

Having a cardiac resynchronisation therapy CRT-P device implanted

The aim of this leaflet is to answer any questions you may have about a cardiac resynchronisation therapy device (CRT-P). It explains what a CRT-P is and how it works, as well as the benefits and risks of having it implanted.

You should have already spoken with your cardiologist or specialist nurse about having a CRT-P. This booklet is not meant to replace these discussions, but we hope it will make you feel more comfortable with your decision to have this procedure.

Your nurse or cardiologist will answer any questions you may have after reading this booklet. We encourage you and your family to ask questions, and are more than happy to talk through any concerns you may have.

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The healthy heart

What does the heart do?

The heart's job is to move blood around the body. Blood contains oxygen and other nutrients that the body needs to do its work. Blood cells pick up oxygen in the lungs and the pumping action of the heart moves this oxygen-rich blood to the rest of the body.

What does the heart look like?

The heart has four chambers – the top chambers are the left and right atrium, and the larger, bottom chambers are called the left and right ventricles. The heart has large blood vessels called veins that bring blood to the heart, and large blood vessels called arteries that take blood away from the heart.

How does the heart normally beat?

Your heart muscle needs an electrical signal to contract and pump blood around your body. In a normal heart, the electrical signal that tells the heart to pump comes from a special area called the sino-atrial node or SA node. This is sometimes called the heart's natural 'pacemaker' and can be found at the top of the heart in the right atrium. The electrical signals from your SA node travel through the top two chambers (atria) causing the heart muscle to contract (pump). They then pass through a second node called the atrio-ventricular node or AV node, and down to the ventricles, which causes them to contract. The contraction (heartbeat) pumps the blood out of the atria and ventricles and around the body. Between each heartbeat, when the heart is at rest, blood flows into the atria and ventricles, ready for the next heartbeat.

Normally, a heart beats 60 to 100 times each minute. When a heart's rhythm is normal, this is called sinus rhythm. When you exercise, become excited or experience stress, your body needs more oxygen and your heart beats faster to keep up with this demand.

If you would like more information about the heart, speak to your nurse or contact the British Heart Foundation (BHF) using the details on the back page.

Heart failure

What is heart failure?

Symptoms such as shortness of breath or ankle swelling may indicate heart failure. Your doctor will need to consider your medical history and carry out a medical examination to confirm the diagnosis.

A failing heart can interrupt the usual pumping action of the heart. Instead of the heart pumping as an organised group of muscles, it creates an unorganised, poorly functioning pump. This is known as cardiac dyssynchrony (dis-sin-kronee). The term 'chronic heart failure' is used to describe heart failure as a long-term condition. For more information on heart failure, ask your nurse for a copy of the British Heart Foundation's leaflet on **Living with heart failure**.

What causes heart failure?

Heart failure can be caused by many things, including:

- coronary heart disease and previous heart attacks
- high blood pressure (hypertension)
- irregular heart beat
- damaged heart valves

- disease of the heart muscle due to genetic causes (cardiomyopathies)
- congenital (inherited/present at birth) heart problems
- damage to the heart muscle following a viral infection
- damage to the heart caused by long-term heavy alcohol consumption.

How is heart failure diagnosed?

To assess your heart failure we will need to do an electrocardiogram (ECG). This involves putting small sticky pads on your arms, legs and chest, which are connected to an ECG machine. It is not painful. The machine then measures and records the electrical activity of the heart and gives us a printed record.

You will also have several tests including blood tests and an x-ray of your chest. If after these tests, your doctor still suspects that you might have heart failure, an echocardiogram will be arranged. This is a test that uses sound waves to view your heart and check how well it is pumping. It is the best way for the doctor to diagnose whether you have heart failure, and if so, why you have it and how best to treat it.

What is cardiac resynchronisation?

When a heart is failing, there is 'dyssynchrony' between the atria and the ventricles (atrioventricular dyssynchrony), and also between the left and right ventricles (intraventricular dyssynchrony). This means that the atria and ventricles are working independently of each other in a non-synchronised fashion. When this happens the heart works ineffectively and fails, causing breathlessness and oedema (swelling). The cardiac resynchronisation therapy device (CRT-P) works by making the atria and ventricles pump together in an organised fashion or in 'synchrony'. This may improve heart function and the symptoms of breathlessness and fluid overload.

Benefits, risks and alternatives

What are the benefits of having a CRT-P?

Many patients feel that their CRT-P gives them peace of mind. They feel safer because it automatically treats their heart condition. The CRT-P device may also help to improve your breathlessness by 'resynchronising' your heart to work more effectively.

What are the risks of having a CRT-P?

As with any operation, there are risks in having a CRT-P implanted. A very small number of people will develop a complication because of the surgery.

Potential risks include:

- **Infection.** We will give you antibiotics before the procedure to reduce this risk. If you develop an infection after you have left the hospital, you must return to St Thomas' for evaluation. About two in every 100 patients develop an infection. Signs of infection to look out for include:
 - a high temperature
 - your wound becoming red and inflamed, or warm and painful
 - your wound starting to ooze.
- **Reaction to medicine.** We try to reduce the risk of this by carefully recording any known allergies that you might have. It is not always possible to know if you will react to a medicine that you have not used before.

Reactions to medicines can vary from developing a rash or feeling sick or unwell, to a drop in your heart rate or blood pressure that needs treatment, problems with breathing, or even death. Our staff are trained to act on any emergency if you have a reaction to the medicines we give you.

- **Haematoma** (collection of blood in the tissues causing swelling and bruising). There is a risk of severe bruising or swelling around the site where the CRT-P is implanted. This is more common in people who are taking anticoagulants (such as warfarin) before their procedure. If this does happen, we may need to take you back to the operating theatre to re-open your wound and drain it. About three to four in every 100 patients have severe bruising.
- **Pneumothorax** (air in the spaces around the lungs also known as a collapsed lung). The CRT-P wires are inserted into the heart through a vein in the upper chest area. When this happens, there is a risk that a small puncture may be made in the top of the lung. This can cause air to leak into the spaces around the lungs and partially collapse your lung. If the leak is small, it may be left to heal by itself. Sometimes we insert a chest drain to remove the air and allow your lung to fully inflate again. This happens in about one in every 100 patients.
- **Pericardial effusion** (blood leak around the heart). When the leads are positioned in the heart, they can damage the heart wall and the sac surrounding the heart (pericardium) may fill with blood. This may heal by itself, or you may need a small drain put in to remove the blood. This happens to about one in every 500 patients.
- **Lead displacement.** There is a risk that the leads we put in will move after the procedure. If this happens, your CRT-P will not work properly and you will probably need another procedure to have the leads repositioned. You can help to lower the risk of this by following the instructions on limiting your arm movements after the procedure (see 'When can I go back to my normal activities?' on page 7). This happens in about 10 in every 100 patients.
- **Blockage in the veins.** Sometimes when we put more than one lead through a vein into your heart, there can be problems with the flow of blood through that vein. If this causes a problem for you, the doctors might consider giving you an anticoagulant medicine (such as warfarin), or removing one or more of the leads. You would need to come back in for another procedure for this, and the leads would be replaced using a different vein.
- **X-rays.** Your examination and/or treatment will involve a period of x-ray scanning that will give you a relatively small x-ray dose. If we need to do more extensive investigation and treatment, there is a small chance that you will get a skin reddening reaction like sunburn which will fade after a few days. Please ask the radiographer if you require further information.

The vast majority of patients undergoing permanent CRT-P implantation will survive – the approximate risk of death is very small (one in every 1,000). Some people are more at risk than others, depending on their general health and well-being.

The cardiologist will discuss the risks with you in more detail before asking you to sign a consent form. Please feel free to discuss all your questions and concerns with him/her.

What are the alternatives?

An alternative to having a CRT-P could be managing your heart failure with medicines.

Usually your cardiologist has considered this before recommending that you have a CRT-P, but has decided that the safest treatment for you is to have a CRT-P fitted. If you would like more information on this option, please feel free to discuss it with your cardiologist.

Asking for your consent

We want to involve you in decisions about your care and treatment. If you decide to go ahead, you will be asked to sign a consent form. This states that you agree to have the treatment and you understand what it involves.

You should receive the leaflet, **Helping you decide: our consent policy**, which gives you more information. If you do not, please ask a member of staff caring for you for a copy.

Having my CRT-P implanted

Will I have a local or general anaesthetic?

Inserting your CRT-P can be carried out under local or general anaesthetic. Your doctor will talk to you about which one would be best for you. You should be given the leaflet, **Having an anaesthetic**, which provides more information about anaesthetic. If you have not received a copy, please ask a member of staff caring for you.

What will happen before the procedure?

You may need to remain in hospital while you are waiting to have your CRT-P inserted.

You will need to fast, which means that you cannot eat or drink anything (except water) for six hours before your operation. You may drink water (not fizzy) up until two hours before the procedure. We will give you clear instructions on when to start fasting. If you take insulin for diabetes, please half your morning dose and bring your insulin with you into hospital.

A nurse will give you a single dose of an antibiotic before the procedure to help prevent infection.

If you are having the surgery under general anaesthetic, the anaesthetist (doctor specialising in anaesthesia) will come to see you on the ward before your operation. He/she will ask you questions about your general health and about any previous operations that you have had under general anaesthetic.

What will happen during the procedure?

All our staff are fully trained for these procedures and will be monitoring you closely at all times. In the operating theatre, the nursing staff will check your details, such as any allergies and when you last ate. They will then help you onto the operating table. A number of staff will be present, including nurses, doctors, radiographers and cardiac physiologists.

A technician will connect you to an electrocardiogram (ECG) machine, which will monitor your heart rhythm during surgery. A nurse will put a cuff around your arm to monitor your blood pressure and a clip on your finger to measure your oxygen levels. These are not painful.

If you are having the procedure under local anaesthetic and have not yet had a needle put into your hand or arm, one will be put in now. All medicines will be given through this needle. We will then assess you, and give you sedation (to help you relax and make you sleepy) and a

painkiller (morphine). Sedation will be 'topped-up' throughout the procedure. Information about having the procedure under general anaesthetic is included on below.

The CRT-P is usually put in on the opposite side to your dominant arm. For example, if you are right handed, it will be put in on the left side. This is usually because the leads will be under less strain on this side. The doctor will then clean the relevant side of your chest with an antiseptic liquid. After this, you will be covered with drapes to make sure the whole area is kept sterile throughout the operation.

The doctor will warn you before they inject the local anaesthetic. At first, the local anaesthetic will sting, but soon the whole area will go numb. You should not feel any pain during the procedure, but you may be aware of pressure in the area where the doctor is working. Please let us know if you feel uncomfortable.

The doctor will put in three wires into your heart through a vein. In some cases, up to four wires may be put in. The wires will be inserted under x-ray guidance. Once in place, a cardiac physiologist will test these wires to make sure they have good contact with your heart muscle.

The wires either have small prongs or a tiny screw to hold them in position against your heart wall. Once the wires are in position, the doctor will make a small pocket under the skin to fit the battery (generator), and will then connect the wires to this.

After this had been done, your CRT-P will be tested.

When this test has been completed, the doctor will close your wound with dissolvable stitches. It will then be sprayed with an antiseptic solution that will help to protect it from infection, and will be left uncovered. The cardiac physiologists will make sure that your CRT-P is programmed correctly and switched on. You will then be ready to return to the ward.

What if I am having a general anaesthetic?

If you are having a general anaesthetic, you will have the same procedure as above, but you will be asleep throughout the surgery. Once you are connected to the monitoring equipment, you will be put to sleep by your anaesthetist. A tube will be passed into your windpipe and connected to a machine called a ventilator. This will control your breathing during the operation. You will also have extra monitoring of your blood pressure through a special needle in your wrist, which will be put in once you are asleep.

You will wake up in the operating theatre once the procedure is over and the tube will be removed from your windpipe. When the anaesthetist is happy that you are fully awake, you will be taken back to your ward.

What happens after my surgery?

You may need to be attached to a heart monitor to keep an eye on your heart rhythm for a few hours. Because of the anaesthetic (local or general) and sedation, you may need an oxygen mask for a few hours to help your breathing. Your nurse will also check your blood pressure and wound regularly.

You can expect to feel drowsy for a few hours following the procedure. As you will have had nothing to drink before your surgery, you may need a drip of intravenous fluid. You will need to stay in bed for a few hours while the sedation wears off. Your nurse will let you know when it is safe to eat and drink.

You will have a chest x-ray to check the positioning of the CRT-P leads in your heart. This is usually done the following morning.

Will my CRT-P be checked before I go home?

Yes. You will be taken down to the Cardiac Outpatient Department to have your CRT-P checked by the cardiac physiologists. This is to make sure that your CRT-P is working as it should be and that it has been programmed correctly before you go home. The cardiac physiologists will give you your ID card with all the technical details for your CRT-P. This gives useful information for anyone needing to treat you or your CRT-P, wherever you are. You will also receive information on how often your CRT-P will need to be rechecked (usually every three to six months), and how to contact the hospital if you have any problems or concerns. Your cardiac physiologist will let you know if your future CRT-P checks can be done at a hospital closer to where you live. Be sure to ask questions if anything is unclear or confusing.

Recovering from my operation

Your wound and the shoulder where the CRT-P has been implanted will be uncomfortable for the first few days. You will be given painkillers by the nursing staff to help with this. For more information on your wound and its care, please see our leaflet, **Living with a cardiac resynchronisation therapy pacemaker device (CRT-P)**. If you do not have a copy, please ask your doctor or nurse for one or contact the Cardiac devices information line (see back page for details).

When can I go back to my normal activities?

You should be able return to your normal activities as soon as you feel up to it. On the side of your body where the CRT-P has been inserted, you must not lift your arm above shoulder height for at least four weeks. You will also have to avoid lifting, pushing or pulling heavy objects for the first four weeks. Do not be afraid to move your arm normally, as this will prevent your shoulder from becoming stiff. You may feel a little tired or sore at first, so build up slowly to your normal routine.

There are rules that regulate whether you can drive with your implant, and you will also need to take some precautions before you travel. For more information on driving and travel, please see our leaflet, **Living with a cardiac resynchronisation therapy pacemaker device (CRT-P)**. If you do not have a copy, please ask your doctor or nurse for one or contact the Cardiac devices information line (see back page for details).

Contact us

Cardiac devices information line – for any questions or concerns you may have about having a pacemaker.

t: 020 7401 9249

m: 07770 581 872 (text messages only)

e: heartdevices@gstt.nhs.uk

You can also contact:

- the nurse case managers on **020 7188 0978**
- or the cardiac rehabilitation team on **020 7188 0946**

They are available on weekdays between 9am and 5pm. If no one is available to take your call, please leave a message on the answerphone. Messages are checked daily and you will be contacted as soon as possible. Out of hours, for **urgent** help only, call your local A&E department for advice.

For more information leaflets on conditions, procedures, treatments and services offered at our hospitals, please visit www.guysandstthomas.nhs.uk/leaflets

British Heart Foundation (BHF)

BHF provides information on issues relating to heart disease.

Address: Greater London House, 180 Hampstead Road, London NW1 7AW

t: 0207 554 0000 (Monday to Friday, 9am to 5pm) **w:** www.bhf.org.uk

Pharmacy Medicines Helpline

If you have any questions or concerns about your medicines, please speak to the staff caring for you or call our helpline.

t: 020 7188 8748 9am to 5pm, Monday to Friday

Patient Advice and Liaison Service (PALS)

To make comments or raise concerns about the Trust's services, please contact PALS. Ask a member of staff to direct you to the PALS office or:

e: 020 7188 8801 at St Thomas'

t: 020 7188 8803 at Guy's

e: pals@gstt.nhs.uk

Language Support Services

If you need an interpreter or information about your care in a different language or format, please get in touch using the following contact details.

t: 020 7188 8815 **fax:** 020 7188 5953

NHS 111

Offers medical help and advice from fully trained advisers supported by experienced nurses and paramedics. Available over the phone 24 hours a day.

t: 111

NHS Choices

Provides online information and guidance on all aspects of health and healthcare, to help you make choices about your health.

w: www.nhs.uk

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