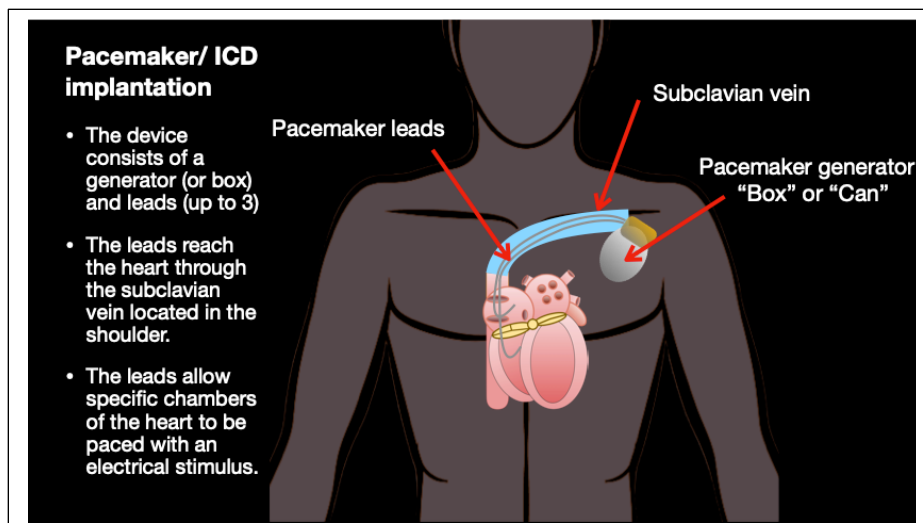


## Pacemaker and Cardiac Defibrillator Implantation

Pacemakers are small electronic devices implanted into the heart through the blood vessels and are used to treat patients with potentially dangerously low heart rates. Defibrillators are a type of pacemaker which has the ability to detect and treat certain dangerously rapid heart rates called ventricular tachycardia (VT) and ventricular fibrillation (VF) which can cause cardiac arrests. They are implanted in certain patients only. All defibrillators can also function as pacemakers. Some pacemakers are designed to specifically improve the heart function in selected patients (called bi-ventricular pacemakers).

Pacemakers consist of a generator which is usually implanted under the collar bone on the left chest, and up to three leads which reach the heart via the blood vessels. These leads are used to sense the electrical activity in the heart and pace the heart when needed.

Defibrillators are similar, however the ventricular lead and the generator are slightly larger to accommodate its additional function to treat VT and VF.



### ***Why is it Done?***

Pacemakers are usually implanted to treat slow heart rates (called bradycardia), which are causing problems such as dizziness, collapse, fatigue or breathlessness. In some patients with heart disease, pacemakers may be implanted pre-emptively where there is a high risk of developing dangerously low heart rates which may cause collapse or cardiac arrest.

### ***Risks***

The risks of pacemaker implantation are generally very low, usually less than 1.5-2.5% in total. The potential risks are listed below:

1. Bruising, bleeding or haematoma at the implantation site, estimated at around 1%. This risk may be higher in patients on blood thinner medications
2. Infection, estimated at less than 0.5%. This risk may be higher in some patients particularly those on haemodialysis or immune suppression.

3. Injury to the lung causing lung collapse (pneumothorax), estimated at less than 1:400
4. Injury to the heart causing fluid build-up around the heart (cardiac tamponade), estimated at less than 1:400
5. Lead dislodgement – movement of lead requiring lead re-positioning, estimated at 1:200.

***What you can expect?*****Before the Procedure**

Before your procedure starts, your health care team will review your medical history, including allergies and medications you take. You'll also empty your bladder and change into a hospital gown. You may have to remove contact lenses, eyeglasses, jewellery and hairpins. You will usually need to cease any blood thinners you are taking (with the exception of warfarin) 24-48hrs prior to the procedure. Antibiotics will be routinely administered through a drip just before the procedure and again 12 hours after the procedure. This is routine to minimise the chance of infection.

**During the Procedure**

For the procedure, you lie flat on your back on an X-ray table. X-ray cameras may move over and around your head and chest during the procedure. Procedures can be performed under sedation with local anaesthesia, or general anaesthesia. The left chest will be shaved and cleaned, and a sterile field applied. Local anaesthetic is given and a 3-4cm incision is made in the left upper chest just under the collar bone. A cavity (known as the pocket) is fashioned to accommodate the pacemaker generator. The blood vessel in the shoulder called the subclavian vein is accessed with a needle, with the aid of ultrasound and X ray (if needed). Occasionally dye may need to be injected into the arm vein to identify the vein to assist in locating the vein. This may cause a flushing feeling in the arm for a few seconds. If accessed, a wire is positioned in the vein. Up to three wires may be required depending on the type of device being implanted.

Once the position of the wires is confirmed on Xray, plastic tubes (sheaths) are advanced over the wires and are used to position leads into the heart. Once positioned, the leads are tested to ensure that they are working appropriately. The leads are then secured in place with sutures, and connected to the generator which is then placed in the previously created pocket. The pocket is then closed with a series of dissolvable sutures and a sterile dressing applied over the incision.

Electrodes on your chest monitor your heart throughout the procedure. An EPS usually involves a number of additional stickers and patches placed on over the chest. A blood pressure cuff tracks your blood pressure and another device, a pulse oximeter, measures the amount of oxygen in your blood.

### After the Procedure

You'll be taken to a recovery area for observation and monitoring. When your condition is stable, you return to your own room, where you're monitored regularly. A chest You will have to remain in the hospital overnight. If you're feeling up to it, have something to eat.

It is routine to have a chest x ray 4-6 hours following the procedure to check the lead position and lung fields. The pacemaker can be checked wirelessly, and a home monitor device will usually be provided. This ensures your doctor is immediately notified of any problems with the device, or the occurrence of any significant arrhythmias.

Ask your health care team when to resume taking medications, bathing or showering, working, and doing other normal activities. Avoid strenuous activities and heavy lifting for several days. Generally, blood thinning medications which had been withheld, should recommence 48-72hrs following the procedure unless directed otherwise. You should see your local doctor in 10-12 days after the procedure to review the wound. There is no need for removal of sutures as they are dissolvable. You should keep the dressing on until then and avoid getting it wet, for at least 3-4 days after the procedure.

It is important not to move the arm on the same side as the device above the level of the shoulder for 4 weeks following the implant. This is to minimise the risk of lead dislodgement. It is important however to keep the arm moving otherwise to avoid developing a frozen shoulder. Your incision site is likely to remain tender for a few days up to a week. It may be slightly bruised for a short period, particularly if you are on blood thinners.

Call your doctor's office if:

- You notice bleeding, new bruising or swelling at the incision site
- You develop increasing pain, redness or discomfort at the incision site
- If you develop fever within the first 4 weeks.
- Weakness or numbness in the arm on the same side as the device
- You develop chest pain or shortness of breath
- Any other symptom of concern to you

### ***Follow-up***

You will be seen in the clinic at 6-8 weeks following the implantation to check the device and the incision site. The device can be checked wirelessly. Routinely, the device should be checked in the clinic every 6-12 months. If you have a home monitor, it may be possible to have the device checked less frequently. After 4 weeks, you should be able to resume all normal activities.