NHS
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Chronic Total Occlusions

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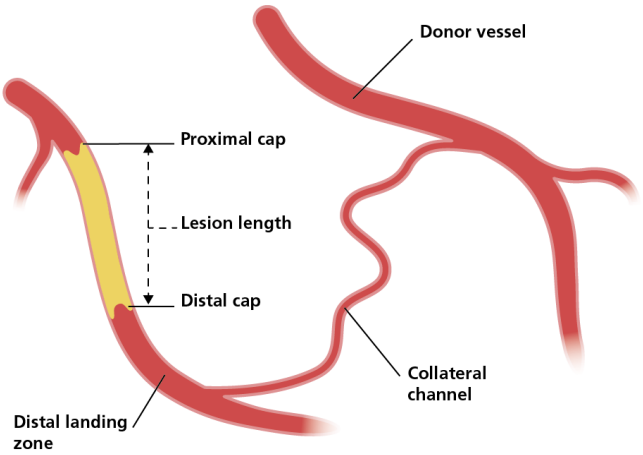
What is a Chronic Total Occlusion (CTO)?

A chronic total occlusion (CTO) is a complete blockage of a coronary artery for three months or more. Because of this, the heart muscle can develop small blood vessels to compensate the area with the blockage. We refer to these as collaterals. As these vessels are small in nature, they may not give an adequate blood supply, resulting in angina like symptoms. If this occurs, you will likely be referred for a CTO percutaneous coronary intervention (PCI) procedure.

But, for many patients this problem does not happen, and they can live a normal life on medications that help prevent any further coronary artery disease.



Example of a chronic total occlusion with a collateral channel

What you need to arrange before you come in

- You will need to arrange for somebody to bring you to the hospital and collect you by car or taxi. You will not be able to drive yourself
- You will be asked to attend for a blood test, please ensure you attend as this is important

On the day

Please remember to:

- Bring all medication with you
- Bring an overnight bag with your preferred nightwear, dressing gown, slippers and toiletries
- Have something to eat and drink, before you leave the house
- Avoid bringing in valuables into the hospital. The hospital cannot accept responsibility for loss or damage to property belonging to patients

Should I take my normal medications?

Unless advised otherwise at your pre- op assessment, you should take all your usual medication with water.

What happens when I arrive at hospital?

You will be admitted to the ward by a nurse and shown to your bed space.

Please tell the nurse if you have had any allergic reactions in the past, or if you think you might be pregnant.

You will be asked to remove clothing and put on a hospital gown.

The nurse will take some observations which includes blood pressure, heart rate, temperature and oxygen level. A small tube (cannula) will also be inserted into a vein in your arm, so you can be given sedation and other medications intravenously.

The nurse then will go through a short pre-procedure checklist.

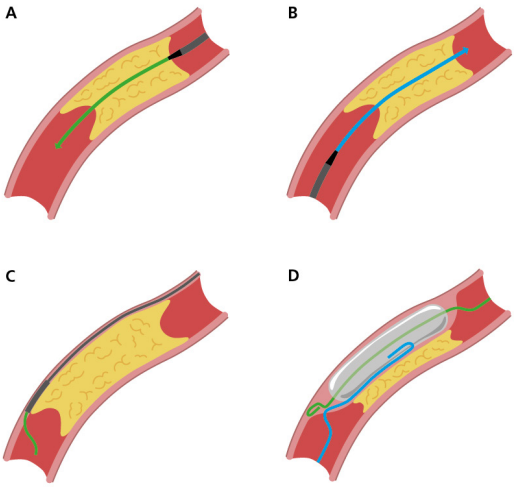
The consultant will explain the procedure and any side effects or possible complications for you. They will ask you to sign a consent form. If there is anything you do not understand, or if you have any questions, please ask.

What happens during a CTO- PCI procedure?

You will be taken to the cardiac catheter lab for your procedure. There will be a team of people present, including the consultant, a doctor, nurses, cardiac physiologists and a radiographer, who all have individual roles and responsibilities during your procedure.

You will be asked to lie flat on the table and it is important for you to stay still. You will be attached to the monitoring equipment to measure your blood pressure, heart rate and rhythm. If you feel anxious before and during the procedure, sedation can be given to help you relax. Please communicate this to the team looking after you.

- You will be given local anaesthetic at the access point which will be the wrist or groin (sometimes both). Once the area is numb, a small incision will be made, and a short tube (sheath) will be placed in the artery to keep it open
- Thin catheters will be passed into the artery via your wrist or groin. It is common for a CTO to use two access sites, so the consultant can inject contrast dye in to two arteries at the same time. So, this is why both groin and wrist may be used
- The catheter will be moved, under X-ray guidance, until it reaches the correct position in your coronary arteries. Contrast dye is then injected through the catheter, and this can be seen on the screen
- X-rays are taken as the dye passes through your arteries outlining the blood supply to your heart. Some people experience a hot flushing sensation from the contrast dye, which will last for a few seconds only. You will be told when this will happen
- The consultant will then attempt to pass a fine wire through the blockage either from the front or back of the artery
- Should either of these be successful the consultant will then attempt to re-open the CTO blockage using small balloons and then stents
- As the artery has been blocked for quite some time, the procedure can take a while. You should expect to be on the table for at least one to two hours



Example of two wires being used during a procedure

What are the risks of a CTO–PCI Procedure?

In general, the risks can include:

- Kidney injury from the contrast dye. You will have your kidney function checked before the procedure and, if needed, given pre-hydration intravenous fluids to minimise the risk of injury
- Bleeding from the puncture sites at the wrist or the groin. The puncture sites will be closely observed during your recovery period on the ward
- Radiation exposure – this is due to the complexity of this procedure as it is common to receive a high dose of radiation. If you have received a high dose, you will be notified by the team
- A small tear in the lining of your coronary artery, which can be fixed during the procedure

In very rare cases, there is a risk of:

- Stroke
- Heart attack
- Death

Your cardiologist will be able to give you a more individual level of risk for your procedure as this can vary. This will also be discussed when you sign the consent form.

Will I feel any pain?

The procedure is not painful, but you may feel some discomfort or chest pain. If you feel any chest pain or feel unwell, please let the team know straight away.

This is also a long procedure. Please inform the team if you start to feel uncomfortable.

What happens after the procedure?

You will return to the ward for recovery, this usually takes six hours and then you can be discharged home, if all is well. In some cases, you may be kept overnight for observation, but this is decided on a clinical basis only.

For the catheter that was inserted via your arm, a small band will be placed around your wrist to stop any bleeding. The pressure will be decreased gradually by a nurse over a period of two hours. The nurse will monitor the site where the catheter was inserted.

For the catheter inserted via your groin, you will be required to lie flat for at least an hour after this has been removed. In some cases, it can take a couple of hours for your blood clotting levels to be ready for it to be removed. The nurse will keep you updated. It can get uncomfortable lying flat for a long period of time, so please discuss any concerns you have with the nursing team. When the sheath ready for removal, the nurse will apply pressure to the groin for up to 15 minutes, and this will all be explained to you as it happens.

Alternatively, there is a device called an angioseal, which may be deployed at the groin puncture at the end of the procedure. This will seal the wound. This device is made of bovine collagen. You will be

given a patient information card, which you should carry with you for 90 days. It takes 90 days for the angioseal to dissolve. If another procedure is required in this time, let the medical staff know and show them the information card.

Cardiac rehabilitation

You will be seen by a cardiac rehabilitation nurse before you go home. They will discuss your condition and your recovery with you. This is known as phase I rehabilitation. They will refer you to your local cardiac rehabilitation centre and give you an information leaflet explaining what they have on offer for you locally and how to contact them.

Cardiac rehab gives you and your family the information, support and advice you need to return to everyday life and is a vital part of your recovery. Research has shown that attending a rehab programme can reduce your risk of further cardiac events and has a positive impact on your wellbeing and quality of life. Rehab staff can support you in lifestyle modification, improving your cardiovascular fitness, and any psychological support that may be required.

For patients who have experienced a heart attack and / or had a coronary stent inserted, attending and completing a course of exercise based cardiac rehabilitation is associated with an absolute risk reduction in cardiovascular mortality.

Useful contact information

If you have any queries about your procedure, please contact your consultant's secretary.

If you have any queries about your appointment date, please contact the booking office on **0121 424 9805 / 0121 424 9003**.

If you require this information in another format, such as a different language, large print, braille or audio version please ask a member of staff or email **interpreting.service@uhb.nhs.uk**.

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