



Having a Coronary Angiogram (Cardiac Catheterisation)

Cardiology

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Information for Patients and Carers

This booklet has been designed for patients at United Lincolnshire Hospitals NHS Trust undergoing a coronary angiogram (also known as cardiac catheterisation) and their carers.

It gives important information about the angiogram procedure, about going home and activity afterwards. If, after reading this booklet you have further questions, please refer to the **Contacts** section at the end.

What is Cardiac Catheterisation and Coronary Angiography?

Cardiac catheterisation is a specialised X-ray dye test to obtain detailed information about your heart. It almost always involves taking pictures of the coronary (heart) arteries – coronary angiography – and for this reason the terms cardiac catheterisation and coronary angiography are used interchangeably. For simplicity, we will use the term coronary angiogram in this booklet.

Why do I need a coronary angiogram?

You may be having this procedure as a day case, or after being admitted to hospital with suspected heart problems. There are many reasons why your doctor may have recommended this test. The most common reason is to look for coronary artery disease ('narrowings' or 'blockages' within the heart arteries) and this will be explained further in the next section.

Other reasons include:

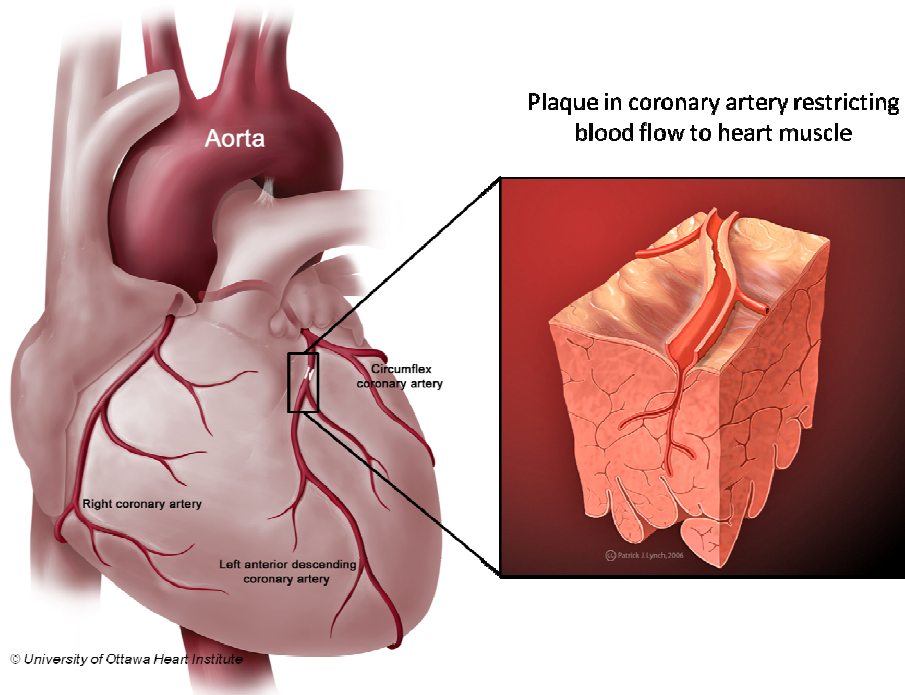
- Measuring the blood pressure in the various heart chambers. This can help determine how well the heart valves are opening and closing
- Finding out how well the main pumping chambers of the heart (ventricles) contract. Dye can be injected into the heart chambers and an X-ray video can show the dye being pumped out of the heart
- Sampling blood from within the heart chambers to measure oxygen levels. This can give us information about how well the heart and lungs are functioning and whether there are any abnormal connections between the heart chambers
- Prior to referral for heart valve surgery as the surgeon will need to know whether there are blockages in the coronary arteries before deciding on the type of operation needed
- Performing treatments within the heart or coronary arteries. For example:
 - inflating a tiny balloon to widen narrowed coronary arteries (see separate BHF booklet on **Coronary Angioplasty**)

Coronary arteries and Angina

The heart is made mainly of special muscle. The heart muscle pumps blood into blood vessels called arteries which take the blood to all parts of the body. Like any organ, the heart needs a good blood supply to function well. The coronary arteries take blood to the heart muscle – they are the first arteries to branch off the aorta which is the major trunk artery carrying blood away from the heart.

What is angina and what causes it?

Angina is pain or discomfort in the chest, jaw or arms that comes from the heart. The usual cause of angina is narrowing of one or more of your coronary arteries. This reduces the blood supply to part of the heart muscle. The blood supply may be enough when you are resting. However, your heart muscle needs more blood and oxygen when it works harder. For example, when you walk fast or climb stairs your heart rate increases to deliver the extra blood. If the narrowing in the arteries limits the blood flow, the heart "complains" with pain.



Coronary arteries supply blood to the heart

The narrowing of the arteries is caused by a process called atherosclerosis. This results in fatty deposits called 'plaques' within the arteries. These plaques usually form gradually over a number of years. In time, they can become large enough to restrict blood flow and cause symptoms.

It is important to realise however, that angina is not the only cause of chest pain. For example, chest pain may also be caused by problems with the lungs, stomach, or bones and muscles of the chest wall.

Coronary arteries do not show up on a plain X-ray. During coronary angiography, dye is injected down the arteries using a catheter (a catheter is a thin flexible tube). The arteries and their branches then show up clearly on the X-ray like a 'road-map'.

Coronary angiography can therefore show the exact size and severity of any narrowing of the coronary arteries. This helps your cardiologist to decide what treatment you need (see the section **The Result of the Coronary Angiogram**).

Where will the coronary angiogram be performed?

Your coronary angiogram will be performed in a special X-ray suite called a cardiac catheter laboratory (or 'cathlab'). This is located next to the X-ray department at Lincoln County Hospital.

What can I expect before the angiogram?

If you are an outpatient, you will receive an appointment to attend a pre-assessment clinic at Lincoln County Hospital prior to the date of your procedure.

Please bring with you a list of all your medications.

- A nurse will take a medical history and gather some additional information
- You may have blood tests and an electrocardiograph (ECG)
- The procedure will be explained to you and you will have the opportunity to ask questions

If you are an inpatient, the doctors and nurses caring for you will explain the procedure and the need for it to you. They will also go through a checklist before taking you to the Cathlab on the day.

You will be asked to sign a consent form to confirm that you understand the procedure and agree to it being done. In order to do this, we will explain not only about the procedure but also mention some of the risks (see **What are the risks of having a Coronary Angiogram?**).

Special Instructions before the angiogram

1. We would advise that you do not eat for 2 hours before your procedure. This is to reduce the risk of vomiting should you feel sick. You may continue to have sips of fluid up until your angiogram

2. Do not bring any valuables (including jewellery) with you as they may be unattended while you are having your angiogram and we cannot guarantee their safety
3. Make advance arrangements for someone to take you home from the hospital after the procedure and for someone to stay with you overnight. You cannot drive yourself home or take a taxi alone. If there is no-one that can stay with you overnight, please tell the nurse at the pre-assessment clinic
4. Bring all of your medication in with you on admission
5. Bring a pair of slippers, a dressing gown and reading material if wanted
6. You must take your usual morning medications on the day of the procedure except for those listed below, for which specific instructions are given:

Metformin

If you are diabetic and take Metformin, please do not take this on the day of your angiogram. Depending on how much X-ray dye you receive, you may be asked not to take Metformin for 48 hours after the procedure, or to have a blood test to check your kidney function first.

Insulin

Take your usual dose of Insulin the day before the procedure. If your angiogram is in the morning and you have had a light early breakfast, then you may take half of your usual morning Insulin dose with breakfast. If your angiogram is in the afternoon and you have had a normal breakfast, take your usual morning Insulin dose.

It is very important that on arrival at the hospital, you tell your nurse that you are diabetic and what Insulin you have had that day.

Warfarin

If you take Warfarin (or one of the newer anticoagulant drugs such as Dabigatran, Rivaroxaban, Apixaban or Edoxaban) you will most likely be asked to stop taking it prior to the angiogram. You will receive specific instructions when you attend the pre-assessment clinic. If you have not been to a pre-assessment clinic, or you are still not sure when to stop your Warfarin, you must contact the Cardiac Catheter Laboratory at least **one week** before the procedure.

However, if you are taking Warfarin because you have a mechanical heart valve then please do not stop taking it. We may need to arrange to admit you to hospital a few days before your angiogram so that your Warfarin can be temporarily replaced with a short-acting blood thinner called Heparin.

You can usually restart your normal Warfarin dose on the evening of the angiogram. Your doctor will advise you of this before you go home. Please make an appointment to have a blood test to check your Warfarin level (INR) after 5 -7 days.

What happens on the day of the angiogram?

If you are an outpatient, you will be given an admission time to attend either the Cardiac Catheter Laboratory or Johnson ward. Please check your admission letter for details as to where you are supposed to go.

When you arrive, you will be asked a few brief questions and your pulse and blood pressure will be checked. You will be asked to change into a hospital gown and an intravenous ('IV') cannula or 'drip' will be placed to allow you to receive any medication or fluid if needed. Please be aware that other patients will also have been scheduled for that session and that you may have to wait some time for your procedure.

What happens during the coronary angiogram?

A team of nurses, cardiac physiologists and radiographers work closely with your cardiologist to provide your care. Our goal is to make your experience as comfortable as possible.

You will either walk or be taken on a bed to the Cathlab where the angiogram will be performed. Once you enter the room, you will be asked to lie flat on a special X-ray couch, with one or two pillows under your head.

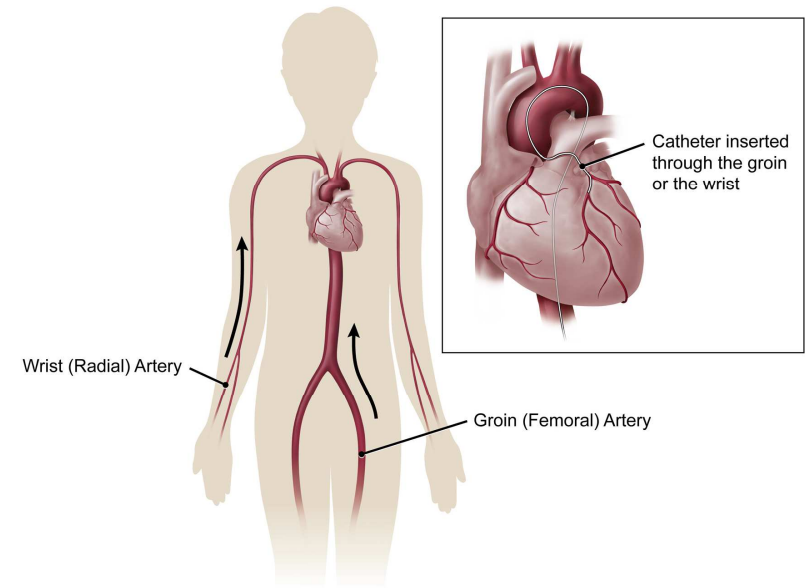
A cardiac physiologist will then attach some ECG monitoring electrodes to your chest to record your heart rate and rhythm during the procedure. As the angiogram is performed under local anaesthetic, you will be awake during it. However, you will be asked whether you would like any sedation first. Although it is not necessary, we would recommend it if you feel at all anxious or worried.



Cardiac Catheter Laboratory

The staff will then set up the equipment needed and clean the groin area at the top of your leg and/or the wrist with an antiseptic solution. The room is kept cool, but you will be covered up with a sterile drape. The doctor will then inject some local anaesthetic into the skin at the top of the wrist or at the top of the leg. This will sting at first but will take effect quickly to numb the area.

The doctor then places a small plastic tube called a sheath through the skin and into the artery in the wrist or the leg. The decision of whether to use the arm or the leg will be made by the doctor on the day, taking several factors into account.



A long thin flexible plastic tube called a catheter is then inserted into the sheath and advanced up to the heart using X-ray guidance. The catheter is gently manipulated into the coronary arteries or the heart chambers and dye is injected through the catheter while X-ray videos are taken.

You are unlikely to feel any movement of the catheter inside you but you may feel occasional 'missed' or 'extra' heartbeats during the procedure. This is normal and should not concern you.

You may also feel a warm feeling throughout your body for a few seconds when the dye is injected. The staff will tell you when to expect this. It can be normal to experience mild chest tightness or discomfort during the procedure – do let the team know of any symptoms so that they may reassure you or make you more comfortable.

The angiogram normally takes 15-20 minutes, but can sometimes take longer. At the end of the procedure, the tube in your wrist or groin is usually removed straight away.

If the wrist artery was used, a soft plastic band filled with air is used to compress the puncture site to prevent any bleeding.

If the leg artery was used, then a small collagen 'plug' may be used to seal the hole in the wall of the artery. If it is not possible to have this, the tube will be taken out in the Recovery area and a nurse will apply pressure over the leg for about 10 minutes.

Sometimes it is necessary to use a special pressure belt called a 'Femostop' which is applied to your leg until any bleeding has stopped.

What are the risks of a coronary angiogram?

Although a coronary angiogram is generally a very safe test, as with any procedure there are some risks which you need to be aware of:

- You may notice a small lump (haematoma) or bruise at the puncture area. This can be normal and may take some days to disappear. If you have any excessive swelling, bruising or redness, please contact the cardiac catheter laboratory or see your GP
- In approximately 1 in 100 cases, a patient will have a reaction to the dye such as a skin rash or visual disturbance. This is usually very mild and temporary. In 1 in 1000 cases, a patient may have a more severe reaction to the dye, although this can be treated
- If the angiogram is performed from the leg, the catheter may cause damage to the artery in the leg, resulting in ongoing bleeding around the puncture site. Although this can usually be treated by applying extra pressure to the artery, approximately 1 in 650 people require a small operation under a general anaesthetic to repair the artery. This would be done before we send you home
- The X-ray dye can have a harmful effect on your kidney function. The risk is less than 1 in 10 unless you receive a large amount of dye or your kidney function is already abnormal. In this case, you may be given fluids intravenously to help flush the dye through your system
- In 1 in 1400 cases, the procedure may lead to a heart attack, stroke or death. If you are having the angiogram because you have been admitted to hospital with angina or a heart attack, the risk may be increased

- In 1 in 1000 cases, the procedure may require emergency coronary angioplasty or coronary artery bypass graft surgery
- This procedure uses radiation (X-rays) to take pictures of the coronary arteries. Radiation can be harmful to unborn babies. If you are a woman having this procedure, you must be absolutely sure you are not pregnant. If you have any doubt, tell your doctor

Please remember that although the above complications must be mentioned, the risk of serious problems is very small. Your cardiologist feels that the benefits that can be gained from performing the angiogram far outweigh any of the risks in your case.

What happens after the coronary angiogram?

After the procedure you will be taken back to the Recovery area on a bed where your blood pressure, pulse and oxygen levels are closely monitored.

If your angiogram is performed from the leg, it is important to lie flat, keeping your head on the pillow and your leg straight to prevent bleeding and allow the artery to heal. The nurses will let you know when it is time to sit up.

If the wrist artery was used, then you should be able to sit up straight away. There will be a pressure band on the wrist to prevent bleeding and the pressure will be decreased over the next 2-3 hours before the band is removed.

You can eat and drink on return to the ward. It is important to drink plenty of water after the procedure to flush the dye through your kidneys.

Please remember that although your angiogram may only be a short procedure, you will need to remain on the ward for up to 4 hours afterwards for us to be sure that there is no bleeding from the artery in the arm or the leg.

Going home

Please remember that you must have someone to drive you home and have an adult stay with you for the first night after the angiogram. You should not drive for 48 hours following the angiogram as your wrist or leg may feel sore and this may affect your reactions in a car.

The groin or wrist site will be covered with a plaster that may be removed after 24 hours. If there is any bleeding from the puncture site after you go home, it is important to lie down flat and have someone apply pressure to the site for at least 10 minutes. If bleeding continues, then go to your nearest Accident & Emergency department by ambulance. Do not make your own way to hospital by car.

The result of the coronary angiogram

Prior to discharge, the doctor will come and give you the results and discuss treatment options. If the doctor performing the angiogram is not the one who arranged for you to undergo the procedure, they will send the result on to your own cardiologist who will contact you if any further treatment is required.

The possible outcomes are:

- Your heart is normal and no further cardiac treatment is required
- You have coronary artery or valve disease that is best treated with medication alone
- You have narrowing within the arteries that is best treated with a procedure called angioplasty and stenting. This is an extension of the angiogram which involves inflating a tiny balloon within the blockage, stretching the artery and opening it. A stent (a small metal scaffold) is usually placed in the artery to keep it open. If you are having the angiogram because you have been admitted to hospital with angina or a heart attack, this may be done immediately following your angiogram. Your doctor will have explained this to you and obtained your consent beforehand. If you are an outpatient, then you will be sent a date for the angioplasty as you may need to be started on some additional medication first
- You have narrowing within the arteries or heart valve problems that are best treated with an operation (bypass operation or heart valve replacement)
- You have narrowing in your arteries which does not appear critical, but may possibly be causing symptoms. In this case, your doctor may wish to arrange additional confirmatory tests before deciding on the best treatment
- You have deterioration in the pumping mechanism of the heart or raised pressures within the heart which require further treatments or changes in your medication.

Notes

Contacts

If you have any problems or questions when you are at home, please contact the nurses at the Cardiac Catheter Laboratory or the office of the cardiologist who arranged for you to undergo the angiogram:

Cardiac Catheter Laboratory 01522 512512 Ext. 582648

Lincoln County Hospital

Dr. R. Andrews	01522 573800	
Dr. W. Arthur	01522 597873	
Dr. P. Jokhi	01522 597875	
Dr. S. Kelly	01522 597535	
Dr. J. Fernandez	01522 512512	Ext. 707357
Dr. D. O'Brien	01522 512512	Ext. 582631
Dr. K. Lee	01522 573800	
Dr. V. Venugopal	01522 597873	
Dr. D. Taleyratne	01522 512512	Ext. 582631

Pilgrim Hospital

Dr. J. Skopal	01205 446489
Dr. S. Dhar	01205 445792
Dr. D. Taleyratne	01205 445664

Grantham Hospital

Dr. A. Houghton	01476 464791
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References

If you require a full list of references for this leaflet please email patient.information@ulh.nhs.uk

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