

Instant gratification has become the norm of our fast-paced society, and no other disease caters to our impatience quite like Sudden Cardiac Death (SCD).

What is Sudden Cardiac Death?

Sudden Cardiac Arrest is a malfunction in the electrical system of the heart causing irregular activity which compromises oxygen supply to the brain. If untreated, it is fatal condition and known as Sudden Cardiac Death.

Can you Teach me a little about the heart?

“3-2-1-CLEAR!”, the Emergency Physician yells as he shocks an aggravated heart out of its deadly arrhythmia. Right in the nick of time too, as every passing minute decreases the chance of survival by 7-10%.¹ The heart is more complex than a Swiss watch, but its two crucial steps are loading with blood and contracting. I want you to hold up your fist. Open and close it in a smooth rhythm to represent the filling and contracting of the heart. Now, speed it up as fast as you can. Ventricular tachycardia is when the heart is contracting so fast there isn't time for blood to fill the heart. Next, barely curl your fingers as if you were beginning to form a fist and twitch them back and forth. Ventricular fibrillation, the most dangerous rhythm, is when the heart quivers ejecting little to no blood. Finally, open your hand and simply don't move it. Asystole is when the heart completely stops. All three interrupt the blood supply, which carries precious oxygen to the brain, causing fainting and if untreated—death within minutes.

That sounds scary; should I be worried?

There is no need to worry since stress is bad for the heart; but, if you are an African American male, make an appointment with your family doctor to get screened immediately because you are the most at risk group.² Scratch that, everyone should make time to get screened ASAP – no excuses. More people die every year in the USA from SCD than AIDS, breast cancer, lung cancer, and stroke combined.³ In thirty short minutes a doctor can perform an ECG, physical exam, and medical history; and you will be free to go with invaluable peace of mind. Make an appointment. [Find a Free Clinic](#)

What Causes SCD?

To answer this question we have to break up people into two groups: younger than thirty five and older than thirty five. SCD in the older group is primarily a result of plaque thickening the walls of arteries that carry blood to the heart, which is known as **Coronary Artery Disease (CAD)**, but is also caused by **dilated cardiomyopathy** and a **history of heart attack**. The younger group is more of a mixed bag: genetic heart defects, inflammation and damage of the heart (**myocarditis**), chest impact (**commotio cordis**), and **Athlete's Heart**.

Coronary Artery Disease

The heart is a muscle and, like all muscles, requires oxygen and nutrients to function. When the blood supply to the heart is interrupted, the heart begins to suffer. Has your mom ever made you water the garden? Well your arteries are like a garden hose. Gunk can accumulate on the inside of the hose (stenosis and inflammation); the hose can be compressed

(vasoconstriction); the gunk can clog the hose (thrombosis); and hose can even rip or tear under all that pressure (hemorrhage). The lack of blood causes the heart muscle to die and scar.

Dilated Cardiomyopathy

Have you ever seen what happens to a retired body builder that lets himself go? That flabby, out-of-shape figure is very similar to a heart with dilated cardiomyopathy (DCM). The heart becomes large and stretched out, unable to contract as well as it used to like a balloon that's been inflated and deflated over and over again. Genetic defects, infection, alcohol, drugs, pregnancy, and iron overload are the causes of this enlarged, stretched out heart.⁴ The only treatment is a heart transplant.

History of Heart Attack

After a heart attack ends, the heart undergoes a massive remodeling. The heart forms scar tissue which interferes with the normal function. This scar tissue impairs the ability of the heart to pump blood the body or causes heart failure. In the first month after a heart attack, SCD risk is extremely high and steadily decreases over a period of months.¹⁴

Long QT Syndrome

The heart is programmed to beat on its own like a computer is programmed. However instead of computer code, circuits, and wires, the heart's AI is run by salts, channels, and nerves. Sometimes, however, the "code" that runs the AI is faulty. The channels don't function correctly, like a bug in a computer program, and cause the heart to take too long to recharge after pumping. Long QT syndrome is caused either by inherited genetic mutation in the SCN5A gene or certain drugs.⁵

Brugada Syndrome

This is another channel disease similar to Long QT Syndrome and can be caused by mutation in the same gene, SCN5A. However, Brugada Syndrome is specifically a problem with sodium channels. The disease can be caused by defects in the sodium channels or the channels going to the wrong place. While mainly a genetic disease, it can be caused by certain drugs.^{6,7}

Wolf-Parkinson-White Syndrome

Let's continue using the computer analogy we used above. Wolf-Parkinson-White Syndrome (WPWS) is a result of faulty wiring. This faulty heart has an extra "wire" that connects the motherboard (Sinoatrial Node) to the engine (ventricles). It is essential for the motherboard to send the signal to contract with precision accuracy. The extra wire (accessory pathway) causes the heart to become confused and beat irregularly as two signals are received at different times.⁵

Arrhythmogenic Right Ventricular Cardiomyopathy

The muscle of the heart (myocardium) is affected in ARVC. This inherited genetic disease affects the ability of individual muscle cells to stay connected by desmosomes. During exercise, the strain is too much and the cells separate. They die and are replaced by scar tissue and fat. This causes the heart to malfunction and eventually can lead to deadly arrhythmias. This disease occurs in 1/1,000 to 1/1,250 people.⁸

Hypertrophic Cardiomyopathy

The heart, like the rest of the body, is high ordered even to the molecular level. The muscle filaments that make up heart muscle are no exception. When the filaments are disorganized, they take up more space and function less efficiently. The heart becomes highly inefficient. The bulging inner heart wall (interventricular septum) decreases the size of the ventricle, which pumps blood to the body. This disordered heart is prone to arrhythmias. This disease can be worsened by vigorous exercise which further increases the size of the heart, but this can be reversed by abstaining from exercise.⁹

Commotio Cordis

Have you ever heard the phrase wrong place at the wrong time? Well, a blunt impact to the chest is the wrong place; and right after the heart has pumped blood is the wrong time. The heart is very vulnerable when it is recharging after pumping, or in medical terms at the peak of the T-Wave. A line drive, slap shot, or jab to the chest could all send an otherwise healthy person in the ventricle fibrillation, the most dangerous rhythm. There are about 10-20 cases a year and primarily affects teenagers.¹⁰

Myocarditis

“No pain, no gain!” Well, sometimes that pain can kill you. Myocarditis is inflammation of the myocardium (heart muscle) primarily caused by infectious diseases. These diseases cause the chest pain that if ignored can be fatal. Since there are so many different causes of myocarditis (viruses, bacteria, and parasites) there isn't one specific way to describe the disease. It can be acute or chronic; silent or symptomatic. There is one thing all forms have in common however; they are dangerous! They can cause arrhythmias similar to the way dilated cardiomyopathy does, and possibly lead to sudden cardiac death.^{11, 12}

Athlete's Heart

I thought exercise is good for the heart? If you have a healthy heart and you exercise moderately, yes it does. There is a reason if you look around a gym or football stadium there are Automatic External Defibrillators (AED's) on the walls. Athletes are constantly putting stress on their heart; and, if their heart is genetically defective, that stress can overwhelm the heart. Italy made SCD screening a requirement for athletes, and rate of SCD among athletes dropped tenfold!¹³ That's way more Italian Stallions to yell out, “Yo, Adrian!” The USA is all about freedom and choice. Take the initiative to go get screened, so you don't have to watch your team win a championship from a hospital bed.

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