TEST

Coronary angiography

Coronary angiography uses contrast dye and X-rays to show narrowing in the heart's arteries.

WHAT IT MEASURES
Narrowing and blood flow in the heart's arteries

SAMPLE
None, imaging

FASTING NEEDED?
Sometimes, especially if sedation or treatment is planned

HOW LONG IT TAKES
Several hours including preparation and recovery

RESULTS IN
Usually same day; reporting varies by catheterization laboratory

USED FOR
Diagnosis and treatment planning

MAIN LIMITATION
Anatomy alone cannot show whether every narrowing restricts blood flow

Overview

Coronary angiography is an invasive imaging test of the arteries supplying the heart muscle. A clinician passes a thin, flexible tube called a catheter into an artery, usually through the wrist or groin, and guides it toward the heart. Contrast dye is injected while X-ray images are taken.

The test can show narrowed or blocked arteries and help plan treatment. Sometimes angioplasty and stent placement can be performed during the same procedure.

Coronary angiography differs from a CT coronary angiogram, which uses a scanner and an injection into a vein without placing a catheter near the heart.

Why the test is ordered

Coronary angiography may be used to:

It is not usually a routine screening test for people without symptoms or other concerning findings. Less invasive tests are often considered first when the situation is stable.

- Investigate symptoms when earlier tests suggest coronary artery disease
- Assess a suspected heart attack or unstable symptoms
- Clarify uncertain stress-test or CT coronary angiogram results
- Plan angioplasty, stenting, or coronary artery bypass surgery
- Assess some heart valve, heart muscle, or coronary anatomy problems

Who should have the test

The test may be appropriate when knowing the location and severity of coronary narrowing could change treatment. The decision depends on your symptoms, previous results, medical history, and urgency.

During a heart attack or another emergency, angiography may be needed quickly because treatment can follow immediately. In stable cases, there is usually time to discuss alternatives, benefits, and risks.

Tell the cardiac team if you are or could be pregnant. Because X-rays are used, the team must weigh radiation exposure against the need for the test. An urgent test may still be recommended when the expected benefit is greater than the risk.

How to prepare

Follow your hospital's instructions because preparation varies between planned and emergency procedures.

You may need to avoid food for several hours. Instructions about clear fluids depend on the hospital and whether sedation or immediate treatment is planned.

Provide a complete list of medicines and supplements, especially blood thinners and diabetes medicines. Do not stop prescribed medicine unless the team responsible for the procedure tells you to.

Tell the team about:

Blood tests may be needed to check kidney function, blood counts, and clotting. Arrange transport home after a planned outpatient procedure, particularly if you will receive sedation.

- Any previous reaction to X-ray contrast dye
- Kidney disease, diabetes, bleeding problems, or pregnancy

- Medicines that affect blood clotting
- A recent illness or infection

What happens during the test

You lie on an X-ray table while staff monitor your heart rhythm, blood pressure, and oxygen level. You may receive medicine to help you relax, although many people remain awake.

The wrist or groin is cleaned and numbed with local anaesthetic. A small tube is placed in the artery, and the catheter is guided toward the heart. You should not feel it moving through the blood vessels.

Contrast dye is injected while images are recorded from several angles. You may briefly feel warm or flushed and may be asked to hold your breath or cough.

If an important narrowing is found, angioplasty and stent placement may sometimes be performed immediately. This should be covered during consent unless an emergency prevents prior discussion.

The catheter is then removed. Pressure, a compression band, or a closure device helps prevent bleeding. You usually remain under observation for several hours.

Understanding your results

A cardiologist examines the coronary arteries, contrast flow, and any narrowed or blocked areas. The report may estimate the percentage reduction in an artery's inner width.

This percentage is based on two-dimensional images and does not always show whether a narrowing meaningfully reduces blood flow. Pressure measurements, such as fractional flow reserve or instantaneous wave-free ratio, may be taken during the procedure.

Results may show:

There is no single universal reference range. Results must be interpreted alongside symptoms, medicines, previous procedures, and the wider clinical context.

- No important narrowing in the major coronary arteries
- One or more narrowed or blocked arteries
- Coronary spasm, unusual anatomy, or a problem with a previous stent or bypass graft
- A finding that requires another test before treatment is chosen

What affects the results

Coronary spasm can temporarily narrow an artery, while medicines such as nitroglycerin can widen it.

Overlapping vessels, movement, heavy calcium deposits, or limited viewing angles may hide a narrowing or make it look worse. Stents and bypass grafts can make the anatomy more complex.

Image quality may also be affected by a very fast or irregular heartbeat, difficulty keeping still, or restricted contrast use because of kidney concerns. Meals, exercise, and time of day do not usually alter a fixed narrowing.

Accuracy and limitations

Coronary angiography shows the open channel inside the major coronary arteries well, but it can miss disease in very small vessels. A reassuring angiogram therefore does not always explain ongoing symptoms.

Because it produces a two-dimensional outline of the artery's inner channel, angiography may not fully show plaque within the artery wall. Vessel overlap, foreshortening, and spasm can also affect estimates.

A visible narrowing does not always restrict blood flow enough to cause symptoms. Pressure-wire testing or a stress test may help determine its importance. Intravascular ultrasound or optical coherence tomography can provide detailed images inside an artery or stent.

For some people with stable symptoms, CT coronary angiography offers a less invasive alternative. The best test depends on the clinical question and whether immediate treatment may be needed.

Risks and complications

A small bruise, tenderness, or minor bleeding at the wrist or groin is common. Some people feel faint during needle or catheter placement.

Less common complications include a larger collection of blood under the skin, artery injury, infection, abnormal heart rhythm, kidney injury from contrast, or an allergic-like contrast reaction. Heart attack, stroke, major bleeding, and death are possible but uncommon.

Radiation is kept as low as reasonably practical. Individual risk depends on kidney function, bleeding risk, previous contrast reactions, the access site, and whether the procedure is planned or performed during an emergency.

What happens next

The cardiologist may explain the main findings before you leave, with a written report available later. Next steps may include medicine, lifestyle support, further testing, angioplasty, bypass surgery, or no immediate procedure.

Follow instructions about activity, driving, wound care, fluids, and restarting medicines. Mild soreness and a small, stable bruise can usually be monitored.

Contact the cardiac team promptly if the puncture site becomes increasingly painful, red, swollen, or starts draining fluid, or if you notice reduced urination after contrast.

Seek emergency help for severe or persistent chest pain, severe breathlessness, fainting, stroke-like symptoms, or heavy bleeding that does not stop with firm pressure. A hand or foot below the access site that becomes cold, pale, very painful, weak, or numb also needs urgent assessment.

Common questions

Can I drink coffee before coronary angiography?

Not if your instructions require fasting or allow only clear fluids. Coffee with milk is not a clear fluid, and even black coffee may be restricted. Follow your catheterization laboratory's instructions.

Does the time of day matter?

The images are not normally affected by appointment time, although timing changes when you must stop eating and when you may go home.

Can I exercise beforehand?

Ordinary activity does not usually change a fixed narrowing. Avoid strenuous exercise if advised or if it causes chest pain, breathlessness, dizziness, or other symptoms.

Will I be awake?

Usually, yes. Local anaesthetic numbs the access site, and light sedation may help you relax. General anaesthesia is not routinely needed.

Is the contrast dye the same as shellfish iodine?

Shellfish allergy alone does not mean you are allergic to X-ray contrast. Tell the team about previous contrast reactions and all significant allergies.

Can I drive home afterward?

You will usually need someone else to take you home. Restrictions depend on the access site, sedation, findings, and whether angioplasty was performed.

Sources

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