

# Implantable Cardioverter Defibrillators (ICDs)

ICDs, like pacemakers are made up of a generator (its brains and power source) and wires that usually go through a vein into the heart.



The generator, which is the size of a small cell phone, is connected to the wires and is placed in a pocket under the skin.

The main function of an ICD is to detect dangerously fast heart beats, and deliver a potentially life-saving shock to correct that rhythm. Someone who has an ICD essentially has a paramedic sitting on his shoulder, watching and always ready to give the heart “the paddles” like on TV programs.

Today all ICDs also act as pacemakers and can prevent slow heart rhythms as well.

People with heart muscle damage or “heart failure” have a greater chance of having one of the dangerous fast heart rhythms that ICDs treat. Therefore, ICDs are often recommended for people who have this problem (often described as a “reduced left ventricular ejection fraction” or “LVEF less than 35%” with 55% being the normal value) even if they have not yet had an abnormal heart rhythm.

ICDs do not prevent heart attacks, which are caused by blockages in the heart’s arteries, but do treat abnormal rhythms, such as ventricular tachycardia, sometimes associated with heart attacks.

## Most Dangerous Rapid Heart Rhythm

Sudden rapid heartbeats originating in the ventricles are the most dangerous arrhythmias. Ventricular tachycardia, a rapid yet steady beat, is dangerous in its own right. It can turn into ventricular fibrillation or VF, which is characterized by irregular and chaotic rapid heartbeats. Because the fibrillating heart muscle cannot contract and pump blood to the brain and vital organs, VF is the number one cause of sudden cardiac death. Without immediate emergency treatment of an electric shock to restore normal rhythm, an individual loses consciousness within seconds and dies within minutes.

DID YOU  
know

The first implantable cardioverter defibrillator was implanted in February 1980 at Johns Hopkins Hospital by Dr. Levi Watkins Jr. Modern ICDs do not require a thoracotomy and possess pacing, cardioversion, and defibrillation capabilities.

Current ICDs weigh only **70** grams  
and are about **12.9** mm thick.

The shock delivered by an ICD may be painful and medications or other treatments may be prescribed to reduce frequency of ICD shocks.

ICDs do not keep people alive forever. People with ICDs can die of causes other than heart rhythm abnormalities. In circumstances where a patient is otherwise very sick and not expected to recover, after consultation with the patient and his family and caregivers, a decision may be made to deactivate the shocking function of the ICD.

ICDs can be “interrogated” or “talked to” with a device that provides doctors with information about a person’s heart rhythms and the overall condition of the ICD. This follow up is very important to make sure the ICD is functioning optimally for each patient.

The battery of the ICD is used up over time and most people will need it changed every 5-8 years. This is a relatively small operation in which the existing generator of the ICD is swapped out for a new one. This is usually done as an out-patient procedure. The leads (or electrical wires) usually do not need to be changed.

### **Sudden Cardiac Death vs. Heart Attack**

**Cardiac arrest, or sudden cardiac death (SCD), happens when a heart rhythm disturbance prevents the heart from operating properly and delivering blood to the brain and other vital organs.**

**A heart attack occurs when a partial or complete vessel blockage interferes with the ability of blood to flow to the heart, and heart muscles die.**

**Cardiac arrest, or sudden cardiac death (SCD), is NOT a heart attack, but a prior heart attack can put someone at risk for SCD.**