

Preparticipation Cardiac Screening in Athletes for Prevention of Sudden Cardiac Death

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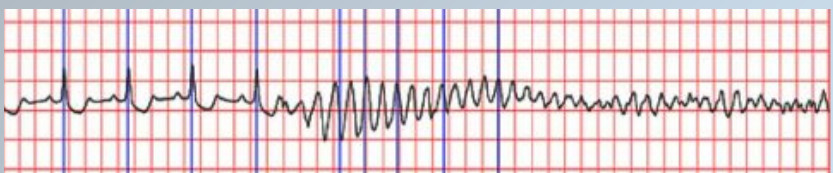


Learning objectives

1. Understand the physiology of sudden cardiac death (SCD) in athletes.
2. Discuss the incidence rate of SCD, and whether screening tests are helpful in reducing SCD incidence.
3. Compare different screening modalities based on efficacy, ethics, and cost-effectiveness in an athlete population.

Introduction

- SCD is defined as unexplained death within 1 hour of symptom onset (i.e. chest pain, syncope), most commonly in the setting of exercise or sports.
- SCD is rare, traumatic, and unexpected, and as of recent has had relevant presence in the media.
- The incidence of SCD is 6.8 per 100,000 athletes
- Competitive athletes under 35 years old have a 2.5 to 3.6 increased relative risk of SCD compared to nonathletes
- An estimated 69% of SCD in athletes from 1980-2006 occurred from the year 1994-2006.
- Preparticipation screening (PPS) fluctuates from country to country
- How can the medical community better optimize preparticipation screening?



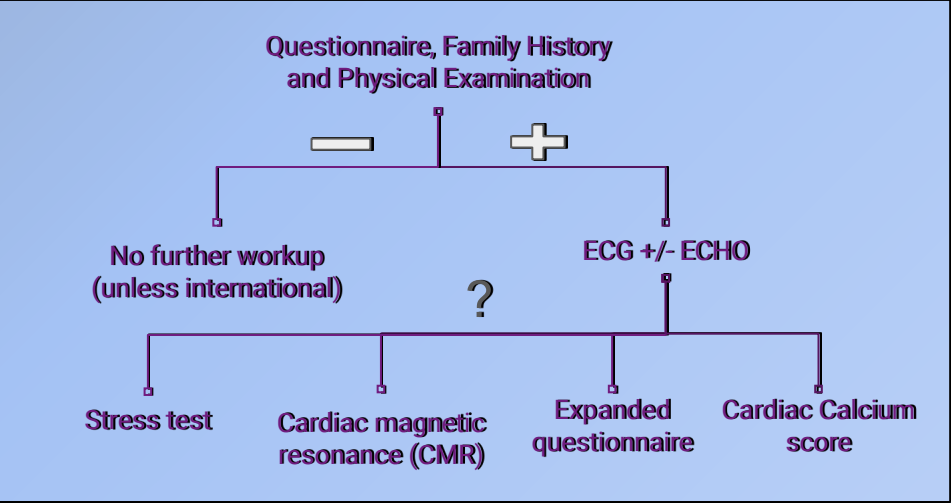
Causes

Structurally Normal Heart	Structurally Abnormal Heart
Brugada syndrome	Hypertrophic cardiomyopathy
Long QT syndrome	Arrhythmogenic right ventricular cardiomyopathy
Catecholaminergic polymorphic ventricular tachycardia	Dilated cardiomyopathy
Commotio cordis	Left ventricular noncompaction
Other channelopathies	Congenital abnormalities of the coronary arteries
Electrolyte abnormalities	Marfan syndrome
Wolf Parkinson White syndrome	Valvular heart disease
	Myocarditis
	Coronary artery disease (athletes >35 years old)

Characteristics of a Screening Test

1. Disease detection in an asymptomatic patient
2. Early detection will change its clinical course
3. Screening is suitable for the general population.
4. Reliable results (i.e. sensitivity, specificity, false negative/positives)

Methods of Screening



Results

- The U.S. prefers to limit the number of ECGs performed in athletes due to a high false positive rate (Dunn et. al)
- ECG sensitivity is upwards of 98.3% internationally, and is used in all athletes in countries like Japan and Italy.
- 617 deaths occurred in Federation International de Football Association (FIFA) leagues from 2014-2018 despite league wide screening with ECHOs.
- Families can spend upwards of \$16,000 on additional workup for SCD risk.
- Expanded questionnaire screening was outperformed by standard work-up and ECG alone.
- Limited data is available for CMR and stress testing, but may be beneficial in select populations of athletes.
- Rapid CPR within 3 minutes of commotio cordis saves lives 25% of the time

Conclusion

- An athlete's heart is difficult to screen, leading to additional workup which typically is unnecessary.
- SCD is nearly impossible to predict, and a cause of death may not be found
- AED availability and CPR are crucial in resuscitation.
- Shared decision making between patients and providers provides for proper education, treatment, and reassurance.

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