



IMPLANTABLE CARDIOVERTER DEFIBRILLATORS (ICDs)

Smaller than the size of a deck of cards, an ICD packs a lot of power into a little space. It sends electrical pulses to the heart when rhythms get dangerously out of control, effectively halting racing beats and protecting against Sudden Cardiac Death. For those who are at high risk of the deadliest forms of arrhythmias—ventricular tachycardia and ventricular fibrillation—an internal “shocking” device may provide the best defense against sudden cardiac arrest. Such a device, known as an implantable cardioverter defibrillator (ICD), is considered effective in fighting cardiac arrest over 90 percent of the time, an astounding success for a condition that few survived as recently as 15 years ago.

ICDs are small devices, about the size of a pager, that are placed below the collarbone. Via wires, or leads, these devices continuously monitor the heart’s rhythm. If the heart beats too quickly, the ventricles will not have enough time to fill with blood and will not effectively pump blood to the rest of the body. Left unchecked, the rapid heartbeat could cause death. To intervene, the ICD issues a life-saving jolt of electricity to restore the heart’s normal rhythm and prevent sudden cardiac death. ICDs also can act as pacemakers when a heart beat that is too slow (bradycardia) is detected.

Most ICDs keep a record of the heart’s activity when an abnormal heart rhythm occurs. With this information, the electrophysiologist, a specialist in arrhythmias, can study the heart’s activity and ask about other symptoms that may have occurred. Sometimes the ICD can be programmed to “pace” the heart to restore its natural rhythm and avoid the need for a shock from the ICD. Pacing signals from the ICD are not felt by the patient; shock signals are, and have been described as a kick in the chest.

When is ICD therapy the right choice?

In the simplest terms, anyone who has had or is at a high risk of having ventricular tachycardia, fibrillation or sudden cardiac arrest is a candidate for an ICD. Many people have both coronary artery disease (the primary cause of heart attacks) and an arrhythmia (a heart rhythm disorder). They are at particular risk for sudden cardiac death and may be candidates for ICDs, even though they have no noticeable symptoms of an abnormal heart rhythm. A cardiac arrhythmia specialist should evaluate cardiac patients if they have experienced any of the following:

- A prior cardiac arrest
- Ventricular tachycardia (VT) which is an episode of rapid heartbeat originating from the lower chambers of the heart
- Ventricular Fibrillation (VF) which is similar to VT, but is characterized by a heartbeat that is too rapid and is irregular or chaotic
- Ejection fractions of less than 35 to 40 percent
 - An ejection fraction (EF) is the proportion, or fraction, of blood pumped by the heart with each beat. A normal heart pumps out a little more than half the heart’s volume of blood with each beat, making a normal EF 55 percent or higher.
- Patients at high risk for sudden cardiac death (SCD) because of an inherited heart abnormality

Dangerous and rapid heart rhythms

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 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.

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 muscle dies. Cardiac arrest, or SCD, is not a heart attack, but a prior heart attack can put someone at risk for SCD.