

# Heart Facts

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## **BIVENTRICULAR PACER**

### **What is a biventricular pacer?**

Symptoms of congestive heart failure develop due to a weak heart muscle. Sometimes, the heart's ability to pump is further compromised if it is not contracting in a synchronized fashion. In such cases, implantation of a biventricular pacemaker, or pacer, improves the function of the heart by re-synchronizing, or re-coordinating, contraction.

A biventricular pacer is a small electrical generator powered by a battery with special wires called "leads" that run to the heart. The device is implanted under the skin of the chest. Computer-like circuitry inside the device transforms the energy from the battery into tiny electrical pulses that travel to the heart through the leads. Electrodes on the tips of these leads touch the heart wall. One electrode is placed in the right ventricle of the heart; the other is placed through a coronary vein that stimulates the left ventricle. Simultaneous impulses down each lead cause the right and left sides of the heart to contract simultaneously, thereby re-synchronizing contraction of the chambers, making the heart work more efficiently.

### **Who should get a biventricular pacer?**

With each heartbeat, the left ventricle, which is the main pumping chamber of the heart, squeezes or contracts, ejecting blood to the rest of the body. If the heart is simply beating weakly, a biventricular pacer will not help. The patients who will benefit the most from this new technology are those whose heart failure stems from a lack of synchrony in the heart's contraction. This occurs when there is a delay in the electrical impulse that signals the heart muscle to contract. The delay in electrical conduction causes one wall of the heart to contract before the other. The resulting lack of coordination, or dyssynchrony, reduces the pumping function of the heart and may lead to worsening heart failure.

An electrocardiogram (ECG) monitors the heart's electrical activity and can easily determine if there is a delay in electrical conduction to the left ventricle. The results of this painless test will determine if you are a good candidate for a biventricular pacer.

### **How does the biventricular pacer help?**

A biventricular pacemaker improves the function of the heart by re-synchronizing contraction. One pacemaker lead is placed in the right ventricle and a second over the left ventricle. The leads are attached to a pacemaker battery that then sends impulses to both leads simultaneously. The heart is re-synchronized – both sides now contract at the same time. The physician programs the pacer according to what the patient's heart requires, making whatever adjustments are necessary to the strength, duration and speed of the electronic impulse.

Implanting the biventricular pacer in appropriate patients has been shown to reduce symptoms, hospitalization and mortality, compared to other treatments for congestive heart failure. Other benefits include improved exercise performance and quality of life.

### **How is the pacer implanted?**

The pacer is implanted through minor surgery. Sedation and local anesthesia are used – not general anesthesia. A local anesthetic is administered to numb an area on the chest wall, near the shoulder, where the device will be placed. A surgeon makes an incision, and a pocket (about three inches by two inches) is created for the pulse generator.

The pacemaker leads are introduced into a vein near the site of the pocket and then, guided by x-ray images, advanced through the large veins leading to the heart. Once proper function is confirmed, the leads are attached to the pulse generator, which is then placed in the pocket beneath the skin.

The resulting scar will be about three inches long. In very thin individuals, the pulse generator may be noticeable underneath the skin. In heavier people, there may be no outward evidence of a pacemaker at all.

### **What happens after the surgery?**

The patient will generally spend one night in the hospital after pacemaker implantation. For comfort, many patients will wear a sling, or “immobilizer”, on the arm during that time. The surgical site may be uncomfortable for one to two weeks. Analgesics (aspirin, acetaminophen or ibuprofen) can provide relief.

Before leaving the hospital, the patient will get a wallet ID card containing details about the pacemaker in the event of an emergency. The patient’s activities may be limited the first two weeks after surgery because vigorous motion of the affected arm and hand could cause the leads of the new pacemaker to move or be dislodged.

Four weeks after the procedure, the patient will visit the surgeon, who will evaluate the pacemaker to make sure it is working properly.

### **Are there risks associated with this procedure?**

Pacemaker implantation is a safe procedure. However, there is a minor possibility (less than 1 percent) of risks such as bleeding, blood clots, infection or a punctured lung. Device malfunction is rare, but patients with pacers should call their physicians if they experience any of these signs:

- Pain at the pacer site
- Swelling of the arm or hand where the pacemaker was placed
- Shortness of breath
- Signs of infection: redness, heat, oozing
- Reappearance of congestive heart failure symptoms that had initially disappeared

### **How do I know if the pacemaker is working?**

Patients generally do not know if their pacemaker is working properly. Therefore, they must return to their doctors’ offices for regular appointments. During these appointments, your doctor will evaluate the function of your pacemaker and be able to non-invasively adjust its function using a computerized program.

Pacer batteries generally last from six to 10 years. During regular office visits, physicians evaluate patients’ pacer battery status. When your battery reaches its elected replacement time, a minor outpatient surgical procedure will be necessary to insert a new battery and remove the old one.

### **Are there restrictions on living with a pacemaker?**

Few precautions are necessary to protect the pacer. High magnetic fields can interfere with pacer function, so patients cannot have MRI scans. Inform screeners at airports so that you do not have to linger around security detectors any longer than necessary for a walkthrough, although this security measure need not be avoided. Everyday devices such as cellular telephones and microwave ovens pose no threats. Your physician will provide instructions about any particular hazards.

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