



Sports and Exercise Cardiology

ECG VOLTAGE CRITERIA FOR LEFT VENTRICULAR HYPERTROPHY DIFFER BY GENDER AND RACE AND ETHNICITY: RESULTS FROM THE TEXAS ADOLESCENT ATHLETE HEART SCREENING REGISTRY

Oral Contributions

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Authors: *Harold Kohl, Arnold Fenrich, Geoffrey Whitfield, Jennifer Hutchings, Eva Garcia, George Rodgers, Silvana Lawrence, University of Texas Health Science Center - Houston, Austin, TX, USA, Baylor College of Medicine, Houston, TX, USA*

Background: ECG screening for left ventricular hypertrophy (LVH) remains controversial. Existing voltage norms for LVH for adolescents are based on relatively small numbers and an ethnically homogenous population. We sought to define race/ethnicity and sex distributions of four commonly used ECG criteria for LVH in a large, ethnically diverse population of 14-18 year olds undergoing community screening for cardiovascular conditions associated with sudden cardiac death.

Methods: Between May 2010 and July 2011, 2,450 athletes were screened as part of a community based SCD screening program in Texas. The study sample consisted of 1,703 boys and 747 girls; 60.1%, 9.2%, 23.0% and 7.0% were White, Black, Hispanic, and other race/ethnicities, respectively. A standard 12-lead ECG was performed for all assessments and measurements were confirmed by hand. Quantile regression was used to determine statistical differences.

Results: Voltages were measured for R in V6, S in V1, R+S in V3 and V4. Maximum voltages based on sex and three major race/ethnicity groups at the 98th% are shown in the table. Girls had significantly lower maximal voltage criteria at the 98th% than boys ($p < 0.001$) in all. Black adolescents had significantly higher voltage at the 98th% for S in V1 and R+S in V3 ($p < 0.01$).

Conclusions: ECG voltage screening criteria and distributions for adolescents should be updated to account for race/ethnicity and sex differences. Our data suggest that separate criteria should be used for boys and girls, and Blacks.

Sex and gender specific values for 98th percentile of ECG voltage criteria for LVH screening: TAAHSR 2010-2011

| | R in V6 (mm) | S in V1 (mm) | R+S in V3 (mm) | R+S in V4 (mm) |
|----------|--------------|--------------|----------------|----------------|
| All | 29.0 | 21.0 | 42.0 | 46.0 |
| Boys | 31.0 | 22.0 | 44.0 | 48.0 |
| Girls | 24.0** | 15.0** | 30.0** | 29.5** |
| White | 29.5 | 20.0 | 41.0 | 44.0 |
| Black | 30.0 | 25.0* | 49.0* | 52.0 |
| Hispanic | 27.5 | 19.0 | 42.0 | 46.5 |

** $p < 0.001$ * $p < 0.01$