

4. Remember to inform all your attending doctors that you have a PPM implanted.
5. Return for regular check-up at the appointed dates so that you derive the greatest benefits from the CRT.
6. Carry the temporary identification card which you will receive after the implantation. It indicates what type of CRT device and leads you have, the date of implant and the doctor who performed the implant, in case medical care is needed. Within three months, you will receive a permanent card from the CRT device company.

If you have any query regarding these instructions, please contact your doctor.

What are the Potential Risks?

The procedure is extremely safe, with a low risk of complications. However, some potential risk includes:

- Minor complications, such as pain, bleeding and bruising at the implant site, which can be easily treated.
- Pneumothorax, a rare complication whereby the lining of the lung is accidentally punctured during the insertion of the pacemaker wire. Air then leaks into the chest cavity, causing the lung to collapse. This condition can be treated with the insertion of a chest tube to allow air to escape and the lung to re-expand.
- Infection of the implant site, a rare but serious complication requiring antibiotic therapy and/or surgical removal of the entire CRT system if the condition is severe.

When Will the CRT Device be Removed?

The CRT device and wires will not be removed once implanted except in the following situations:

- Upon death of the patient, the pulse generator has to be removed from the body before cremation.
- The pulse generator will be removed and replaced when it is near the end of battery life.
- The pulse generator and the wires may have to be removed if infection occurs at the site of implant.

LEVEL 3 TTSH MEDICAL CENTRE

- The Cardiac Centre
- Clinic 3A (Cardiology, Cardiac Ambulatory Services, Cardiac Rehabilitation Gym)
- Clinic 3B (The Heart Atrium, Cardiac Imaging Centre)

LEVEL 3 EMERGENCY (A&E) BLOCK

- Invasive Cardiac Laboratory

CONTACT:

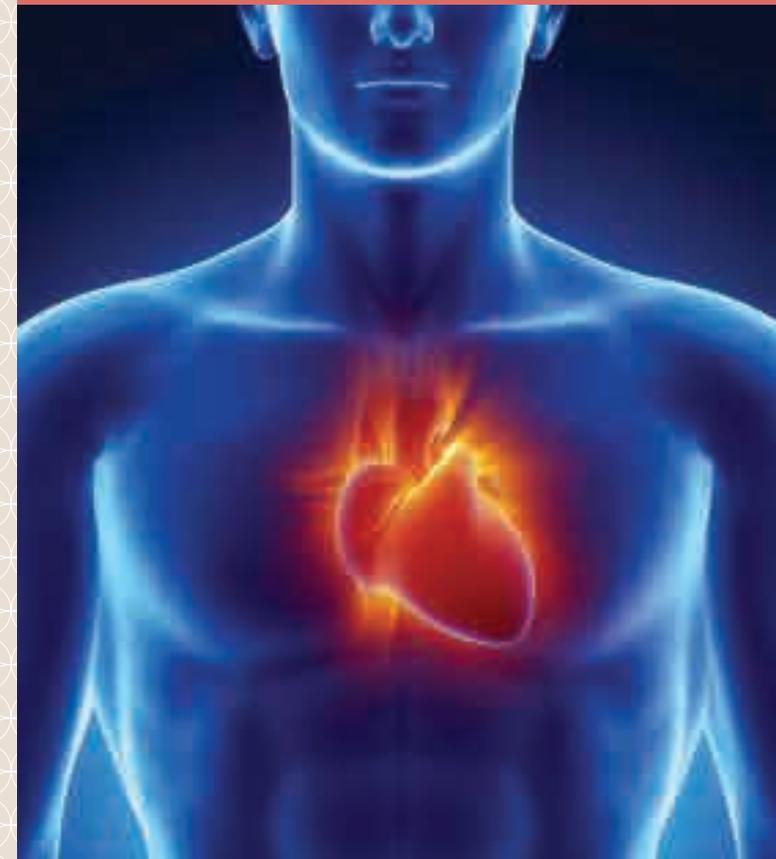
6537 7000 (All Appointments)



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Department of
CARDIOLOGY

Implantation of Cardiac Resynchronisation Therapy (CRT) Device



What is a Cardiac Resynchronisation Therapy (CRT) Device?

A CRT device, also known as a biventricular pacemaker, is surgically implanted in the chest, just beneath the skin below the collar bone. It functions to treat delay in contractions between the heart's left and right lower chambers or ventricles in heart failure patients. In a normal heart, the ventricles pump at the same time. However, when a person has heart failure, it is common that the right and left ventricles do not pump together. The device generates small electrical impulses to the heart, which makes the left and right ventricles pump together.

The CRT device consists of 2 parts: the pulse generator and 3 leads, which are wires with sensors (called electrodes) on one end.

1. The pulse generator is an electronic, battery powered device.
2. The leads are positioned in the heart to help the heart beat in a more balanced way. They are inserted through veins in the upper chest into the right atrium, right ventricle and coronary sinus vein to pace the left ventricle.



Fluoroscopic image of CRT

Why do I Need a CRT Device Implantation?

When the heart's contractions are delayed, the left ventricle is unable to efficiently pump blood to the body. This leads to an increase in heart failure symptoms, such as:

- Shortness of breath
- Swelling in the ankles or legs
- Weight gain
- Fatigue
- Rapid or irregular heartbeat

CRT has been proven to improve heart failure symptoms and overall quality of life by pacing the heart continuously and making the left and right ventricles pump together.

What Happens During CRT Device Implantation?

Before the Procedure

Some routine blood tests and electrocardiograms (ECG) will be performed. The procedure usually lasts about two to three hours and is performed in the Invasive Cardiac Laboratory. You will need to be warded for 1 to 2 days for the implantation. You will need to sign a consent form after you have been given details of the procedure and its risks, benefits and alternatives.

If necessary, hair on your chest will be shaved, and cleansed with a special soap to keep the area of insertion sterile to prevent infection. Sterile drapes will then be used to cover you from neck to feet. A soft strap will be placed across your waist and arms to prevent your hands from coming into contact with the sterile field.

A small plastic tube or cannula will be inserted into one of your veins on your hand to facilitate the injection of medications. Just before the procedure, you will be given an injection of antibiotic to prevent wound infection and medication through the cannula to make you drowsy even though you may not be fully asleep.

During the Procedure

After the injection of anaesthetics, a small incision or cut is made in the upper chest to create a small "pocket" under the skin to accommodate the pulse generator. One end of the pacemaker wire is connected to the pulse generator while the electrode end of the wire is inserted through the vein in the upper chest and is positioned in the heart with the X-ray guidance.



After the Procedure

Upon returning to the ward, you will be required to lie flat in bed until the next day. Your arm on the side of the implantation may be held in a sling to avoid any big movements.

You will be given regular antibiotics for a day, followed by oral antibiotics for about 5 days.

Chest X-ray will be performed the day after the procedure to check the position of the CRT leads and identify potential complications. The CRT device will also be programmed and checked by a cardiac technologist. Most patients can be discharged 1 to 2 days after the implantation.

Upon discharge, you will be given an appointment for a follow-up at the Pacemaker Clinic in a week's time. The waterproof dressing should not be removed until you return for your review. The stitches need not be removed as they are absorbable. After your first review, your doctor will arrange for regular check-ups to ensure that the CRT device is functioning normally and to electronically program the CRT device to suit your heart's requirements.

Preparing for the Implantation of a CRT Device

You will need to fast for at least 6 hours before the implantation.

What Precautions Do I Need to Take After the Procedure?

1. Inform your doctor immediately if you have these symptoms:
 - Fever
 - Excessive pain
 - Inflammation over the wound
2. Avoid any big movement of the arm on the affected side such as lifting the arm above your head and lifting a load of more than 5kg during the first week after implantation.
3. Complete the course of antibiotic medication prescribed upon discharge.