SPORT SHORTS

GUIDELINES FOR PEDIATRICIANS

Sudden Cardiac Death (SCD)

Issue 9

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN™

DEFINITION: Sudden cardiac death (SCD) is defined as a nontraumatic, nonviolent, unexpected event resulting from sudden cardiac arrest within 6 hours of a previously witnessed state of normal health.

INCIDENCE: The SCD of a young athlete (younger than 35 years) during a sporting event is particularly tragic. Fortunately, the occurrence of such an event is extremely rare. Approximately 10 to 13 such cases are reported annually in the United States. Thus, the statistical chance of a SCD occurring in an apparently healthy adolescent during a year of sports participation is no more than 1:250,000.

EPIDEMIOLOGY: For reasons unknown, SCD appears to be disproportionately more common in males, African-Americans, and competitors of football and basketball. Most events have occurred between 3 PM and 9 PM, during or immediately after training or competition.

ETIOLOGIES: SCD in young athletes is usually caused by previously unsuspected cardiovascular disease. Approximately 90% of cases of SCD in young athletes are caused by structural pathologic abnormalities. The remaining 10% are primarily electrical disorders.

MOST COMMON CAUSES	LESS COMMON	RARE
• Hypertrophic cardiomyopathy (HCM) 36% • Coronary artery abnormalities (23%) • Idiopathic left ventricular hypertrophy (9%-10%)	• Ruptured aortic aneurysm • Myocarditis • Valvular aortic stenosis • Atherosclerotic coronary artery disease • Arrhythmogenic right ventricular dysplasia	• Wolff-Parkinson-White syndrome • Long QT syndrome • Mitral valve prolapse • Commotio cordis • Drugs

Drezner JA. Sudden cardiac death in young athletes. Causes, athlete's heart, and screening guidelines. *Postgrad Med.* 2000; 108:37-44, 47-50.

SCREENING EVALUATIONS: One study of 115 young athletes in whom SCD occurred who had a standard preparticipation medical evaluation showed that only 4 (3%) were suspected of having cardiovascular disease, and the cardiovascular abnormality responsible for sudden death was correctly identified in only 1 athlete (0.9%). The American Heart Association (AHA) makes the following recommendations:

Athletic screening should be performed by a healthcare worker with the requisite training, medical skills, and background to reliably obtain a detailed cardiovascular history, perform a physical examination, and recognize heart disease. Screening evaluations should include a complete medical history, and physical examination, including brachial artery blood pressure measurements.

OF THE COMPONENTS OF THE SCREENING EVALUATION, THE HISTORY IS THE MOST IMPORTANT

Cardiovascular history should include but not be limited to the following:

- Prior occurrence of exertional chest pain or discomfort, syncope or near-syncope as well as excessive, unexpected, and unexplained shortness of breath or fatigue associated with exercise
- Past detection of a heart murmur or increased systemic blood pressure
- Family history of premature death (sudden or otherwise) or significant disability from cardiovascular disease in close relatives(s) younger than 50 years or specific knowledge of certain conditions (eg, HCM, Marfan syndrome, long QT syndrome, or clinically important arrythmias)

PARENTS SHOULD COMPLETE THE MEDICAL HISTORY FORMS WITH THEIR CHILD

Cardiovascular physical examination should include but not be limited to the following:

- Precordial auscultation in both the supine and standing positions to identify, in particular, heart murmurs consistent with dynamic left ventricular outflow obstruction (the auscultation should be performed in a quiet room).
- Assessment of the femoral artery pulses to exclude coarctation of the aorta
- Recognition of the physical stigmata of Marfan syndrome
- Brachial blood pressure measurement in the sitting position

Diagnostic procedures:

- Echocardiography and electrocardiography are not recommended as part of routine screening of athletes at this time because of the low frequency of disorders that are detected, the high rates of false-positive findings, and the high cost.
- Future developments may include genetic testing for high-risk young athletes

MEDICAL CLEARANCE: Young athletes suspected of having a cardiovascular abnormality should be referred to a cardiologist for further evaluation. Clearance for participation may be based on guidelines established for cardiovascular abnormalities at the 26th Bethesda Conference (sponsored by the American College of Cardiology and the American College of Sports Medicine; *J Am Coll Cardiol.* 1994;24:845-99).

MOST CHILDREN WITH CARDIOVASCULAR CONDITIONS CAN PARTICIPATE IN MOST, IF NOT ALL, PHYSICAL ACTIVITIES

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Doctor: This side of "Sports Shorts" is for your use; flip side is for photocopying and giving to your patient

GUIDELINES FOR PARENTS, COACHES, AND ATHLETES

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WHAT IS IT? Sudden cardiac death in young athletes is nontraumatic, nonviolent, and unexpected. An athlete actually appears healthy within 6 hours before death. Most often, death is caused by a heart (cardiac) problem, which this handout will focus on.

HOW OFTEN DOES IT HAPPEN? About 5 million youth participate in competitive sports each year. Chances of a teen dying from heart failure while playing sports is less than 1 in 250,000. Each year, approximately 10 to 13 such cases are reported in the United States. In comparison, about 15,000 teens die each year in motor vehicle crashes.

For reasons unknown, sudden cardiac death appears to be more common in boys, African-Americans, and football and basketball players. This may be because more athletes participate in these sports. Most deaths occur between 3 PM and 9 PM - during or immediately after training or competition.

WHAT CAUSES THIS? Most young athletes who die unexpectedly from heart disease while participating in sports were not known to have heart disease. Most sudden cardiac deaths in athletes younger than 35 years are due to conditions that may be inherited or conditions that the athlete had since birth. Unfortunately, some heart problems that can cause death during sports training and competition are not likely to be detected during sports physicals or routine exams.

SCREENING EVALUATIONS: Before participating in any sports, young athletes should have a complete physical exam that includes a detailed personal and family history of any heart conditions. Most children and teens who experience heart symptoms during physical activity will not appear to have heart disease during an exam, so more tests may be needed.

> *Athletic screening (sports physicals) should be done by a health care provider with the training, medical skills, and background to obtain a detailed family history of heart disease, perform a physical exam, and recognize heart disease. Screening evaluations should include a complete medical history and physical exam, including blood pressure measurements.*

PARENTS SHOULD COMPLETE THE MEDICAL HISTORY FORMS WITH THEIR CHILD

Young athletes may be at greater risk and need further evaluation and tests if there is:

1. A history of chest pain, dizziness, fainting, or abnormal shortness of breath or fatigue during exercise.
2. Unexpected sudden death of a family member at a young age. (This could mean there is a possibility of inherited heart disease.)
3. A history of abnormal heartbeat or heart murmur (most murmurs are harmless).
4. Heart and/or eye problems experienced by an athlete who is unusually tall, especially if being tall is not common in other family members.

Electrocardiography (EKGs) and echocardiography (echos) are not recommended as part of regular screening of athletes. This is because a heart problem is found very rarely.

RECOMMENDATIONS: Most young athletes with heart conditions can participate in most, if not all, physical activities. Deciding whether to participate in physical activities is an individual choice. It is the main responsibility of health care providers to evaluate each individual heart problem and set individual limits of physical activity with appropriate consultation with a cardiologist.

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