



Carolina Cardiology Consultants

## Understanding Pacemaker Implantation

### Your Heart's Natural Pacemaker

When your heart's natural pacemaker is not working properly, it may need help. A small electrical pacemaker can be placed inside your body to help your heart keep a steady beat.

Having a pacemaker means you will need to take certain precautions. But with proper care, you can live a healthy, active life. You may find that you are able to return to activities you have not been able to do for a while. Knowing more about your heart will help you understand how a pacemaker can help you.

Your heart has its own natural pacemaker that produces electrical signals. These signals cause the heart to contract and pump blood.

A heartbeat starts with electrical signals from a small bit of tissue called the SA node.

The SA node is in the upper right chamber. It's the heart's natural pacemaker. Signals from the SA node tell the upper chambers to contract.

Signals from the SA node are picked up by the AV node. The AV node sends these signals to the lower heart chambers. Pathways in the muscle walls carry signals through the lower chambers. These signals tell the lower chambers to pump blood.

As long as the signals travel freely and occur at the right time, the heart pumps at a steady pace.

### When Problems Occur

Sometimes, problems develop with the heart's electrical system, which change the normal beating of the heart. For example ...

- The SA node may send out less than the usual amount of signals: This decrease causes an abnormally slow heartbeat
- The SA node may send out signals that cause the heart to alternate between beating too fast and beating too slowly
- Signals from the SA node travel to the AV node, but the AV node may not be able to send the signals to the lower chambers

### A pacemaker may be needed if ...

- Your heart is beating too slowly
- Your heartbeat is irregular
- The pathways that carry signals through the walls of the heart become blocked

A pacemaker often is used to correct a slow heartbeat. Your heart may beat too slowly all of the time, too slowly once in a while, or too slowly and too quickly at different times. Symptoms of a slow heartbeat are dizziness, lightheadedness, shortness of breath, fatigue and fainting spells. You may experience symptoms while you are doing something physical. But symptoms also can occur while you are resting. After your pacemaker is put in, your symptoms should lessen or go away.

### What a Pacemaker Does

When your heart's own electrical system sends a signal and your heart beats as it should, the pacemaker does not generate a signal. But when your heart's electrical system misses a signal, the pacemaker sends a signal that causes your heart to beat.

### Parts of a Pacemaker

A pacemaker is made up of two parts. The generator contains a tiny computer and a battery. It is the part of the pacemaker that generates electrical signals. Signals from the generator are carried through leads to the heart. Leads are soft wires that bend easily, so they can be placed in the right position inside the heart. A pacemaker can have one or two leads.

A single-chamber pacemaker has one lead. The lead is placed in the lower right heart chamber. A dual-chamber pacemaker has two leads, one in the upper right chamber and one in the lower right chamber. In some cases, two leads are needed to coordinate the signal from the upper chamber with the beating of the lower chamber.

### Possible Complications

While complications are rare, a few people experience severe bleeding or bruising or develop infection around the incision. A vein or artery can tear, or a blood clot can form within a vein. It also is possible for a lung to be punctured

during the procedure. The risks will be explained, and you will be asked to sign a consent form before the procedure.

### **Pacemaker Implantation**

The process of putting a pacemaker in your body is called implantation. You will be sedated during the procedure. The skin where the incision will be made is numbed. The incision is made in the upper chest just over a vein. A pocket is formed under the muscle where the pacemaker will be placed.

The vein just under the incision is opened. The lead is placed inside the vein and guided into your heart. If there are two leads, the second lead is guided through the vein into the heart. The generator then is attached to the lead, and the pacemaker is put inside the pocket under your skin. After the procedure, your heart will be monitored, and your incision will be checked for signs of bleeding. You may be asked not to use the arm on the side of your incision for a short time.

### **Home Recovery**

You will be told how to care for your incision. You may have small Steri-Strip bandages on your incision to keep it together. Your doctor will discuss removal with you. You may have some soreness, bruising, puffiness and numbness around your incision. These effects are normal and should heal in about one month.

Do not rub the skin around your incision. Call your doctor right away if you have a fever, drainage, or swelling, redness or very warm skin around your incision.

For the first few weeks, avoid reaching above shoulder level with the arm closest to your incision. Avoid strenuous activities such as running, lifting, pushing or pulling. As you recover, you can return to your normal activities. Follow your doctor's activity guidelines.

### **Follow Up With Your Doctor**

Your pacemaker will need to be checked periodically. Special tests may be done. Your pacemaker has been programmed for your needs, but your needs can change over time. If they do, your pacemaker can be adjusted. In most cases, adjustments are made from outside the body, and surgery is not needed. You may be asked to check your pacemaker at home by sending signals through the telephone with a special transmitter. You will be given guidelines for telephone monitoring.

Pacemaker batteries will be checked often and replaced when they begin to wear out. To replace batteries, the generator must be replaced. Surgery must be performed to replace the generator. The leads will be checked and replaced if they begin to wear out. Leads can be replaced without performing surgery. Most pacemakers last for five to seven years.

Your pacemaker has built-in safety features that protect it from signals that come from other electrical devices. Most equipment you come in contact with will not affect your pacemaker. However, if you experience symptoms and you think a device is interfering with your pacemaker, turn off or move away from the device.

### **When to Call the Doctor**

These symptoms may be a sign that your pacemaker is not working the way it should: difficulty breathing; shortness of breath; dizziness; fainting spells; prolonged weakness; swelling in the legs, ankles, arms or wrists; chest pain or prolonged hiccupping. If these symptoms appear, call your doctor right away.

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