Master athletes'ECG and the diagnostic accuracy of contemporary ECG interpretation criteria

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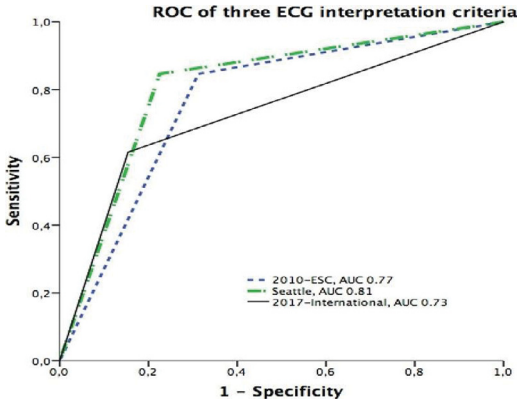
Background: Over the last years, several efforts have been made to refine the ECG criteria for interpretation of young (16–35 years) competitive athlete's ECG in order to improve specificity maintaining good sensitivity. However, few data exist about the efficacy of such interpretation criteria in master athletes (over 35 years). We aimed to assess the diagnostic performance of screening based on 2017 International ECG recommendation (2017-International), 2010 European Society of Cardiology recommendation (2010-ESC) and Seattle criteria in a cohort of master athletes competing at regional and national level.

Methods: 506 Caucasian master athletes (mean ages 47.9±8.7, 85,6% male, 65% endurance athletes) underwent standardized medical history, physical examination, resting and exercise ECG during their pre-participation screening. ECGs were retrospectively interpreted based on 2010-ESC, Seattle-criteria and 2017-International. For the purpose of the study we included also a transthoracic echocardiography as reference, to calculate the sensibility and specificity, area under the ROC curve (AUC) was estimated as measure of discriminative ability of each ECG criteria. Athletes with abnormalities underwent further examinations according to the European Guidelines.

Results: Twelve athletes (2,3%) were diagnosed with a condition potentially related to SCD (1 hypertrophic cardiomyopathy, 1 Type1 Brugada Syndrome, 4 Chronic Coronary Syndromes, 2 Dilated Cardiomyopathy, 3 Aortic Dilation, 1 Moderate aortic stenosis) during the pre-participation screening. International criteria failed to identify two athletes with DCM and left axis deviation on ECG while no athletes with complete right bundle branch block showed serious structural abnormalities. The most common ECG abnormalities were left axis deviation (7,1%), left atrial enlargement (4,2%) and T wave inversion (3%). 29 athletes (5,7%) exhibited a long QT interval according to 2010-ESC and 1 athlete according to International and Seattle criteria. The false positive ECG rate was 15% for 2017-International based screening, 21,9% for Seattle based screening and 30,40% for 2010-ESC based screening while the diagnostic accuracy for pathologies at risk of SCD was 0,73 (95% CI 0,69–0,77) for 2017 International based screening; 0,81 (95% CI 0,77–0,84) for Seattle Criteria based screening and 0,77 (95% CI 0,73–0,80) for 2010-ESC based screening.

Conclusion: In master athletes the 2017-International ECG criteria showed inferior accuracy compared to the Seattle criteria and 2010-ESC, the least showing a higher false positive rate mostly due to lower cut-off for long QT. Furthermore complete right bundle branch block may be considered a normal finding also in master asymptomatic athletes.



Accuracy of ECG criteria