH

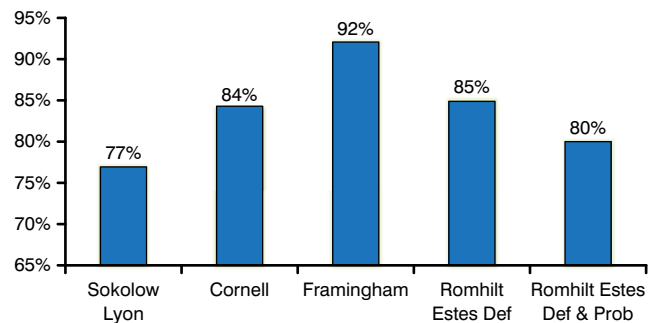Figure 1. Presence of Left* Ventricular Hypertrophy on ECG and ECHO.
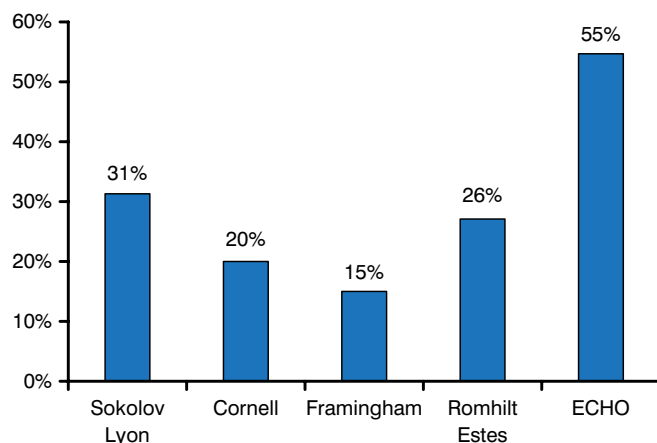
ECG=electrocardiography; ECHO=echocardiography.
Reproduced with permission from K Cenac, MD.
*On November 12, 2014, Left was inserted in this figure title.

Figure 2. Positive Predictive Value of ECG Criteria for Left Ventricular Hypertrophy.

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in Jamaican adults, and difficulty in standardizing the ECHO procedure among the participating institutions. Nevertheless, the results indicate that everyday clinical practice could benefit from the use of other criteria, such as the Framingham criteria, in LVH screening.

Normal ECG May Not Preclude Cardiovascular Risk in Jamaican Patients

Written by Brian Hoyle

Normal results on electrocardiography (ECG) may not rule out the risk for cardiovascular diseases (CVDs), with patient history still being important in the screening for CVD, according to a study conducted by Ayoki C. Levy, BA, Kalamazoo College, Kalamazoo, Michigan, USA, in collaboration with colleagues at the Heart Foundation of Jamaica in Kingston, Jamaica.

CVDs are the leading global cause of death, with 17 million attributable deaths each year.

The World Health Organization estimates that CVD will kill > 23 million people annually by 2030. Early detection and treatment can reduce associated morbidity and death. A host of ethnic, physiologic, and behavioral risk factors have been linked with CVD, including a sedentary lifestyle, hypertension, diabetes mellitus, obesity, age, tobacco exposure, excessive consumption of alcohol, and a family history of CVD.

The present study examined the prevalence of risk factors among 157 adult Jamaicans who underwent ECG to screen for CVD at the Heart Foundation of Jamaica during June 2013. The majority of patients resided in Kingston (n = 87) and the bordering St. Catherine parish (n = 52), with the remainder distributed evenly