Racial and Ethnic Trends in Athlete ECG Interpretation Utilizing International ECG Criteria

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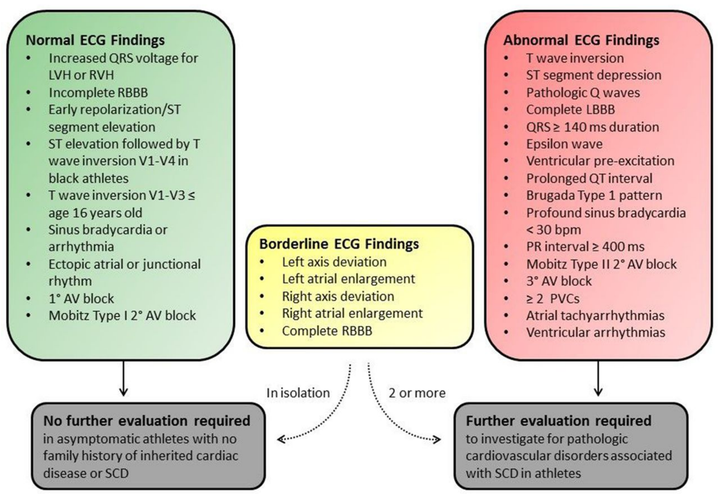
Background

Screening ECG to prevent sudden cardiac death (SCD) in athletes is a rapidly evolving field. Four novel criteria – ESC Criteria, Seattle Criteria, "Refined" Criteria and International Consensus Criteria - have been published in the past decade with improving sensitivity, specificity, and particular recognition of unique, benign findings in black athletes. Though the most recent 2017 International Athlete ECG Criteria made several adjustments intended to increase sensitivity and specificity, an analysis of its practical application by athlete race/ethnicity has not been published.

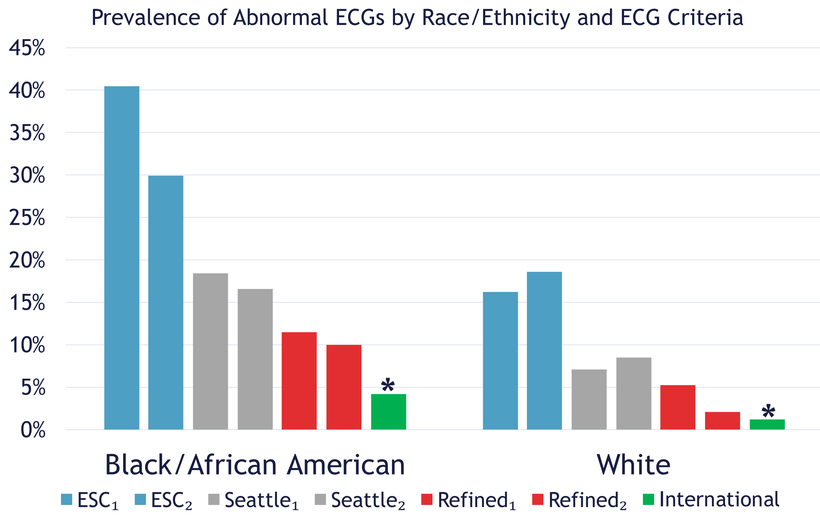
Methods

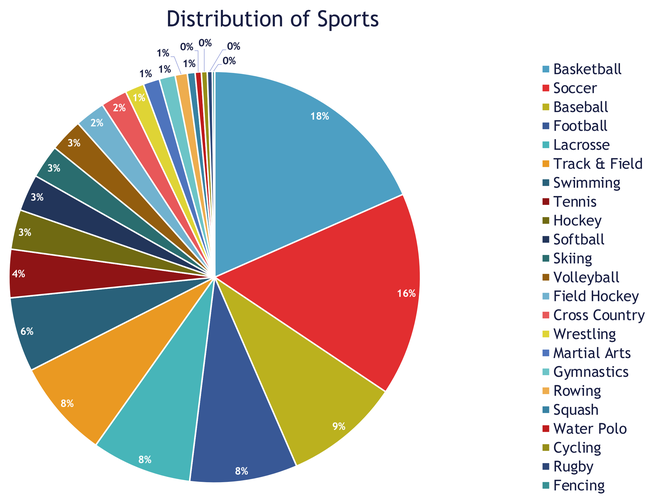
We analyzed the results of screening ECGs performed by a large, non-profit organization providing cardiovascular screenings for adolescent athletes. All athletes met recommended inclusion criteria for age (>12 years) and athletic activity level for expected training-related physiological changes (minimum 4-8 hours/week of intensive training). Race/ethnicity was determined by self-identification. To ensure strict adherence to International Criteria, all ECGs were independently read by two expert clinicians. We determined the prevalence and causes of abnormal ECGs, respective to each race/ethnicity and compared the results to published literature for prior athlete ECG criteria including ESC, Seattle and "Refined" Criteria.

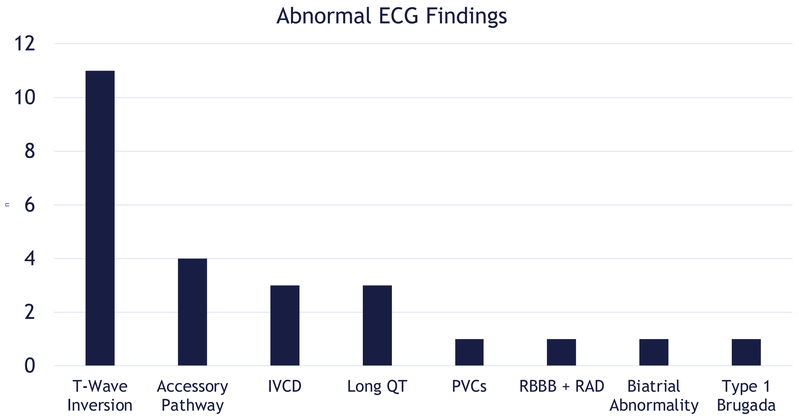
International Athlete ECG Criteria



Figures 1-3







Results

1777 consecutive screening ECGs were performed at 13 screening events (mean age 14.9 years, 64% male). The distribution of race/ethnicities was: 86.9% White, 4.2% African-American, 3.9% Latino/Hispanic, 3.8% Asian/Pacific Islander. The distribution of sports is shown in Figure 2. 26 ECGs (1.5%) were identified as abnormal. The prevalence of abnormal ECGs for each race/ethnicity were: African-American (4.2%), Latino/Hispanic (2.9%), Asian/Pacific Islander (1.5%), White (1.2%). The total number of ECG abnormalities is shown in Figure 3. All ECG abnormalities identified in Black/African-Americans were due to T-wave inversions. Amongst White athletes, the most common abnormalities identified were T-wave inversions, accessory pathways and long QT.

Conclusion

- Strict application of International ECG Criteria resulted in a lower overall percentage of abnormal screening ECG interpretations compared to published literature on prior screening criteria including ESC, Seattle and Refined Criteria.
- This finding of fewer observed ECG abnormalities was observed across all races, though this improvement was most significant in Black/African-American athletes.
- Compared to White athletes, Black/African-American athletes were still observed to have the highest percentage of abnormal ECGs, consistent with literature utilizing previous criteria.

References

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3. Drezner JA, et al. International criteria for electrocardiographic interpretation in athletes: Consensus statement. British Journal of Sports Medicine 2017;51:704-731

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