A comparison of Cornell and Sokolow-Lyon electrocardiographic criteria for left ventricular hypertrophy in a military male population in Taiwan: the Cardiorespiratory fitness and HospItalization Events in armed Forces study

Fang-Ying Su, Yi-Hwei Li, Yen-Po Lin, Chung-Jen Lee, Chih-Hung Wang, Fan-Chun Meng, Yun-Shun Yu, Felicia Lin, Hsien-Tsai Wu, Gen-Min Lin

中文摘要

研究背景：心電圖左心室肥大的定義中，以 Cornell 及 Sokolow-Lyon 為普遍使用於診斷高血壓患者的左心室肥大。然而，亞洲地區對於探討這兩個心電圖定義篩選左心室肥大的準確性及針對軍人族群的研究相當缺乏。本研究目的在具有常規運動可能產生左心室肥大的軍人族群，比較 Cornell 和 Sokolow-Lyon 心電圖定義左心室肥大的準確性。

研究方法：本研究利用台灣花東區志願役軍人體適能及嚴重疾病住院研究資料庫進行分析。納入在 2014 年期間做過心臟超音波及心電圖的 539 位平均 28 歲的男性志願役軍人為研究對象。統計方法以皮爾森相關係數確定四個心電圖：Cornell voltage、Sokolow-Lyon voltage、Cornell product 和 Sokolow-Lyon product 定義左心室肥大與心臟超音波左心室質量指標(LVM (g)/height (m)$^{2.7}$) 的相關性。另外使用 ROC 曲線 (Receiver operating characteristic curve) 評估這四個心電圖組分析值之間的診斷效能。

研究結果：心臟超音波左心室質量指標與 Cornell voltage 和 Cornell product 的相關性(相關係數分別為 0.24 和 0.26，P 值皆<0.0001) 強於 Sokolow-Lyon voltage 和 Sokolow-Lyon product (相關係數分別為 0.049 和 0.095，P 值分別為 0.26 及 0.03)。此外，診斷左心室肥大的心臟超音波左心室質量指標 ROC 曲線分析中，Cornell voltage 和 Cornell product 心電圖定義 (曲線下面積 (Area Under Curve, AUC)；範圍 0.6-0.7，P 值皆 <0.0001) 的準確性優於 Sokolow-Lyon voltage 和 Sokolow-Lyon product (曲線下面積 (AUC)；範圍介於 0.5 之間，P 值>0.1)。

結論：台灣年輕男性軍人族群中，心臟超音波診斷左心室肥大，Cornell 比 Sokolow-Lyon 心電圖定義篩選的準確性高。

Abstract

Background: The Cornell and Sokolow-Lyon electrocardiography (ECG) criteria have been widely used for diagnosing left ventricular hypertrophy (LVH) in patients with hypertension. However, the correlations of these ECG criteria with LVH were rarely compared in military members who received rigorous training, particularly of the Asian male population.

Methods: We compared the Cornell voltage and product criteria with the Sokolow-Lyon criteria for the echocardiographic LVH in 539 military male members, ages 18–50 years and free of hypertension in the Cardiorespiratory fitness and HospItalization Events in armed Forces (CHIEF) study in Taiwan. Pearson's correlation coefficient was used to determine the association of each ECG criterion with the index of left ventricular mass (LVM, g)/height (m)2.7. The sensitivities and specificities were estimated using a receiver-operating characteristics (ROC) curve in relation to the echocardiographic LVH which was defined as LVM index ≥49 g/m2.7.

Results: The correlations of the Cornell voltage and product criteria (r=0.24 and 0.26 respectively, both P<0.0001) were stronger than that of the Sokolow-Lyon criteria (r=0.049 and 0.095, and P=0.26 and 0.03 respectively) with the LVM index. Similarly the performances of the Cornell voltage and product criteria for the echocardiographic LVH [area under curve (AUC): 0.66 and 0.68, both P<0.0001] were superior to that of the Sokolow-Lyon criteria (AUC: 0.54 and 0.53, both P>0.1) in the area under the

ROC curve analysis.

Conclusions: The Cornell ECG criteria for the echocardiographic LVH had better performance than the Sokolow-Lyon criteria in a young military male cohort in Taiwan.