Detecting Cardiovascular Disease in the Young Athlete

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Cardiovascular Disease in the Young Athlete

• Are athletes at increased risk of sudden cardiac death (SCD) compared to non-athletes?
• What is the prevalence of SCD in athletes?
• Is there evidence for screening athletes?
• Preliminary results from the young athlete screening program in British Columbia.
Defining Different Classes of Athletes

Athlete

- Young
  - 12 to 35 y.o.
- ‘Masters’
  - > 35 y.o.

Congenital Heart Disease

Coronary Heart Disease
Are Athletes at Greater Risk?

- 21 year prospective study from Italy (1979 – 1999)
- Over 1 million adolescents
- Relative risk increase of 2.5x for sudden cardiac death in athletes.
- Those with undiscovered heart disease risk may be 100 fold higher.

Corrada et al. JACC. 2003
Prevalence of Cardiac Disease in Athletes

- Basketball
- Soccer
- Baseball
- Volleyball
- Baseball
- Rowing
- Karate
- Swimming...

Maron et al. JACC. 2014
Etiology of Cardiac Disease in Athletes

47 confirmed cardiovascular deaths

1. Hypertrophic cardiomyopathy
2. Coronary artery anomaly

Both pathological states are potentially identifiable through screening

Maron et al. JACC. 2014
Impact on the Community

• Devastating impact on athletes, parents and the entire community.
• 2012 Scott Stephen’s son, a Texas high school football player died of SCD.
  – Development of Bill H.B. 767
  – Requiring all high school athletes to have mandatory electrocardiograms completed.
  – Texas would be the only state in the country to mandate this type of screening.
Rationale for Screening

• In 60% of athletes the first presentation of cardiovascular disease can be sudden cardiac arrest.
• Degree and type of screening differs among the major cardiovascular organizations worldwide.
• Currently, only Japan, Israel and Italy have implemented national screening programs.
Evidence for Screening?

• 25 year longitudinal study from Italy between 1979 – 2004.

• Screening using history, physical examination and ECG

• Results of over 33,000 athletes indicated that ECG’s had 77% greater power for detecting hypertrophic cardiomyopathy than the United States screening restricted to history and physical.
Current Approaches to Screening Athletes

- Cardiovascular screening every 2 to 4 years for high school and college athletes.
- History and physical examination.

- Systematic pre-participation screening of young competitive athletes.
- History, physical examination and 12-lead ECG.
Debate Over Inclusion of ECG in Screening Process

- Cost effectiveness of mandating screening.
- Lack of infrastructure
- False positive rates – several studies suggest 8 – 15% of athletes will require secondary testing.
- Expertise in what constitutes normal variants in athletes is necessary.
- Guidelines for ECG interpretation have been established by United States and Europe
Current Screening Recommendations in Canada

- No consensus guidelines currently exist.
- British Columbia has unique and diverse population of young athletes.
- Further data on our athletes are needed to help guide future recommendations.
SportsCardiologyBC – Young Athletes Study

• *Prevalence of Cardiac Disease in British Columbia for Young Competitive Athletes – Sports Cardiology BC*

Heart Screening

• Goals:

1. To determine prevalence of cardiac disease in a subset of our population.
2. Utilize AHA and ESC to compare and contrast efficiencies of screening methods.
3. Provide recommendation for screening strategies.
Preliminary Results – Presented at ACSM

- >1200 Athletes screened from across B.C.
- Detailed Questionnaire, Physical Exam and ECG
  
  First 697 participants
  
  55 Follow-up cardiovascular evaluations required (7.9%)

  26 – Personal histories (palpitations, fainting, fatigue, chest pain)
  
  7 – Family histories
  
  17 – Abnormal ECG
  
  11 – Physical Exam Findings
Young Athlete Study – Protocol Amendments

• Study has been amended to include questionnaire and ECG and remove physician assessment component.

• Assessing risk without the involvement of a physician.
  – Efficiency
  – Physician fees

• Physical exam can have low utility in detecting abnormalities.
Young Athlete Study – Protocol Amendments

• AHA and ESC questionnaires sensitivity and specificity can be improved upon.
• Newly developed questionnaire by Sports Cardiology BC researchers.
• Develop a questionnaire and scoring system which can be utilized by physicians, coaches, parents, athletes.
• Score on questionnaire in combination with ECG can guide need for further investigation.
Summary and Conclusions

- Athletes may be at greater risk of SCD.
- Prevalence rates of SCD are similar to those of suicide and drug deaths in young athletes.
- Screening programs may be effective in the detection of cardiac disease in these athletes.
- Currently there is a lack of consensus on screening protocols.
- More data needs to be collected across B.C. and the country to help guide evidence based screening programs for our athletes.
Acknowledgements and Contact Information –

Young Athlete Study
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