

## **PACEMAKER / CARDIOVERTER-DEFIBRILLATOR**

### **What is it?**

Permanent pacemakers (PPM) and implantable cardioverter-defibrillators (ICD) are small devices that are placed underneath the skin. As the pacemaker name suggests, it makes or keeps the pace of your heart.

Cardioverter-defibrillators senses whether or not your heart is beating at an adequate rate, if your heart beats too fast or fall too low, shocks will be delivered to restart your heart beat. An electrophysiologic study (EPS) will determine that appropriateness of these implantable devices.

Pacemakers may be implanted for patients with sick sinus syndrome (SSS; also known as sinoatrial nodal dysfunction) or atrioventricular (AV) heart block. Sick sinus syndrome is when the sinus node, also known as the heart's pacemaker, fails to produce an adequate beat or rhythm causing dizziness or even fainting. Atrioventricular heart block is when the conduction pathway is disrupted causing an electrical blockage.

Implantable cardioverter-defibrillators may be implanted for patients with ventricular fibrillation or low ejection fraction. Ventricular fibrillation and tachycardia are two arrhythmias, or abnormal heart rhythms, that originate in the ventricles, or the lower chambers of the heart. These two rhythms are the most common causes of sudden cardiac death in the United States. Due to the unorganized nature of these heart beats, the chambers can't properly fill with blood, causing decreased blood oxygenation and neurologic disturbances, such as dizziness, anxiety or fainting. Ejection fraction is the amount of blood that gets pumped out of your heart per heart beat. Patients with low ejection fractions may also experience decreased blood oxygenation and neurologic disturbances.

Since these devices are electrically powered, they may require battery or generator changes periodically. Fortunately, for the advances in technology, these devices will only have to be changed a maximum of once a year, but current devices are expected to last at least 6 years or longer. For some patients, if the current pacemaker or cardioverter-defibrillator is not sufficient, you may have to change the device for a higher amount of leads or a change from one device to another.

### **Who needs it?**

Permanent pacemakers are recommended if you have:

- Sick Sinus Syndrome (SSS) / Sinoatrial (SA) Nodal Dysfunction
- Second-degree, or complete atrioventricular (AV) heart block
- Chronotropic incompetence (inability to increase heart rate to match exercise)

Implantable cardioverter-defibrillators are recommended if you have:

- Ventricular fibrillation (VFib or VF) with history of a heart attack
- Ventricular tachycardia (VTach or VT) with structural heart disease
- Fainted, AND ventricular fibrillation/tachycardia was induced during electrophysiology study
- Sustained low ejection fraction (EF)

### **What to expect before, during, and after?**

#### **BEFORE**

Prior to the scheduled procedure, you will be asked to come by the office to speak to us regarding how to best prepare. The doctor will explain the procedure to you in detail and review your most recent test results and lab work to see if any other precautionary steps are needed. You may need to make certain changes to your diet or medication regime. Direct instructions will be provided by our office. Since these procedures are performed in a hospital, it is best to make arrangements for a ride both to and from the hospital.

#### **DURING**

Depending on your handedness, the device will be implanted on the right or left side of your body, underneath your clavicle (collarbone). Generally speaking, implantable cardioverter-defibrillators will be inserted on the side opposite of your dominant hand. These cases may be variable based on other factors such as history of breast removal (mastectomy), existing cardiac devices, and others.

The device has one, or multiple, leads that come out of the generator. These are passed from your collarbone over to your heart, once the leads have made it into your heart, the doctor will decide on the appropriate place to connect the leads and anchor it in. Careful attention will be made from the point of insertion, insertion of the leads and pulse generator, and anchoring of all associated parts. After everything is set, there will be certain tests to see the functionality of the device under controlled circumstances. If everything is working as it should, the doctor will stitch the skin back together, and finish with his procedure.

#### **AFTER**

Pain medication may be given to you if you are experiencing any. An overnight stay is necessary; if the next morning, all parts of the device is functioning appropriately, no pain is expressed, and there aren't any complications at the insertion site, you will be discharged and may go home. Specific instructions will be given to you about the care of the device and any type of activity that you may or may not do.

Are there any risks I should be aware of?

As with all procedures, there is a risk, but these rarely carry any serious adverse events.

Some complications include:

- Blood clot formations
- Infection, bleeding, bruising at the insertion site
- Mechanical malfunctions after hospital discharge