TEST

Pulmonary angiography

Pulmonary angiography uses contrast dye and X-rays to examine blood flow through the lung arteries.

WHAT IT MEASURES
Blood flow and blockages in the lung arteries

SAMPLE
None - X-ray imaging with injected contrast

FASTING NEEDED?
Sometimes, before sedation; follow your hospital's instructions

HOW LONG IT TAKES
About one to two hours, longer if treatment follows

RESULTS IN
Often same day; turnaround varies by laboratory and imaging service

USED FOR
Diagnosis, procedure planning, and treatment guidance

MAIN LIMITATION
Overlapping vessels can hide or mimic small blockages

Overview

Pulmonary angiography is an imaging test of the pulmonary arteries, which carry blood from the heart to the lungs. It can show a blockage, narrowing, unusual blood vessel connection, or another change in blood flow.

During the test, a specialist passes a thin, flexible tube called a catheter through a vein, usually in the groin, neck, or arm. The catheter is guided through the right side of the heart into a pulmonary artery. Iodine-based contrast dye is then injected while moving X-ray images are taken.

This test is different from CT pulmonary angiography, or CTPA. CTPA uses contrast injected into an ordinary arm vein and does not require a catheter to be placed in the pulmonary arteries. Catheter pulmonary angiography is more invasive, so it is now reserved for selected situations.

Why the test is ordered

Pulmonary angiography may be used to:

For suspected pulmonary embolism, CTPA or a ventilation-perfusion scan is usually considered before catheter angiography. The most suitable test is based on the clinical question and whether contrast, radiation, or an invasive procedure presents additional concerns.

- Look for a pulmonary embolism, meaning a blood clot in a lung artery, when other imaging has not provided a clear answer
- Map long-standing clots or narrowed arteries before treatment
- Examine an abnormal connection between blood vessels
- Plan or guide catheter-based treatment
- Measure pressures in the heart and pulmonary arteries when combined with right heart catheterisation

Who should have the test

Pulmonary angiography is not used as a routine screening test. It may be offered when detailed pictures of the pulmonary arteries could change your care, or when a catheter treatment may be performed during the same procedure.

Your healthcare team will consider other options if you are pregnant, have reduced kidney function, have previously reacted to contrast dye, or have a bleeding problem. These factors do not always prevent the test, but they may change the preparation, contrast amount, or choice of imaging.

Tell the team if you have had a previous reaction to injected contrast. An allergy to shellfish does not, by itself, mean that you are allergic to contrast dye.

How to prepare

Your hospital will give you instructions based on whether you will receive sedation. Sedation is medicine that helps you relax and may make you drowsy.

You may be asked not to eat for several hours beforehand. Rules for water and other clear drinks differ between hospitals, so follow the instructions you receive rather than using a general fasting rule.

Before the appointment, tell the team about:

Do not stop a prescribed medicine unless the team performing the procedure tells you to. A blood test may be arranged to check kidney function and blood clotting. If sedation is planned, arrange for someone to take you home.

- All prescription medicines, over-the-counter medicines, and supplements
- Blood-thinning medicines
- Diabetes medicines, including metformin
- Kidney disease or a recent change in kidney function
- Pregnancy or the possibility of pregnancy
- Previous contrast reactions, asthma, or serious allergies

What happens during the test

You will change into a gown and lie on an X-ray table. Staff will monitor your heartbeat, blood pressure, and oxygen level. An intravenous line may be placed for fluids or sedation.

The skin over the access vein is cleaned and numbed with local anaesthetic. You may feel a brief sting. The specialist then places the catheter into the vein and guides it through the right side of the heart using X-ray images. You should not usually feel the catheter moving inside the blood vessels, although you may notice pressure at the insertion site.

When contrast is injected, you may briefly feel warm or flushed. Some people notice a metallic taste. You may be asked to hold your breath for a few seconds while images are taken.

Afterward, the catheter is removed and pressure is applied to reduce bleeding. If the groin was used, you may need to lie flat during recovery. The appointment often takes one to two hours, but it can take longer if measurements or treatment are performed.

Understanding your results

A radiologist or interventional specialist examines how contrast moves through the pulmonary arteries. A typical study shows contrast filling the expected vessels without an abrupt cutoff or filling defect.

A filling defect is an area where contrast does not fill the vessel as expected. It can suggest a clot, but the appearance must be interpreted with your symptoms, previous scans, and other test results. The images may also show narrowing, an unusual vessel shape, or an abnormal

connection between arteries and veins.

There is no universal numerical reference range for the images. If pressures or blood tests are also recorded, ranges and interpretation vary by laboratory or centre, age, sex, pregnancy status, medicines, and clinical context.

What affects the results

Pulmonary angiography has fewer day-to-day biological influences than many blood tests. Eating, coffee, and ordinary activity do not usually change the appearance of the pulmonary arteries.

However, several factors can make the images less clear or change their interpretation:

If pressure measurements are taken, breathing, body position, sedation, hydration, catheter position, and heart rhythm can affect the numbers.

Kidney function does not usually make a blockage appear or disappear. It does affect how safely contrast can be used and may lead the team to reduce the contrast amount or choose another test. Pregnancy can also change the choice of test because both radiation and contrast exposure need individual consideration.

- Breathing or body movement during image capture
- Poor timing or uneven delivery of the contrast
- Slow blood flow caused by reduced heart function
- Overlapping blood vessels on two-dimensional images
- Previous surgery or naturally unusual blood vessel anatomy
- Treatment already started for a blood clot, which may change its size or appearance

Accuracy and limitations

Pulmonary angiography can provide highly detailed pictures and was historically treated as the reference test for pulmonary artery clots. It is not always right.

A small clot in a distant branch may be missed if the vessel is not filled well, the image is blurred by movement, or another vessel lies over it. Conversely, overlapping vessels, vessel narrowing, or imaging artefacts can sometimes look like a clot when none is present. Interpretation can differ between readers, especially for very small abnormalities.

Because pulmonary angiography is invasive, CTPA is usually the more practical test for

suspected acute pulmonary embolism. A ventilation-perfusion scan may be more suitable when CT contrast cannot be used. For long-standing clot-related pulmonary hypertension, several tests are often combined because no single image provides every necessary answer.

Risks and complications

A bruise, soreness, or a small amount of bleeding at the catheter site is common. Some people feel faint during needle or catheter procedures.

Less common complications include infection, damage to a blood vessel, a temporary abnormal heart rhythm as the catheter passes through the heart, or a blood clot at the access site. Pulmonary artery injury and serious bleeding are rare but important risks.

Contrast can cause nausea, itching, a rash, or an allergic-like reaction. Serious reactions are uncommon. Kidney injury is also a concern, particularly if kidney function is already significantly reduced or you are acutely unwell.

The test uses ionising radiation. The medical team balances this exposure against the expected benefit, with added consideration during pregnancy.

After discharge, contact the procedure team promptly for increasing bruising, persistent bleeding, worsening pain, redness, swelling, or discharge at the catheter site. Seek emergency help for severe breathlessness, chest pain, fainting, uncontrolled bleeding, or a rapidly enlarging swelling.

What happens next

A specialist may discuss the main findings soon after the procedure. A full written report may follow later, depending on the imaging service.

If no important blockage or vessel abnormality is found, your clinician will consider whether another cause needs investigation. An abnormal result may lead to medicines, further imaging, surgery, or a catheter-based procedure. In some cases, treatment can be performed during the angiography itself.

Routine follow-up should explain the findings, access-site care, medicine changes, and when you can return to usual activities.

Common questions

Can I drink coffee first?

If you have been told to fast, do not assume coffee is allowed. Milk or cream usually breaks a fast, and some sedation services also restrict black coffee. Follow the instructions from your hospital.

Does the time of day matter?

The arteries do not need to be imaged at a particular time. Appointment timing is mainly affected by fasting, medicine plans, kidney blood tests, and recovery arrangements.

Can I exercise beforehand?

Ordinary activity does not usually affect the images. Avoid strenuous exercise if it makes you breathless or unwell, and follow any specific instructions if pressure measurements are planned.

Will I be awake?

Most people receive local anaesthetic and may also receive light or moderate sedation. General anaesthesia is not routinely required, although it may be used for some treatments or individual needs.

Can I drive home afterward?

You should not drive after sedation. Even without sedation, the access site may limit movement, so arrange transport and follow the discharge instructions.

Is this the same as a CT pulmonary angiogram?

No. A CT pulmonary angiogram uses a CT scanner and contrast through an arm vein. Catheter pulmonary angiography places a catheter directly into the pulmonary arteries and can sometimes be combined with treatment.

Sources

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