

Sudden Cardiac Death

How to Protect Your Family

Georgia High School Association



Introduction

- Why are we here?
- What is sudden cardiac death (SCD)?
- Causes
- Prevention strategies
- Recognition and actions

Why are we here?

- **SB 60 – Jeremy Nelson and Nick Blakely Sudden Cardiac Arrest Prevention Act** **March, 2019**
 - “All Georgia schools (public and private including charters) that have one or more grades 6-12 shall hold an informational meeting twice per year regarding the symptoms and warning signs of sudden cardiac arrest. At such informational meeting, an information sheet on sudden cardiac arrest symptoms and warning signs shall be provided to each student’s parent or guardian. In addition to students, parents or guardians, coaches, and other school officials, such informational meetings may include physicians, pediatric cardiologists and athletic trainers.”

What is Sudden Cardiac Death (SCD)

- Cardiac arrest is the leading cause of death in young athletes
- Rare, but when a young, previously healthy athlete dies suddenly on the playing field, communities can be devastated. Young athletes are perceived to be a healthy group of individuals. They aren't supposed to die...
- Stirs up medical attention, discussion and sometime finger pointing among school personnel, coaches, administrators, parents, and physicians.

Causes of SCD in Young Athletes

- Structural abnormalities
- Electrical abnormalities
- Trauma
- Infections

- By various mechanisms, these abnormalities cause the heart to beat out of control, called ventricular fibrillation, or Vfib. This leads to the inability of the heart to pump blood the brain, lungs and the heart itself, causing *hypoxic injury* (lack of oxygen delivery) and *ischemic injury* (lack of blood flow) and death.

Structural abnormalities

- **Hypertrophic cardiomyopathy (HCM)**
 - Inherited condition, may run in families so a history of sudden death in a family member before age 50 may be the only clue to the condition.
 - The heart muscle walls are thickened, which disrupts the flow of blood from the heart, and disrupts the heart's electrical system during exercise. This can lead to ventricular fibrillation (Vfib) and cardiac arrest.
 - A history of shortness of breath, chest pain or syncope (dizziness) during exercise may be a clue.
 - Physical exam is usually normal but a skilled physician in cardiac auscultation may detect a murmur.

Structural abnormalities

- **Coronary artery abnormalities**

- The arteries that supply the heart muscle itself are connected abnormally and may get compressed during exercise and not provide adequate blood flow to the heart muscle. This results in Vfib and cardiac arrest.
- Sudden death is usually the initial clue but there may be a history of chest pain or syncope with exercise.

- **Marfan syndrome**

- Inherited condition so family history may be a clue.
- Abnormal collagen in the aorta may lead to rupture with exercise.
- Tall, slender, long arms, legs, fingers, abnormal breastbone, high arched palate, extreme nearsightedness, curved spine, flat feet
- These traits in any athlete should raise suspicion of the condition.

Electrical abnormalities

- **Wolff-Parkinson-White syndrome**
 - Extra electrical pathway in the heart causes rapid heartbeat leading to Vfib.
 - Usually born with the condition and can cause chest pain, syncope and shortness of breath with exercise.

- **Long QT syndrome**
 - Inherited rhythm disorder causing fast, chaotic heartbeats often causing fainting. Can result in Vfib.
 - May occur with immersion into cold water as in swimming and diving.
 - History of drowning or near drowning in family member may be the only clue.

Traumatic injuries to the heart

- **Commotio Cordis**

- Blunt trauma to the chest from a projectile (lacrosse, baseball, hockey) or contact sports (martial arts) at exactly the wrong time in the cardiac electric cycle may induce Vfib.
- More common in children due to a thin and compliant chest wall.

Infection

- **Myocarditis**

- Inflammation of the heart muscle usually from a virus.
- Inflamed heart muscle can't tolerate the stress of strenuous exercise and goes into Vfib
- Recent viral illness (cold, flu symptoms), fever, or recent exercise intolerance may be a clue.
- Athletes with fever or recent febrile illness should not exercise until they are afebrile, are symptom-free and have completed a gradual return to exercise program symptom-free.

Prevention Strategies

- **Primary prevention**

- Recognize the warning signs of SCD if they occur
 - Recognize chest pain, shortness of breath or syncope with exercise. Syncope in the middle of exercise (vs at the end of a race) or fainting suddenly with loud noises alarm clock, phone ringing, or doorbell warrants investigation.
 - Chest pain or shortness of breath often due to asthma or being “out of shape” but these symptoms need to be investigated prior to returning to strenuous workouts (remember SB 60).
- Sudden, unexpected death in a family member before age 50 is a red flag to a possible inherited condition and warrants investigation.
- Drowning or near-drowning in a family member could indicate Long QT
- Family history of known cardiac disorder, Marfan syndrome or electrical abnormalities of the heart warrants investigation

Prevention Strategies

- Get a yearly pre-participation physical examination **by your primary care physician, usually a pediatrician.**
- GHSA requires this form as of 8/1/2019 and will not accept any other version. Endorsed by AAP, AHA and 5 other orgs.
- Thorough history and physical exam by a skilled physician is the primary screening tool in preventing SCD. (AHA)
- Mass pre-participation physical screenings in gymnasiums should be discouraged because this format, despite being popular, often doesn't allow for a thorough history or careful cardiac auscultation due to the noisy environment.
 - Performed by a provider that is not the athlete's primary physician. Usually an orthopedic surgeon, not skilled in cardiac auscultation.
 - Previous health records are not available, unable to update immunizations with this format.
 - Family history may not be reviewed by parent and may be inaccurate and possibly miss important family historic clues that may be causes of SCD.

Recognition and Actions

- Must recognize SCD. Whether you see them collapse or not, you must assume SCD as a possible cause.
- Act quickly. Call for help.
- Be trained and certified in hands-on CPR.
- Obtain AED as early as possible and know how to use it.
 - Every minute is critical.
- Have an emergency action plan (EAP) and *rehearse it*.
 - Personnel assignments (CPR, go get AED, crowd control, call 911, unlock gate, direct EMS to victim, etc.)
 - Equipment location and accessibility
 - Working phone

Summary

- Get pre-participation physical done by pediatrician 6 weeks before season starts.
- Know accurate family history and be familiar with warning signs and symptoms.
- Recognize warning signs if they occur.
- Have all coaches and personnel CPR certified and AED trained.
- Know where AED is.