

## Cardiovascular Collapse and Sudden Death

**Received :** December 01, 2021; **Accepted :** December 20, 2021; **Published :** December 29, 2021

Cardiovascular collapse is severe hypotension from acute dysfunction of the heart or peripheral vasculature causing hypotension with resulting cerebral hypoperfusion and loss of consciousness that can be the result of a cardiac arrhythmia, severe myocardial or valvular dysfunction, loss of vascular tone, and/or acute disruption of venous return. When an effective circulation is restored spontaneously, patients present with syncope. If spontaneous resolution does not occur, then cardiac arrest occurs, ultimately resulting in death if resuscitation attempts are unsuccessful or not initiated. Underlying etiologies for cardiovascular collapse include benign conditions such as vasovagal syncope, but also life-threatening conditions, including: ventricular tachyarrhythmias, severe bradycardia, severely depressed myocardial contractility, as with massive acute myocardial infarction (MI) or pulmonary embolus, and other catastrophic events interfering with cardiac function such as myocardial rupture with cardiac tamponade or papillary muscle rupture with torrential mitral regurgitation.

Sudden cardiac arrest (SCA) refers to an abrupt loss of cardiac function resulting in complete cardiovascular collapse due either to an acute life-threatening cardiac arrhythmia or abrupt loss of myocardial pump function that requires emergency medical intervention for restoration of effective circulation

Sudden cardiac death (SCD) is a sudden, unexpected death caused by a change in heart rhythm (sudden cardiac arrest). It is the largest cause of natural death in the U.S., causing about 325,000 adult deaths in the U.S. each year. SCD is responsible for half of all heart disease deaths.

Sudden cardiac arrest is not a heart attack (myocardial infarction) but can occur during a heart attack. Heart attacks occur when there is a blockage in one or more of the arteries to the heart, preventing the heart from receiving enough oxygen-rich blood. If the oxygen in the blood cannot reach the heart muscle, the heart becomes damaged.

In contrast, sudden cardiac arrest occurs when the electrical system to the heart malfunctions and suddenly becomes very irregular. The heart beats dangerously fast. The ventricles may flutter or quiver (ventricular fibrillation), and blood is not delivered to the body. In the first few minutes, the greatest concern is that blood flow to the brain will be reduced so drastically that a person will lose consciousness.

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**Citation:** Wilson (2021) Cardiovascular  
Collapse and Sudden Death. Med Case Rep Vol.7  
No.12.216

Death follows unless emergency treatment is begun immediately.

Emergency treatment includes cardiopulmonary resuscitation (CPR) and defibrillation. CPR is a manual technique using repetitive pressing to the chest and breathing into the person's airways that keeps enough oxygen and blood flowing to the brain until the normal heart rhythm is restored with an electric shock to the chest, a procedure called defibrillation. Emergency squads use portable defibrillators and frequently there are public access defibrillators (AEDs, automated external defibrillators) in public locations that are intended to be available for use by citizens who observe cardiac arrest.

Some people may experience symptoms of sudden cardiac arrest, such as a racing heartbeat or feeling dizzy, alerting them that a potentially dangerous heart rhythm problem has started. In over half of the cases, however, sudden cardiac arrest occurs without prior symptoms.

Most sudden cardiac deaths are caused by abnormal heart rhythms called arrhythmias. The most common life-threatening arrhythmia is ventricular fibrillation, which is an erratic, disorganized firing of impulses from the ventricles (the heart's lower chambers). When this occurs, the heart is unable to pump blood and death will occur within minutes, if left untreated.

## Acknowledgement

None

## Conflict of Interest

None