

Screening Young Competitive Athletes for Underlying Cardiovascular Disease in British Columbia, Canada – A SportsCardiologyBC Study



SPORTSCARDIOLOGYBC

Daniel Lithwick MHA^{1,2}, Brett Heilbron MD^{1,2,3}, Barbara N. Morrison BHK^{1,2}, Jack Taunton MD^{1,2}, James McKinney MD^{1,2,3}, Hamed N. Nazzari MD. PhD^{1,2}, Michael W. Luong MD^{1,2,3}, Saul H. Isserow MD^{1,2,3}

¹SportsCardiologyBC, University of British Columbia, Vancouver, British Columbia

²Faculty of Medicine, University of British Columbia, Vancouver, British Columbia

³Division of Cardiology, University of British Columbia, Vancouver, British Columbia

Introduction:

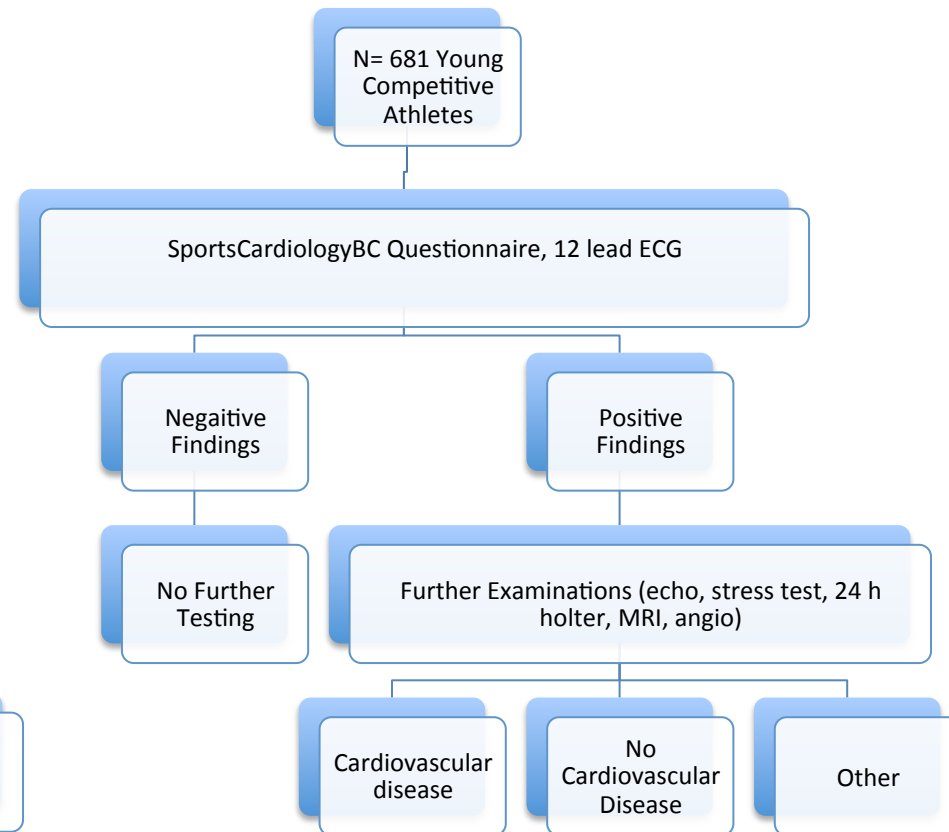
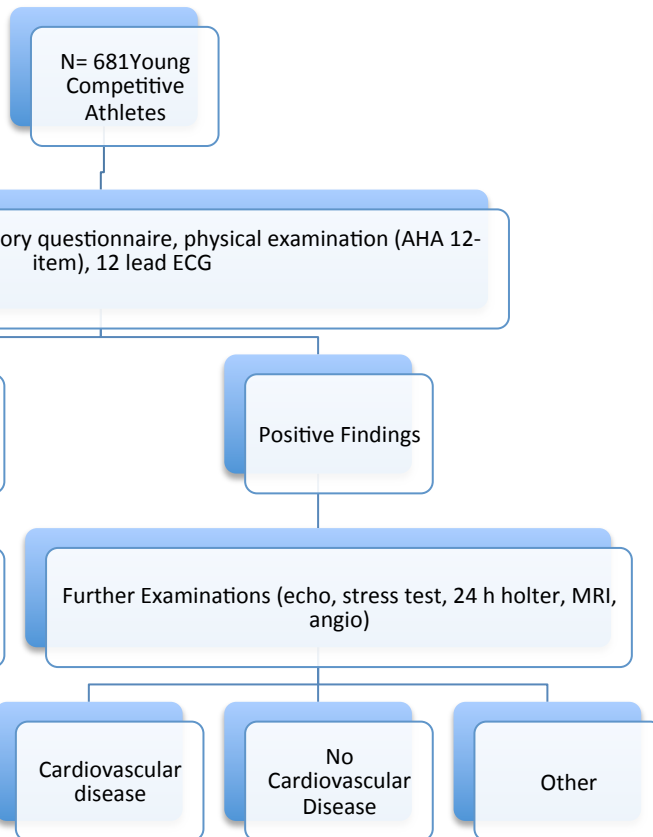
- Following the publication of a 25-year study out of Italy that showed a 90% risk reduction for SCD after the implementation of a systematic screening program, international attention towards the concept of screening has increased
- Implementation of screening remains a controversial issue, with the primary disparity lying in whether a 12-lead electrocardiogram (ECG) should be included in addition to a cardiovascular focused medical history and physical examination
- The purpose of this study is to determine the prevalence of cardiovascular diseases that can lead to SCD in a sample of young (12-35) competitive athletes in British Columbia

Methods



SPORTSCARDIOLOGYBC

- The first 681 participants were screened using the AHA 12-element recommendations for screening and resting 12-lead ECG
- The latter 681 participants were screened using a revised SportsCardiologyBC protocol and resting 12-lead ECG with no physical exam
- ECGs were interpreted by cardiologists using the “Seattle Criteria”





Results

- Of the 1,362 athletes evaluated, 93 (6.8%) required follow-up investigation.
- 11 (0.8%) cardiovascular disorders were found
 - Probable hypertrophic cardiomyopathy (HCM)
 - Long QT syndrome
 - 4 cases of Wolff-Parkinson-White Syndrome
 - Myxomatous mitral valve prolapse with mild regurgitation
 - Mild-moderate tricuspid insufficiency with pectus excavatum
 - Paroxysmal supraventricular tachycardia
 - Supraventricular tachycardia
 - Restrictive ventricular septal defect
- 11 participants are still under investigation for the presence of disease.
Notable queries include:
 - Atrial septal defect
 - HCM
 - Arrhythmogenic right ventricular dysplasia
 - Premature coronary artery disease



ECG Findings

Abnormal ECG Findings (suggestive of pathology)	Prevalence
Right ventricular hypertrophy pattern	n=2 (0.15%)
T-wave inversion	n=4 (0.29%)
Premature ventricular contractions	n=3 (0.22%)
Left atrial enlargement	n=1 (0.07%)
Long QT interval	n=4 (0.29%)
Complete left bundle branch block	n=1 (0.07%)
Ventricular pre-excitation	n=4 (0.29%)
Intraventricular conduction delay	n=1 (0.07%)
Biatrial abnormality	n=1 (0.07%)
Accelerated idioventricular rhythm	n=1 (0.07%)
Total abnormal ECG findings = 22 (1.7%) ECG Positive predictive value = 7/19 = 36.8% (3 athletes still under investigation with initial abnormal ECG)	



SPORTSCARDIOLOGYBC

Conclusions

- With 11 positive cases of underlying CVD found, and the investigation into several more athletes pending, screening for CVD in this population is likely a worthy endeavor
- The AHA 12-element preparticipation screening tool produced several false-positive results, prompting the research team to revise the protocol
- Considering the low proportion of ECG false-positive findings, as well as the improvement in positive predictive value over physical exam and ECG alone (36.8% vs. 10.2%), the resting 12-lead ECG should be considered an effective tool for screening

Questions? – dlithwick@sportscardiologybc.org