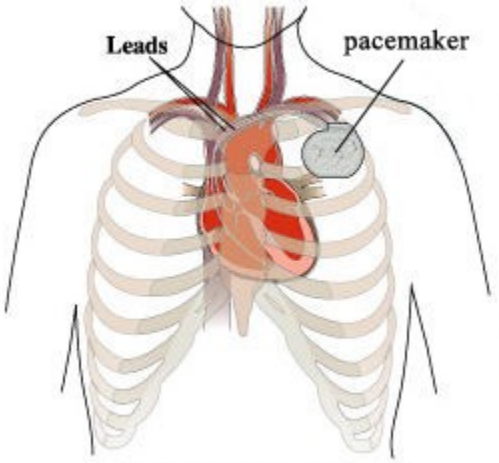
Implantable Cardioverter Defibrillator (ICD)

Any irregularity in your heart's natural rhythm is called an arrhythmia. Almost everyone's heart skips beats. These mild palpitations are usually harmless. Electrical impulses from the heart muscle cause your heart to beat (*contract*). This electrical signal begins in the sinoatrial (SA) node, located at the top of the heart's upper-right chamber (the right atrium). The SA node sets the pace for how fast the heart will beat.

When an electrical impulse is released from the SA node, it causes the upper chambers of the heart (the atria) to contract. The signal then passes through the atrioventricular (AV) node. The AV node checks the signal and sends it through the muscle fibers of the lower chambers (the ventricles), causing them to contract. The SA node sends electrical impulses at a certain rate, but your heart rate may be changed by physical demands, stress, or other factors.



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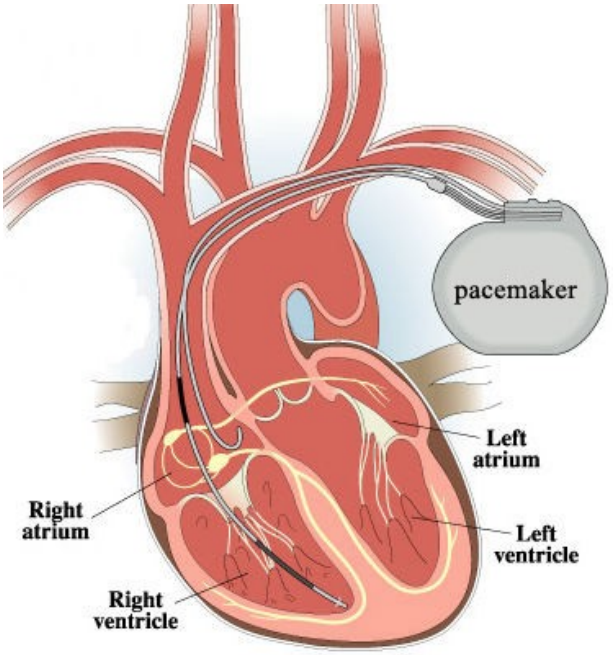
ICD's are for people who have had an abnormal, fast heart rate that caused them to faint or caused their heart to stop pumping properly. Sometimes medicines can be used to control these fast heart rates. When medicines do not work, doctors can implant an ICD.

An ICD is used in patients at risk for:

- Ventricular tachycardia, when the lower chambers of the heart independently beat faster than 100 beats per minute.
- Ventricular fibrillation, when the muscle fibers of the lower chambers of the heart contract in a fast, uncoordinated manner.
- Sudden cardiac death likely to be caused by an arrhythmia.



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CAUSES

Sometimes the SA node does not work properly. This can cause the heart to beat too fast, too slow, or irregularly. In other cases, the heart's electrical pathways may be blocked. This can also cause an irregular heart rhythm. Arrhythmias can be divided into two categories: ventricular and supraventricular. Ventricular arrhythmias happen in the heart's two lower chambers, called the ventricles. Supraventricular arrhythmias happen in the structures above the ventricles, mainly in the atria. Atria are the heart's two upper chambers.

SYMPTOMS

A very slow heart rate, called bradycardia, means the heart rate is less than 60 beats per minute. Tachycardia is a very fast heart rate. This means the heart beats faster than 100 beats per minute. Fibrillation, the most serious form of arrhythmia, results in uncoordinated contractions of individual heart-muscle fibers.

TREATMENT

- An ICD is usually about the size of a pager. It is made up of two parts:
  - A pulse generator that includes the battery and several electronic circuits.
  - Wires, also called leads. Depending on the type of ICD, you may have one or two leads.
- The ICD is implanted beneath the skin near the collarbone or somewhere at or above the waistline. The leads are placed inside the heart or on its surface and are attached to the ICD.
- ICD implant surgery has become a very common procedure. It is done while you are asleep. It is not open

heart surgery. Some of the newer, smaller devices have simpler lead systems that can be inserted with a catheterization procedure.

After the device is implanted, caregivers will perform electrophysiology studies (EPS) to make sure the device is working properly. The procedure usually takes about two hours. You will need to stay in the hospital for at least one night after the device is implanted. Antiarrhythmic medicines may also be prescribed.
Once the ICD is implanted, the leads monitor your heart rate. If the ICD detects ventricular tachycardia or fibrillation, it sends out a controlled burst of impulses (called "overdrive" pacing). If that does not work, the ICD "shocks" the heart to restore a normal rhythm. Newer ICD devices can also work like a pacemaker if a slow heart rate (bradycardia) occurs. When ventricular tachycardia or fibrillation occurs, the ICD records your heart rate, as well as the date and time of the event. It can also record what electrical therapy was needed to restore a normal heart rhythm.

HOME CARE INSTRUCTIONS

- If you have an ICD, you should always be aware of your surroundings. It is safe for you to be around wood working tools and normal home appliances, including microwave ovens. Stay away from heavy equipment that has very strong magnetic fields or strong electric fields (antennas, arc welders, and industrial equipment). Your caregiver will help you understand what to avoid when you have an ICD.
- You should keep your cell phone at least 6 inches away from your ICD. When you are talking on your cell phone, hold it on the opposite side of the body from your ICD. Do not carry your cell phone in your breast pocket or on your belt if is within 6 inches of your ICD.
- Many caregivers will tell you not to drive for 6 months after your implantation surgery or after a shock. Talk to your doctor if you are not sure if it is safe for you to drive.
- Tachycardia is usually corrected with very small electrical impulses. You may feel a flutter, palpitations (like your heart is skipping a beat), or nothing at all. Fibrillation may require you receive a "shock." Most patients say the shock feels like a sudden jolt or thump to the chest. Some people black out during fibrillation, so they may not feel anything when the shock is given. If someone is touching you while you are receiving a shock, they may feel a small muscle jerk, but it will not hurt them.
- Your caregiver will tell you what to do after you have received a shock. Some patients' caregivers will have them call their office after a shock has been given. Most caregivers will want to know if you have received two or more shocks within 24 hours.
- After you get your ICD, you will have to see your caregiver for regular check-ups. ICD's can also be checked over the telephone. This is called transtelephonic monitoring. Even with telephone monitoring, you will still need to go to your caregiver's office for regular check-ups. The ICD is checked with a device called a programmer. When the programmer is held over the ICD, your caregiver is able to tell if the ICD is working properly, how much power is left in the battery, and if the device has delivered therapy. The programmer can also be used to change the settings of the ICD.
- An ICD battery usually lasts anywhere between 4 and 8 years, depending on how many shocks it sends. When the battery runs down, a new ICD will be implanted. In most cases, your original ICD leads will not need to be replaced.

SEEK IMMEDIATE MEDICAL CARE IF:

- You have a frequent or persistent triggering of your defibrillator.
- You have any sign of inflammation, heat, tenderness, or swelling around the pacemaker.
- You experience unexplained fatigue, dizziness, or fainting or if there is a sensation of pulsation in your neck or chest.

MAKE SURE YOU:

- Understand these instructions.
- Will watch your condition.
- Will get help right away if you are not doing well or get worse.

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