

Arrest the Risk
Sudden Cardiac Arrest (SCA)
Medical Device Backgrounder

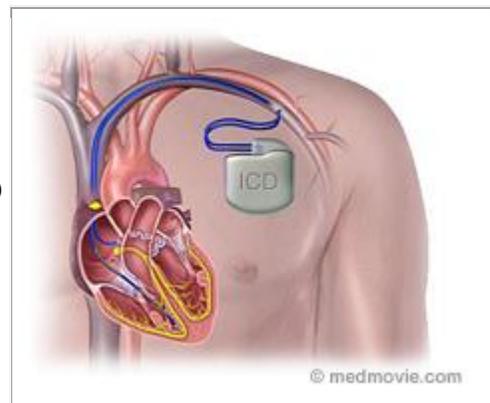
An arrhythmia is when the heart beats too fast (tachycardia) or too slow (bradycardia). In most cases an arrhythmia causes serious injury or death. In order to correct an arrhythmia an electrical shock is delivered to the heart to convert the abnormal heart rhythm back to a normal rhythm. This life-saving process is called cardioversion.

Sudden cardiac arrest (SCA) occurs when the heart stops beating, abruptly and without warning. If the heartbeat is not restored with an electrical shock immediately, sudden cardiac death (SCD) occurs.

“Shocking” of the heart provides the best defense against sudden cardiac arrest. Internal and external medical devices have been developed to help quickly shock the heart back to its normal beat. External devices are used in emergency situations, when a person’s heartbeat must be quickly restored, and include automatic external defibrillators or AEDs. However, if any symptoms of SCA are present, electronics that shock the heart can be implanted in a person’s chest to avoid an emergency situation. These devices include implantable cardioverter defibrillators or ICDs, pacemakers and cardiac resynchronization therapy.

Implantable Cardioverter Devices (ICDs)

ICDs are 99 percent effective in stopping life-threatening arrhythmias and are the most successful therapy to treat arrhythmias. 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 or too slowly, the ICD issues a jolt of electricity to restore the heart’s normal rhythm.



Most ICDs keep a record of the heart's activity when an abnormal heart rhythm occurs. With this information, an electrophysiologist (a physician who specializes in cardiac 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.

Pacemakers

Devices that “pace” the heart rate when it is too slow are called pacemakers. Pacemakers help monitor and regulate the rhythm of the heart and transmit electrical impulses to stimulate the heart if it is beating too slowly. A pacemaker is



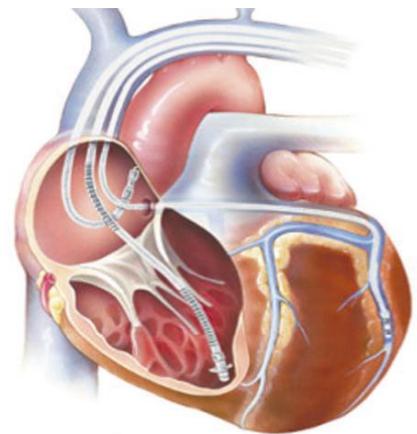
a small device that contains a powerful battery, electronic circuits and a computer memory that together generate electronic signals. The signals, or pacing pulses, are carried by leads to the heart muscle. The signals cause the heart muscle to begin the contractions that cause a heartbeat.

A pacemaker is implanted just below the collarbone in a procedure that takes about two hours. It is programmed to stimulate the heart at a pre-determined rate, and settings can be adjusted at any time. Routine evaluation, sometimes even via telephone, ensures the pacemaker is working properly and monitors battery life, which is approximately five to ten years.

There are three basic types of pacemakers that serve different purposes. An electrophysiologist can help determine the appropriate type of pacemaker based on a person's condition. The three types are: single chamber, dual chamber and rate responsive. ICDs can sometimes serve as a pacemaker in certain situations, but are not designed for that function.

Cardiac Resynchronization Therapy

The U.S. Food and Drug Administration (FDA) recently approved a special type of pacemaker for certain patients with heart failure. In cardiac resynchronization therapy, an implanted device paces both the left and right ventricles (lower chambers) of the heart simultaneously. This resynchronizes muscle contractions and improves the efficiency of the weakened heart.



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