What is it?
Sudden death refers to an unexpected demise occurring over a short period of time, usually within 1 hour of symptom onset. It is predominantly caused by abnormalities of the heart and affects both those with known and unknown heart (“cardiac”) disease. For this reason, it is commonly known as Sudden Cardiac Death (SCD). Cases of SCD are tragic and often receive a large amount of public attention, particularly when young, previously healthy athletes are affected. Fortunately, SCD is rare in athletes. It is estimated to occur in 1 in 50,000 to 1 in 200,000 athletes under 35 years old. In these young athletes, genetic or congenital cardiac disease is typically the cause, such as hypertrophic cardiomyopathy, arrhythmogenic right ventricular dysplasia, coronary artery anomalies, and dilated cardiomyopathy. However, in 2-10% of SCD cases in young athletes, no structural heart abnormality is found. In these cases, the cause of sudden death is presumed to be electrical heart disease, such as cardiac ion channel defects, long QT syndrome, or Brugada syndrome. A more rare form of SCD in young athletes is commotio cordis, where a blunt, non-penetrating chest injury results in sudden arrhythmia and death.

In older athletes (defined as over 35 years of age), blockage of the heart’s blood vessels (atherosclerotic coronary artery disease) causes the vast majority of SCD. While the risk of SCD from coronary artery disease increases transiently with any exercise, this acute risk is much larger in habitually sedentary individuals, especially those engaging in sudden vigorous activity. Death from sudden cardiac events is much more common in older athletes. In the general population, only 6% of sports-related fatal events occur in younger athletes, while more than 90% occur in older athletes performing “recreational sports” at an average age of 46 years old.

Symptoms
- Exertional chest pain
- Palpitations
- Gasping
- Sudden loss of consciousness

Risk Factors
**Younger Athletes (<35yo):**
- Male
- African-American
- Older age
- Family history of SCD

**Older Athletes (>35yo):**
- Smoking
- Hypertension
- Hyperlipidemia
- Diabetes
- Obesity
- Sedentary lifestyle
- Family history of coronary artery disease or SCD

Sports Medicine Evaluation & Treatment
In the case of a sudden cardiac event, prompt recognition of the problem is very important. Sudden cardiac arrest is suspected by sports medicine professionals in any athlete who collapses and becomes unresponsive. The sports medicine professional will start cardiopulmonary resuscitation (CPR) and send for an automated external defibrillator (AED). Once the AED is applied, the athlete’s heart rhythm is analyzed and shocks by the AED are applied, if appropriate. Access to early defibrillation is essential for survival, with a goal of the first shock being given within 3-5 minutes of collapse. Public access to AEDs and established emergency action plans at the sporting facility greatly improve the likelihood of survival. After the patient is stabilized in the hospital, a full cardiac work-up and further testing is done by a consulting cardiologist.
Injury Prevention
Periodic physical examinations before athletic participation are used to detect symptoms, assess risk factors, and identify those athletes potentially at higher risk for sudden cardiac events. A current area of controversy is the use of screening electrocardiograms (ECG) to identify cardiac disorders in asymptomatic young athletes. ECGs may detect more life-threatening disease than the standard history and physical, but may also lead to false-positive diagnoses, which can result in much greater expense, greater anxiety, and potentially needless disqualification for athletes. Newer criteria to interpret ECGs in athletes may lead to fewer false positive diagnoses. But since sudden cardiac death is so rare, there are no prospective studies that delineate the best use of ECGs to prevent SCD in young athletes.

In older athletes, prevention of SCD equates to preventing coronary artery disease. Regular exercise reduces the chances of developing coronary artery disease and greatly increases survival odds should a sudden event occur. Athletes should see a physician to identify and treat known risk factors for coronary artery disease. Older athletes who have been previously sedentary and are planning on starting intense exercise should definitely be evaluated by a physician. Exercise treadmill testing is recommended for older athletes who have known cardiovascular disease or who have high-risk cardiovascular profiles.

Return to Play
The decision of whether or not an athlete may return to vigorous physical activity after surviving a sudden cardiac event is very individualized. Knowing the exact diagnosis that caused the event is crucial in making these decisions. Athletes with known arrhythmias that have received ablation treatment to correct the arrhythmia may be able to return to their previous activity level. Generally, athletes with known structural heart disease should not participate in vigorous physical activity but may participate in select low-intensity, low-impact activities. Some athletes may return to intense activity after receiving an implantable cardioverter defibrillator for certain conditions. Ultimately, the best decision is made after a discussion of the involved risks between the physician and the athlete.

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References