

# Cardiac catheterisation and coronary angiography

## Introduction

### Healthy hearts

Cardiac catheterisation is an invasive diagnostic procedure that provides important information about the structure and function of the heart.

It usually involves taking X-ray pictures of the heart's arteries (coronary arteries) using a technique called coronary angiography or arteriography. The resulting images are known as coronary angiograms or arteriograms.

### Why do I need coronary angiography?

Coronary angiography is used to diagnose a number of heart conditions and to help guide treatment. For example, it may be used:

after a heart attack – where the heart's blood supply is blocked

to help diagnose angina – where pain in the chest is caused by a restricted blood supply to the heart

to plan interventional or surgical procedures – such as a coronary angioplasty, where narrowed or blocked blood vessels are widened, or coronary artery bypass surgery (CABG), where the narrowed arteries are bypassed using an alternative arterial supply or segments of the patient's own veins that are usually taken from the leg

Coronary angiography is also considered to be the 'gold standard' method of diagnosing coronary artery disease (conditions that affect the arteries surrounding the heart).

### What happens during coronary angiography?

During the procedure a long, flexible tube called a catheter is inserted into a blood vessel in your groin or arm. Using X-ray images as a guide, the tip of the catheter is fed up to the heart and coronary arteries.

A special type of dye called contrast medium is injected into the catheter and X-ray images (angiograms) are taken.

The contrast medium is visible on the angiograms, showing the blood vessels that the fluid travels through. This clearly highlights any blood vessels that are narrowed or blocked.

### After coronary angiography

After having coronary angiography, you will usually be able to leave hospital the same day, after a period of rest and observation.

Most people are fine the day after having the procedure, although you may feel a bit tired afterwards and the wound site is likely to be tender for up to a week. Any bruising may last for several weeks.

However, you should seek immediate medical attention if swelling at the site of your wound gets worse, or if you experience excessive bleeding or circulation problems to a limb.

### Risks

Cardiac catheterisation and coronary angiography are usually very safe. However, as with all procedures there are some risks, including:

being allergic to the contrast dye (this is rare) – discuss any allergies that you have with your cardiologist (heart specialist) before having the procedure

bleeding under the skin where the catheter was inserted – this should stop after a few days (contact your DOCTOR if you are concerned about it)

bruising – it is common to have a bruise in your groin area or arm afterwards

a very small risk of more serious complications, including damage to the artery in the arm or leg where the catheter was inserted, heart attack, stroke, kidney damage and, very rarely, death

Why cardiac catheterisation and coronary angiography are used

Cardiac catheterisation and coronary angiography can provide important information about the heart and the blood vessels that surround and supply it.

The heart has four chambers; the two small chambers at the top are called atria and the two larger chambers at the bottom are called ventricles. Each ventricle has two one-way valves to control the flow of blood in and out of the ventricle.

Using cardiac catheterisation, your cardiologist (heart specialist) can tell how well your heart valves and chambers are working. It can also provide important information about the blood pressure inside your heart.

The arteries are the blood vessels that carry blood from your heart to the rest of your body. The blood is returned to the heart through your veins.

Coronary angiography provides pictures (angiograms) that can show whether the blood vessels surrounding your heart are narrowed or blocked. You may need treatment if there are any narrow areas or blockages.

## Heart conditions

Coronary angiography can be used to help diagnose a number of heart conditions, including:

heart attack – a serious medical emergency where the heart's blood supply is suddenly blocked, usually by a blood clot

angina – a dull, heavy or tight chest pain caused by a restriction in the heart's blood supply due to a build-up of fatty substances (atheroma) in the walls of the coronary arteries (the arteries that supply blood to the heart)

## Treatments

Coronary angiography is also used during certain treatments. For example, it may be used if you need to have:

a coronary angioplasty or percutaneous coronary intervention (PCI) – this is a procedure to widen blocked or narrowed coronary arteries

a coronary artery bypass graft (CABG) – surgery to divert blood around narrow or clogged arteries and improve blood flow to the heart

heart valve surgery or intervention – the valves are structures inside the heart that control blood flow within and through the organ

## Angiogram

Cardiac catheterisation and coronary angiography will be carried out at a hospital or specialist heart centre.

The team responsible for your care will usually include a cardiologist (heart specialist), nurse, cardiac technician and a radiographer (a specialist in using imaging technology).

The procedure will usually be carried out in an X-ray room or a catheterisation laboratory.

Before having the procedure, you should tell your cardiologist if you have any allergies and if you are taking any medication, either for a heart problem or another medical condition.

You will be told whether to continue taking your medication or if you need to stop. You should not stop taking prescribed medication unless you are advised to do so.

Occasionally, you may also be asked not to eat or drink anything for six hours before the procedure.

## Anaesthetic

The procedure will be carried out under local anaesthetic and you may also be given the option of having a sedative.

Sedatives are a type of mild anaesthetic (painkilling medication) used during minor painful or unpleasant procedures. If you are sedated, you will feel sleepy and relaxed but remain awake and have enough awareness to respond to instructions.

For example, you may be asked to take a deep breath and hold it at certain points during the procedure.

### Monitoring your heart

Throughout the procedure, you will be attached to an electrocardiogram (ECG) machine. An ECG records your heart's rhythms and electrical activity. A number of electrodes (small metallic discs) are placed on your arms, legs and chest. The electrodes are connected to a machine that records the electrical signals of each heartbeat.

### The procedure

Provided that you do not need to have a further procedure, such as a balloon angioplasty (see below), cardiac catheterisation and coronary angiography should take about half an hour.

Below is a step-by-step guide to what you can expect during the procedure. The healthcare professionals who are with you will explain what is happening.

After entering the catheterisation laboratory you will be asked to lie on a special table. If the catheter is being inserted into your groin, your groin may be shaved and will be cleansed with antiseptic fluid.

You will be covered with a sterile sheet and given an injection of local anaesthetic to numb the skin of your groin or arm, so the procedure should not be painful.

The catheter will be inserted through a fine tube called a sheath.

The catheter will be moved through your blood vessels and into your heart using X-ray guidance.

A small amount of special dye called contrast medium will be injected through the catheter and the pressure in your heart will be measured.

As the dye is injected, you may feel a hot flushing sensation that passes quickly. You may experience a warm sensation in your groin that feels as if you have wet yourself. You may also have a metallic taste in your mouth. This is nothing to worry about and you will be warned when to expect it.

You will not feel the catheter being guided through your blood vessels. However, you may be aware of the odd missed or extra heartbeat.

A series of X-ray images will be taken of your heart and the blood vessels around it. These are called angiograms and will be stored digitally (on a computer).

In certain circumstances – for example, if your arteries are blocked, your cardiologist may decide to carry out a balloon angioplasty (an interventional procedure to widen blocked arteries). This will be carried out immediately and will add about an extra hour to the procedure. This should usually have been discussed with you beforehand, unless it is required as an emergency procedure.

After the procedure is complete, the catheter will be removed.

If the catheter was inserted into your groin, the nurse or cardiologist may apply pressure to the entry site for about 10 minutes to stop any bleeding.

Alternatively, a number of different plugs or clips may be used to seal or close up the wound.

If the catheter was inserted through your arm, a tight dressing will be applied for around two to three hours.

Cardiac catheterisation and coronary angiography are generally considered to be safe procedures. However, as with all medical procedures, there are some associated risks.

Potential risks of coronary angiography include:

bleeding under the skin at the wound site (haematoma) – this should improve after a few days but contact your DOCTOR if you are concerned

bruising – it is common to have a bruise in your groin or arm afterwards

allergy to the contrast dye used – this is rare but you should discuss any allergies that you have with your cardiologist (heart specialist) before having the procedure

Serious complications

In very rare cases, more serious complications of coronary angiography can occur. These include:

heart attack – a serious medical emergency where the heart's blood supply is suddenly blocked, usually by a blood clot

stroke – a serious medical condition that occurs when the blood supply to the brain is interrupted

damage to the artery in the arm or groin in which the catheter was inserted, with possible impairment of circulation to the limb

deterioration in kidney function

tissue damage from X-rays if the procedure is prolonged

death

The risk of a serious complication occurring is estimated to be around 2 in 1,000. It is usually the result of serious underlying heart disease. Your cardiologist should discuss the risks with you before you have the procedure.

Recovering from cardiac catheterisation and coronary angiography

After having cardiac catheterisation and coronary angiography, your pulse and blood pressure will be checked and recorded.

If the catheter was inserted into your groin, a nurse may apply pressure for 5-10 minutes to stop the bleeding after the catheter and sheath have been removed from the artery.

Sometimes, the doctor carrying out the procedure will insert a small collagen plug at the puncture site, or use a special stitch or other closure device. In this case, it will not be necessary to press on the artery.

If the catheter was inserted into your arm, a small pressurised cuff may be placed around your arm and pressure will gradually be decreased over the course of several hours. A nurse will check whether there is any bleeding at the point where the catheter was inserted.

If the catheter was inserted into your arm, you should be able to sit up straight away and you may be able to walk around soon afterwards.

If the catheter was inserted into your groin, you will be asked to lie flat after any bleeding has stopped. If all is well, you will be asked to sit up after a few hours and you should be able to get up and walk around shortly after.

You should tell the healthcare professionals treating you if you feel unwell at any time after the procedure.

Several hours after having cardiac catheterisation and coronary angiography, a family member or friend will be contacted and asked to collect you to take you home.

Most people feel fine a day or so after having the procedure. You may feel a bit tired and the wound site is likely to be tender for up to a week. Any bruising may last for up to two weeks.

### Self-help advice

The advice listed below may help with your recovery.

Avoid having a hot bath for three to four days until the wound site has healed. You can still take a shower.

Remove the plaster from your groin the day after the procedure. Gently clean the site with mild soap and water and dry it thoroughly before applying a new plaster. Change the plaster daily until your skin has healed.

Contact your DOCTOR if you experience any redness at the wound site that is warm to touch, or if you have a high temperature, rash, numbness or pain in your leg when walking.

Do not drive for 24 hours.

Avoid playing sport, excessive activity or lifting anything heavy for two to three days.