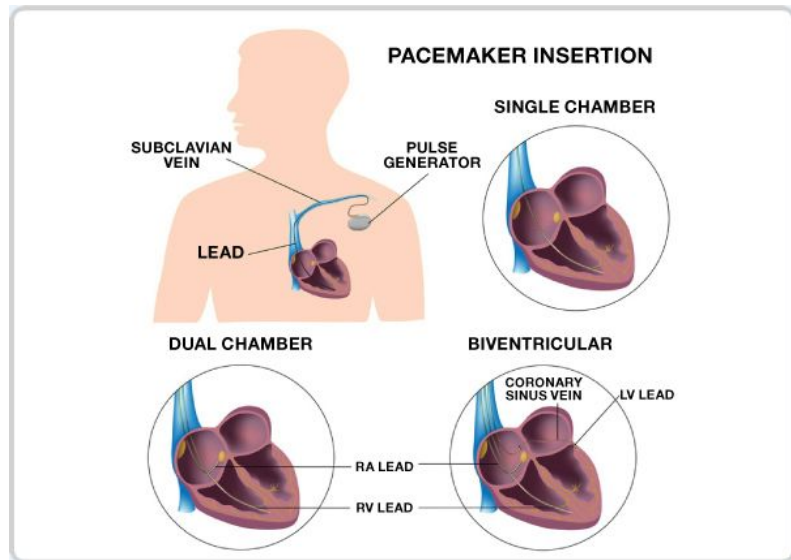


Pacemakers and Implantable Cardioverter Defibrillators (ICD)

What is a pacemaker?

A pacemaker is a small device that is placed in the chest to help control abnormal heart rhythms. This device uses low-energy electrical pulses to prompt the heart to beat at a normal rate. Pacemakers are used to treat slow heart beats. During an arrhythmia, the heart can beat too fast (tachycardia), too slow (bradycardia) or with an irregular rhythm. There are 3 types of pacemakers:

- **Single chamber pacemaker**- one lead in the upper or lower chamber of the heart
- **Dual chamber pacemaker**- one lead in the upper chamber and one lead in the lower chamber of the heart
- **Biventricular pacemaker**- 3 total leads placed in the right atrium, right ventricle, and left ventricle



What is an implantable cardioverter defibrillator?

An implantable cardioverter defibrillator (ICD) is a small device that is placed in the chest. An ICD can generate low-energy pulses to convert an irregular rhythm to a normal rhythm. If the low-energy pulses do not restore a normal rhythm or if the ventricle does not contract strongly, the ICD switches to high-energy pulses for defibrillation. High-energy pulses last only a fraction of a second, but they can be painful. An ICD uses electrical pulses or shocks to help control life-threatening arrhythmias, especially those that can cause sudden cardiac arrest (SCA). SCA is a condition in which the heart suddenly stops pumping blood. If the heart stops pumping blood, blood stops flowing to the brain and other vital organs. SCA usually causes death if it is not treated within minutes.

When do patient need this procedure?

Pacemaker or implantable cardioverter defibrillator placement will be considered if you have persistent arrhythmia. Dr. Ben-Zur will determine the need for this procedure based on your symptoms, results of diagnostics and current medical condition.

Sources:

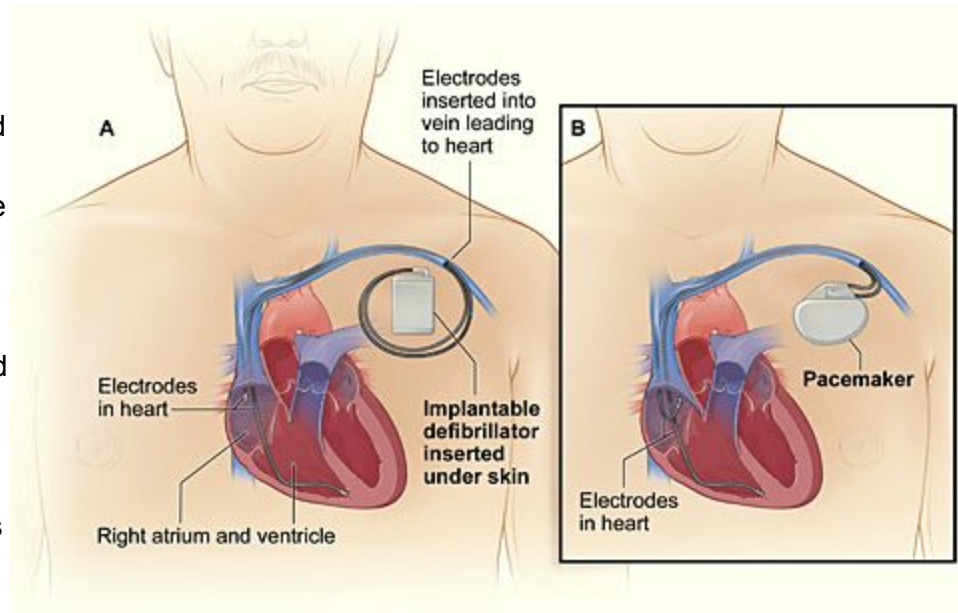
1. <http://www.mayoclinic.org/tests-procedures/pacemaker/basics/what-you-can-expect/prc-20014279>
2. <http://my.clevelandclinic.org/services/heart/services/arrhythmia-treatment/permanent-pacemaker>
3. <http://www.nhlbi.nih.gov/health/health-topics/topics/icd>
4. http://www.analog.com/library/analogDialogue/archives/46-11/AD46-11_FIG_03.jpg

What to expect during the procedure¹

Pacemaker /ICD placement surgery is usually performed while you are sedated and typically takes a few hours. You will be given a sedative to relax, and the area where your pacemaker is inserted will be numbed.

During the surgery, one or more flexible, insulated wires (leads or electrodes) are inserted into a major

vein under or near your collarbone and guided to your heart with the help of x-ray images. One end of each wire is secured to the appropriate position in your heart, while the other end is attached to the pulse generator, which is usually implanted under the skin beneath your collarbone. After the procedure, you will usually stay in the hospital for one day and your pacemaker/ICD is programmed to fit your particular pacing needs.



What to expect before the procedure:

Before the procedure you will have a pre-procedure appointment. This will include obtaining labs and any necessary imaging as well as any medication adjustments that need to be made for the procedure. This is an additional opportunity to ask any questions that you may have.

On the day of the procedure:

- Do not eat or drink anything after midnight the night before the exam.
- Do not ingest any stimulants for 24 hours BEFORE the test. This includes coffee, tea, and cola drinks.
- Wear loose fitting, comfortable clothing.
- Do not wear necklaces or clothing with metal on it (metal buttons, sequins, brooches, etc.).
- If you have asthma presently or previously, bring your inhaler(s) with you.
- Bring a list of your medications with you.
- Take your usual morning medications with sips of water on the day of your test unless directed by Dr. Ben-Zur.
- Notify Dr. Ben-Zur if you take insulin or diabetic medication as these medications may need to be discontinued or decreased the morning of the procedure.

What are possible complications?

With any procedure there is always a risk of complications. Pacemaker or ICD placements are common medical procedures. Serious complications are uncommon but may occur. There are risks, benefits, and alternatives of the procedure. These include, but are not limited to: infection, bleeding, heart attack, stroke, death, neurologic deficit, nerve injury, lymphatic injury, venous thrombosis, pericardial effusion (blood around the heart), pleural effusion (blood around the lungs), pulmonary embolism, hematoma, pain, need for an emergent operation such as emergency coronary artery bypass grafting, possible blood transfusion and its complications, complications associated with anesthesia, drug allergies, vascular perforation, dissection, rupture, thrombosis, distal embolization, renal insufficiency/failure, dialysis dependence, limb loss, dye allergy, and radiation exposure. Your risk of having these complications may increase if you have diabetes or kidney disease.

Post-implant pacemaker/ICD precautions:

Patients with pacemakers have very few limitations after the recovery phase. An identification card with the pacemaker's/ICD's information should be carried at all times and shown to all medical personnel caring for that patient. The following circumstances are to be avoided:

- Close proximity to powerful magnets that are used in junk yards, electronic equipment, amusement park rides, running auto engines, large generators or power plants
- CB or Ham radio antennae
- Placing a cellular phone near your pacemaker device (the other ear is acceptable)
- Hand-held security wands
- Tight clothing over the pacemaker site
- MRIs
- Lithotripsy procedures
- Electrocautery
- Electric arc welding equipment
- Induction furnaces such as kilns
- Large magnets that may be used in some stereo speakers

Other precautions may be added or deleted depending on the model and type of pacemaker/ICD implanted. Further details are found in the manufacturer's "Patient Guide."

Routine follow-up visits:

Regularly scheduled visits are necessary to check the efficiency of the pacemaker/ICD and leads, including an electrocardiogram. At times, the pacemaker/ICD may require some reprogramming adjustments that are accomplished by computer in the office.

Need more information?

We encourage you to ask Dr. Ben-Zur any questions and discuss concerns you have at anytime. Visit our website at www.DrBenZur.com, give us a call at (818) 986-0911, or email us at ubenzurmd@gmail.com. You may also call Dr. Ben-Zur after hours if you have any additional questions that you did not have a chance to ask during your visit.