

Inpatient Coronary Angiography and Angioplasty (PCI)

An information guide



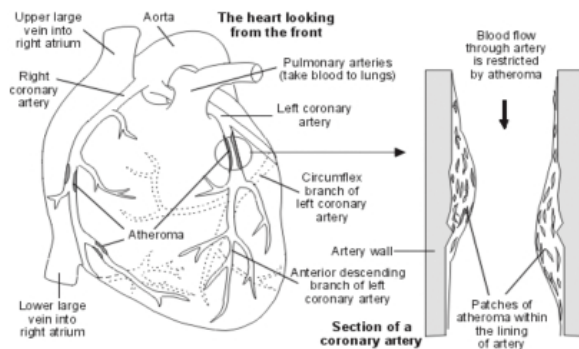
Inpatient Coronary Angiography and Angioplasty (PCI)

Your cardiologist has arranged for you to have a coronary angiogram at the Silver Heart Unit at Fairfield General Hospital during your hospital stay. This booklet will provide you with information about the procedures, the risks and the benefits associated with them.

What is a coronary angiogram?

Coronary angiography, also known as 'cardiac catheterisation', is a test to show if there are any problems with the coronary arteries. These blood vessels lie on the surface of the heart and supply the heart muscle with blood and oxygen.

The procedure is performed by a cardiologist, who is a heart specialist. The test involves a colourless dye being flushed into the arteries through a long thin tube passed from the wrist or groin artery around to the heart whilst X-ray pictures are taken. It is generally a straightforward test and usually takes about 20-30 minutes.



Why do you need the test?

Coronary angiography is usually performed in patients who are suspected of having heart conditions, including heart attacks, unstable angina, heart failure or problems with the heart valves. The test shows whether significant narrowing is present within the coronary arteries and allows the best treatment to be planned as a result. This might include an angioplasty and stent procedure to stretch one or more narrowed arteries at the same time as the angiogram. Inpatients who have had heart attacks or uncontrolled angina this has been proven to reduce the chance of further heart attacks.

Are there any alternatives?

Research studies have shown that a coronary angiogram is the most accurate way to plan treatment when a serious problem such as a heart attack has occurred. There are currently no alternative tests available. Tests such as **exercise stress testing, dobutamine stress echocardiography (DSE) and myocardial perfusion scanning**, can look at blood flow through the heart. These tests are non-invasive and can be used to rule out a serious problem, but cannot be used to plan treatment to improve blood flow within the coronary arteries.

The day before the procedure

- You will be given some medication to thin the blood. There will be a number of tablets, including an extra dose of aspirin and either 'clopidogrel' or 'ticagrelor'. If you take warfarin then this may have been stopped a few days earlier to allow the effects to wear off before the procedure.
- You may have blood tests, If one of your blood results relating to the kidneys is low or shows an abnormal kidney function then you will be encouraged to drink plenty of fluids. You may

need a saline drip before and after the procedure. This is nothing to be worried about - it is a precaution to protect the kidneys, by helping to dilute and flush out the colourless dye that has been injected during the procedure.

- If you have diabetes and take a medication called metformin, this may be stopped before and after the procedure depending on the blood levels relating to your kidneys. You may also be advised to drink plenty of water before the procedure. This is nothing to worry about, it is done to prevent any damage to the kidneys.
- You will need to sign a consent form agreeing to the benefits and risks of the procedure, which you will sign with a doctor present.

On the day of the procedure

You will be asked to fast for six hours before the procedure, although you can continue to have small sips of water. If you are not already on Ward 1 or 2 at Fairfield General Hospital you will be transferred there by ambulance. On the day the staff there will settle you on to the ward and get you ready for the procedure. You will be transferred to the catheter lab in list order.

Occasionally there can be unforeseen delays, if the procedure before yours has taken longer than expected or if any problems occur with the equipment. The staff will do their best to keep you informed if delays do happen. Sometimes procedures may need to be cancelled and rescheduled if time does not allow. This will be at the earliest opportunity, usually the following day.

In the cardiac catheterisation lab (X-ray room)

You will be asked to lie on the X-ray bed and once you are comfortable, a member of the team will attach you to a monitor so that you can be observed during the procedure. In the room you will see a C shaped X-ray arm over the bed and screens where your arteries will be shown when the dye is injected. There will be a trolley containing the equipment needed for the test. You may be given a sedative injection to make you more comfortable and a spray under your tongue to help relax the arteries during the procedure.

The doctor will sterilise the skin over your right wrist (radial artery) and/or leg (femoral artery) using an antiseptic liquid which may feel cold and wet. A local anaesthetic will be given into the skin over the artery, and may sting for a few seconds before the area becomes numb.

This will allow the doctor to place a small tube, called a sheath, into the artery causing you very little if any discomfort. If the sheath has been placed in the groin, the doctor will take a picture to decide whether a plug can be used to seal the artery at the end of the procedure. This picture may cause a warm flush feeling around your tummy area and leg, and may give a sensation of passing water, although this won't happen.

Once the doctor is happy that the sheath is in the correct position, a long thin plastic tube, called a catheter, will be passed through the sheath and up to the coronary arteries. The X-ray machine will be guided into the correct position and a colourless dye injected into the arteries, showing any blockages or narrowing that may be present. The machine may be positioned quite close to you but will not touch you.

After the angiogram the doctor will give you some information about the results of the test, and if appropriate may advise you that a further angioplasty/stent procedure is performed at the same

time (see below). This can usually be done using the same sheath and similar equipment to the angiogram, but usually does take a little longer. Further drugs will be given to thin the blood during this procedure. You may develop some chest heaviness or tightness during this procedure, and although this is generally mild, if it does become uncomfortable a pain killing injection can easily be given.

At the end of the procedure the small sheath will be removed from the artery. If it was in the femoral artery (groin), the doctor may seal the vessel with a collagen plug called an 'Angioseal', after which you will have to sit for 30 minutes before you can mobilise.

It doesn't mean anything is wrong if an angioseal cannot be used, in which case the sheath will be removed and firm pressure applied for about 10 minutes by a doctor or nurse. If blood thinning drugs have been given, then this may be done later on the ward after they have worn off. Once the sheath has been removed you will need to lie flat for an hour, and then sit up for another hour before you can mobilise.

If the procedure was done through the wrist (radial artery) a tight pressure band will be applied to the wrist at the puncture site. This puts pressure on the site allowing the puncture to heal, after 1 to 2 hours the band will be slowly deflated over an hour and if no problems occur the band will be removed.

Risks of a coronary angiogram

Complications are rare, and most are minor but some can be more serious:

Serious or frequently occurring risks;

- Small background risk of serious complications including stroke, heart attack and death (1 in 1,000 risk overall).
- Minor bleeding and bruising around the puncture site is common.
- Rarely significant bleeding can occur, requiring blood transfusion, compression, injection or surgical repair of the damaged blood vessel (1 in 200 risk).
- Development of an abnormal heart rhythm, possibly leading to loss of consciousness, can occasionally occur, requiring treatment with either drugs or an electric shock.
- Damage (usually temporary) to kidneys can occur but is rare in patients with normal kidney function before the procedure (less than 1 in 500 risk).
- Minor allergic reactions to the contrast dye may cause nausea or a rash. More serious reactions can occur but are rare.
- The test uses X-rays but the levels of exposure are closely monitored.

These risks are just a general guide and your doctor will discuss these on the day of your procedure before you sign your consent form.

How long is the recovery?

Following the procedure you will be taken back to the ward and your recovery time will depend on which method of recovery the doctor has used. The staff will monitor your heart rate, blood pressure and puncture site regularly. If you notice any bleeding or

swelling please let the staff know straight away. Some patients will need heart monitoring at the doctor's instruction.

Results of the test

You will be given the results of the test immediately afterwards, usually when you are still within the cardiac catheter lab. You may be told that:

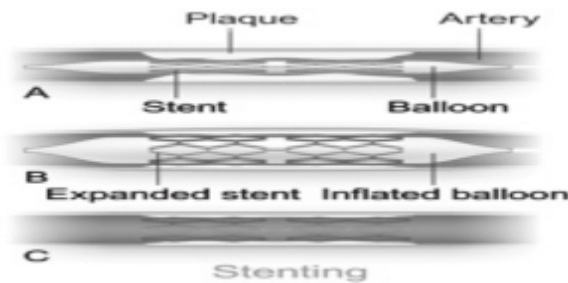
- **There were no abnormalities found.** In most cases, a normal coronary angiogram is reassuring and the medical team may be able to let you go home the following day. Occasionally, however, further tests will be required to rule out other serious conditions, this will be decided when you return to your base hospital.
- **Medication is the best treatment for you.** It may be that there are just minor narrowings that do not require treatment, that there is a completely blocked artery, or that the arteries are too small for further procedures. Medications and lifestyle changes alone are often effective at reducing the risk of further heart attacks and controlling angina, even if another procedure isn't considered to be beneficial.
- **You will benefit from a 'PCI' procedure** ('angioplasty' or 'stenting') – this will usually be done immediately after the angiogram whilst you are still in the cardiac catheter lab (see below). Not everyone is suitable for PCI, and this will largely be decided based on what the angiogram has shown. Occasionally the doctor may need to discuss your case with other colleagues, or perform further tests to decide whether PCI is the best way forward, in which case this may be done at a later stage.
- **You need a heart bypass and/or valve operation.** This may be a better treatment in patients where there are many narrowed areas, narrowings that are technically difficult to treat using PCI, or narrowings involving the 'left main coronary artery'. If the condition of the coronary arteries is considered very

serious, or your symptoms have failed to settle down, then this will be arranged following discussion with a heart surgeon at Manchester Royal Infirmary or Wythenshawe Hospital before you are discharged home. It usually takes a few days to arrange heart surgery, and you will return to your base hospital for the arrangements to be made. There will be plenty of time to discuss this with the medical team beforehand.

Having a PCI procedure

Percutaneous coronary intervention or 'PCI' is a minimally-invasive procedure where a narrowed artery can be stretched open to improve blood flow to the heart muscle beyond. Narrowings usually develop over many years due to the accumulation of cholesterol at damaged areas, and are more likely in patients that smoke or have high blood pressure or diabetes.

PCI involves the use of small balloons to stretch the artery which are then removed following the procedure, and replaced by small metal tubes called 'stents', which remain inside the arteries to hold the walls widely open. There are two types of stents – these may be 'drug eluting' or 'bare metal' in design, and one or other type may be more suitable for any one particular patient. This will be decided by the doctor performing your procedure.



The procedure will be very similar to the coronary angiogram, but it may be a little more involved for the doctor and their team. A very

fine and flexible wire will firstly be passed into the artery and across the narrowed area to the healthy part beyond. A tube with a small balloon attached will then be threaded over the wire, passed across the narrowing, and inflated to stretch the narrowing and squash the furring up out of the way. This may be done several times, and it is common to feel some chest discomfort when the balloon is inflated. Please let the staff know if this is uncomfortable as effective pain relief can easily be given. The doctor will then remove the balloon and pass a stent into place over the wire. The stent is expanded against the wall of the blood vessel by a further balloon which is removed afterwards. More than one stent may be required. The procedure is often quite quick and usually takes around 30-60 minutes to complete, but occasionally may be more prolonged in difficult cases.

What are the risks and complications of having a stent?

The risks and complications of having a stent are slightly higher than those of an angiogram, but the procedure is also highly beneficial and can reduce your risks of a further heart attack or angina very significantly.

- You may experience some chest pain or discomfort.
- There may be minor damage to the artery caused by the equipment used; this may require you to stay in hospital a little bit longer for observation.
- There is a small risk of heart attack, stroke, and death during the procedure. In most patients this risk is about one to two in a hundred, but this risk may be increased if you have other illnesses or health issues.
- If a very serious problem arises during the procedure, you may need an urgent bypass graft operation to repair the artery. You would be transferred urgently to Manchester Royal Infirmary or Wythenshawe Hospital.

- There is a risk that the artery can narrow down again because of scar tissue forming within the stent. This is called 'restenosis' and the risk is reduced to about 5-10% of cases using drug eluting stents. The risk is greatest in the first six months after the procedure and symptoms of angina may return.
- There is also a risk that a blood clot can form within the stent after the procedure causing another heart attack. This risk is about one in a hundred providing your medications are taken as directed. It is usually advised that you take aspirin and either clopidogrel or ticagrelor for 12 months after the procedure.

The PCI team collect a lot of facts and figures about the procedure, which is then analysed with information from hospitals across the UK; this ensures that we provide a safe, high quality service.

Pressure wire

Occasionally the doctor may be undecided as to whether the artery is narrow enough to need a stent, and may want to perform a 'pressure wire' procedure following the angiogram to measure the blood flow in the artery.

The procedure is similar to the angiogram and involves passing a fine wire, with a pressure sensor at its tip, across the narrowing. Once the wire is in the correct position, a drip will be given to stimulate blood flow in the artery, and the pressure recorded to see if the flow of blood is restricted by the narrowed area seen on the angiogram. The medicine in the drip may cause you to experience some shortness of breath, light headedness and chest tightness. This will only last whilst the drip is running, usually for about 30 seconds, and should pass off quickly after it is stopped. If a PCI procedure is required then this will be performed immediately after the pressure wire test.

After the procedure

You will be transferred back to the ward and your blood pressure, pulse and puncture site will be checked regularly. If the procedure was performed from the wrist, or an angioseal was placed in the groin, and you require no further heart monitoring, then you should be able to mobilise after about two hours. In other cases you may need to remain in bed for a period of further monitoring, or until the sheath in your leg can be removed.

There may be some slight bleeding from the puncture site for a couple of hours after the procedure. This is due to the blood thinning drugs that you have been given before and during the procedure, and as the effects of these drugs wear off the bleeding will stop. We may need to apply some pressure to the puncture site to slow or stop the bleeding.

If you have diabetes or have had multiple stents, the doctor may wish to put you on a blood thinning drip for 12-18 hours and it is recommended that you remain on bed rest while this is running, due to the risk of bleeding if you catch or knock yourself. You will need regular blood tests whilst you are on this drip.

In most cases you should be discharged from hospital the day after PCI, but if there are complications following the procedure, or you require further procedures or tests then you may have to stay longer. Your medical and nursing staff will keep you fully informed.

Returning to normal activity (after a coronary angiogram only)

The following apply if you have a coronary angiogram only;

- On discharge from the ward you will need someone to stay with you overnight.
- Don't drive for at 2 to 3 days. This restriction may be longer if you have had a heart attack (see below).

- Avoiding bending too much or lifting anything heavy for 2 to 3 days, such as picking up small children, carrying shopping bags vacuuming or gardening.
- Following the procedure do not have a bath or shower. You can have a shower the day after the procedure, but you will need to wait 5 to 7 days to bathe or until the puncture site is fully healed.
- The small see through dressing can be removed the following day.
- You can resume sexual activity after 2 to 3 days.
- Do not put any creams or talcum powder on the wound for a week due to the risk of infection.

Discharge information will be discussed with you before you are discharged home.

Returning to normal activity after PCI

You will be given verbal and written information before you are discharged from hospital. This is a short summary:

- Check your puncture sight once a day for seven days and contact the hospital if you have any concerns.
- Do not do any heavy lifting for five days, for example carrying shopping bags, picking up small children, vacuuming and lawn mowing.
- You will be contacted by a rehabilitation nurse within two weeks of leaving hospital.
- You should not start any new exercise until six weeks after the procedure.
- You may be prescribed a daily dose of aspirin, clopidogrel or ticagrelor for up to twelve months. You will be given a card to keep with you, stating when it is safe to stop taking these.

These medications should only be stopped before the stated time by your cardiologist (heart doctor) and it is very important not to miss taking these medications.

- If you have had a heart attack before having PCI, it is usual to be off work for at least **six weeks**. In other cases, it may be alright to go back to work after **one week** if you have an office based job, or after **two weeks** if you have a manual job.
- You can travel within the British Isles after one to two weeks but it isn't advisable to undertake overseas travel for 4 to 6 weeks. Inform your travel insurance company about your treatment.

Driving

- Inform your **insurance company** about the treatment you have had. If you do not, then it may invalidate your insurance if you make a claim at a later stage.
- If you hold a normal car or motorcycle licence (Group 1 entitlement) then you do not need to inform the DVLA if you have had a heart attack or PCI procedure. The DVLA state that you must not drive for a minimum of one week, but if you have had a heart attack which wasn't treated successfully by PCI, or sustained significant damage to your heart, then you will not be allowed to drive for 4 weeks.
- If you drive large lorries or buses (Group 2 entitlement), **you must let the DVLA know about your treatment**, and you will be disqualified from driving for at least six weeks. Relicensing may be allowed, as long as you haven't sustained significant damage to the heart, and can satisfactorily perform a medically supervised exercise test off medication following the disqualification period.
- If you have had a heart attack before having PCI you may resume car and motorcycle driving provided you have been

successfully treated and you have no other disqualifying conditions.

Summary

On the whole these are very safe and effective procedures. This leaflet is provided to keep you as fully informed as possible about what to expect, but if you have any other questions please do not hesitate to discuss these with the medical or nursing staff on the ward.

If after leaving the ward you need more information or advice about your procedure, you will be given a number to contact the ward.

More information about your heart and lifestyle can be obtained from the British Heart Foundation.

If English is not your first language and you need help, please contact the Interpretation and Translation Service

Jeśli angielski nie jest twoim pierwszym językiem i potrzebujesz pomocy, skontaktuj się z działem tłumaczeń ustnych i pisemnych

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For general enquiries please contact the Patient Advice and Liaison Service (PALS) on 0161 604 5897

For enquiries regarding clinic appointments, clinical care and treatment please contact 0161 624 0420 and the Switchboard Operator will put you through to the correct department / service

The Northern Care Alliance NHS Group (NCA) is one of the largest NHS organisations in the country, employing 17,000 staff and providing a range of hospital and community healthcare services to around 1 million people across Salford, Oldham, Bury, Rochdale and surrounding areas. Our Care Organisations are responsible for providing our services, delivering safe, high quality and reliable care to the local communities they serve.

The NCA brings together Salford Royal NHS Foundation Trust and the hospitals and community services of The Royal Oldham Hospital, Fairfield General Hospital in Bury, and Rochdale Infirmary (currently part of The Pennine Acute Hospitals NHS Trust).

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