

## Electrocardiographic ECG characteristics among Malaysian athletes

### ABSTRACT

The electrocardiogram (ECG) is a graphic representation of the heart's electrical activity. Although it has some limitations as a diagnostic or prognostic tool, it contains a wealth of information necessary for the proper care of a patient with a potential cardiovascular disease. Understanding the ECG changes among athletes would allow medical practitioners to distinguish between normal physiological adaptations and abnormal changes. However, there is limited data on the ECG characteristics among multi-ethnic athletes such as in Malaysia. This study aimed to determine the ECG characteristics and its associated factors among Malaysian national athletes. Malaysian national athletes annual preparticipation medical records were retrieved. Information on sociodemographic, sports and medical history including the 12-lead resting ECG tracings were extracted. ECG were assessed and categorised into normal, physiological adaptation changes, and abnormal ECG using the standardised 'Seattle criteria'. Differences in ECG characteristics between genders, ethnic background, and type of sports was investigated. Additionally, factors associated with the ECG characteristics were assessed using multiple logistic regression. Majority of Malaysian national athletes had physiological adaptation ECG changes (61%). The most frequent changes were early repolarization, sinus bradycardia and isolated left ventricular hypertrophy. We found significantly higher prevalence of physiological adaptation changes among men ( $\chi^2(2,371) = 18.9; p = 0.001$ ) and athletes of Chinese ethnicity (both genders) ( $\chi^2(2,356) = 13.8; p = 0.002$ ). Factors associated with physiological ECG changes were men (OR=2.67; 95% CI= 1.68, 4.27;  $p < 0.001$ ) and Chinese ethnicity (OR=2.92; 95% CI=1.68, 4.27;  $p = 0.039$ ). Most athletes had physiological adaptation ECG changes which were significantly associated with male gender and Chinese ethnicity. This information would facilitate the development of a specific guideline in interpreting ECG among Malaysian athletes.

**Keyword:** Athletes' heart; Electrocardiogram; Patterns; Physiological adaptation