

Pacemaker Insertion

Pacemakers and cardiac defibrillators are small, computerised devices that can be surgically implanted into patients for a variety of clinical reasons. The devices themselves treat heart rhythm and provide remote monitoring. The devices themselves are generally around 4-5cm in diameter and up to 1cm in thickness and possess an internal battery capable of delivering treatment for around 7 to 12 years depending on the type of device and the patients' individual requirements.

The use of pacemakers and cardiac defibrillators allows patients to have ongoing care and treatment provided for multiple reasons and continue living a generally otherwise uninterrupted life.

In general, the most common insertion reasons can include:

- Bradycardia (slow heartbeat)
- Syncope (blackouts due to the heart beat stopping for an extended period)
- As an adjunct therapy for ongoing management of arrhythmias where patients are unable to tolerate medications required for treatment
- Supplemental assistance to boost overall heart function for patients experiencing decreased heart function
- To shock a patient where it has been identified that potentially deadly arrhythmias are present

While the initial insertion of a pacemaker or cardiac defibrillator requires an overnight admission for observation, patients requiring a battery change (where it has been assessed as needing replaced through device interrogation) are brought back into hospital for a day procedure and discharged home after only a few hours.

In recommending this procedure, your doctor has made has determined that on balance, the benefits and risks of the procedure outweigh the benefits and risks of not proceeding. As such, your doctor believes there is a net benefit to you going ahead and that the procedure should be successful overall.

Symptoms

Pacemakers can be implanted for a variety of conditions and symptoms that will often vary between patients. Many patients report experiencing symptoms such as:

- Fatigue
- Dizziness / blackouts
- Decline in heart function / heart failure

- Inability to tolerate medication therapies for arrhythmia management
- Shortness of breath
- Lethal arrhythmias (requiring defibrillation)

What are the risks involved in a pacemaker insertion?

As with all procedures, the insertion of a pacemaker or cardiac defibrillator carries their own risk profiles that can range from common occurrences, through to uncommon and rare instances. All Risks should be taken into consideration when considering a pacemaker or cardiac defibrillator insertion to determine if the procedure is an appropriate treatment option for yourself during consultation with your treating cardiologist.

Common risks and complications can include but are not limited to:

- Bruising to the surgical access site/puncture site and surrounding tissues that can take weeks to heal completely in some instances.

Uncommon risks and complications can include but are not limited to:

- Blood pooling around the heart (tamponade) that requires immediate drainage or surgical intervention in extreme cases.
- Punctured lung (pneumothorax) which generally re-inflated without intervention but in some cases a chest tube is required.
- Persistent or considerable bleeding to the access site that can require surgical repair in some cases.
- DVT or blood clot formation.
- Infection
- Bleeding

Types of Pacemakers

Pacemakers are categorised into three main groups depending on their general functionality: pacemakers, cardiac resynchronisation devices and defibrillators. Although each device serves its own purpose, they can be implanted to serve a variety of treatment purposes.

Most modern devices are capable of being remotely monitored through either a mobile phone app or a bedside device monitor that reads the devices functional data and transmits abnormal alert readings to the device company and device clinic team when detected. This allows for adjustments to medical therapies or device upgrades to take place.

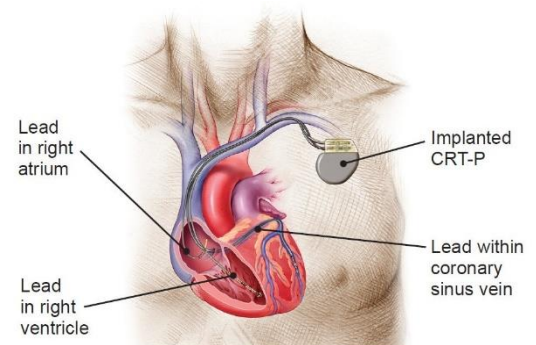
1. Pacemakers

Standard pacemakers have one general purpose – to observe for a lack of heart beat and provide a stimulating impulse to cause a heart beat when this is detected. They can be inserted into either the atrium or ventricle (single chamber devices) or into both heart chambers (dual chamber devices) depending on the requirements of the individual.



2. Cardiac Resynchronisation Pacemakers

A more robust version of a standard pacemaker is the cardiac resynchronisation pacemaker (CRT) which not only has a lead to the atrium (top chamber), but also a lead each of the ventricles (bottom chambers). As such, this device is capable of enabling a synchronised delivery of impulses to both ventricles at the necessary time to ensure they beat in a more coordinated fashion. These are generally implanted or upgraded to where individuals require more functionality than a standard pacemaker due to heart failure or reduced cardiac output.



3. Defibrillators

Defibrillators can be implanted for individuals who require not only standard pacing but also are experiencing or have potential to experience a lethal heart arrhythmia such as ventricular tachycardia or ventricular fibrillation. These devices can detect the presence of a lethal heart arrhythmia and attempt to outpace the rhythm back to normal or deliver a programmable

‘shock’ in order to restart the heart if necessary. The necessity of a defibrillation component can also be combined with a CRT device in order to deliver lifesaving therapies in the event of a lethal arrhythmia and provide improvements to synchronised heart pumping in order to improve overall heart function.

What Can I expect during the procedure?

Once checked into hospital for your procedure, you will be taken through an admission process where a detailed medical history is completed, pre-procedural blood tests are taken and your body is prepared by shaving off any hair to your chest and back. This is undergone to ensure a sterile surgical field can be created to reduce any chance of infection and ensure that any

defibrillator pads or electrodes can be appropriately placed on your chest or back in a way that is both effective for use and comfortable to remove.

You will then be taken to the anaesthetic holding bay where your anaesthetist will discuss their part in the procedure, your airway management process and discuss any queries or concerns you may have prior to the introduction of any medications – it is worth noting that the insertion of a pacemaker can be completed comfortably under local anaesthetic and a general anaesthetic is not necessarily required. Upon entering the cardiac catheter laboratory, you will be prepared for your procedure by the nursing staff who will position you on the table before applying defibrillation pads and various electrodes to your body prior to the induction of any anaesthetic medications.

At the commencement of the procedure once you have been anaesthetised and surgically prepared by the staff assisting with the procedure, the doctor will inject local anaesthetic to the left side of your chest before making a small incision and forming a 'pocket' under the skin for the pacemaker device to be housed internally when the procedure is complete. A series of x-ray contrast images will then be taken to visualise the subclavian vein for access before a sheath is inserted with the use of an access needle. This allows for the insertion of the pacemaker leads. Once inserted, the leads will be navigated to your heart under x-ray guidance and positioned while a series of measurements are taken to determine the optimal position of the lead and gauge your hearts response to the pacing stimulus.

Once both the doctor and pacemaker technician are satisfied with the lead positioning, the access sheath will be removed, the leads will be connected to the generator and placed into the already formed pocket before the incision is closed with dissolvable On closing the wound, a layer of clear skin glue called Dermabond is used to reinforce the wound closure and assist with the healing process and a dressing is applied for additional comfort.

The patient is then awoken from their anaesthetic (if required) and transferred to the post anaesthetic recovery area for observation before being transferred to their room in either the cardiac ward or coronary care for overnight monitoring. Provided no complications are observed post-operatively, patients are generally

discharged the following day once the device parameters have been rechecked and the patient has been reviewed.

The entire procedure is generally reasonably quick, taking around an hour to complete in most cases however can take longer if optimal lead positioning proves difficult to achieve.

Before Your Procedure

It is important that you fast prior to your procedure in line with your anaesthetists' instructions. Generally, a fast time of 6 hours for solid food and 2 hours for water is required in order to prevent any complications with the use of anaesthesia during your procedure.

For patients taking Ozempic, Trulicity, Saxenda, Wegovy or Mounjaro, the current anaesthetic guidelines require you to continue your medication as normal, commence a clear fluid diet 24 hours prior to your procedure and completely fast for 6 hours immediately prior to your procedure to minimise the potential for anaesthetic related complications surrounding aspiration.

Note: Clear fluids includes water, apple juice, broths, black coffee and black tea. Any non-transparent fluids such as milk, smoothies, juice containing pulp or soups are not considered clear fluids and can cause a delay in your procedure time if consumed.

After Discharge Process

Prior to discharge from hospital, patients are advised of any changes to their regular medications by their discharging doctor and advised of their follow up process. This usually consists of an in-clinic appointment with a device technician and Dr. Hunt to assess the devices functionality and wound healing 6-8 weeks following the procedure. If you are unsure if an appointment has been made, please contact the clinic to confirm a date and time for review.