PROCEDURE

Cardiac catheterization

Cardiac catheterization uses a thin tube to examine or treat the heart and its blood vessels.

PURPOSE
Diagnose heart problems and sometimes open narrowed coronary arteries

PROCEDURE TYPE
Diagnostic and therapeutic, minimally invasive catheter procedure

WHERE IT IS DONE
Hospital cardiac catheterization laboratory

ANAESTHESIA
Local anaesthesia, often with moderate sedation

HOW LONG IT TAKES
30 to 60 minutes; longer if treatment follows

PREPARATION
Fasting, medication review, blood tests, and arranged transport

RECOVERY
Same day or overnight; do not drive yourself home

MAIN RISKS
Bleeding, artery injury, kidney injury, allergic reaction

RESULTS
Initial findings immediately; treatment plan before discharge or follow-up

Overview

Cardiac catheterization examines the heart, measures how it is working, or provides treatment. A doctor guides a thin, flexible tube called a catheter through a blood vessel in the wrist, groin, arm, or neck and into the heart.

Coronary angiography uses contrast dye and X-rays to show the arteries supplying the heart. Right-heart catheterization measures pressures inside the heart and lungs. A small heart tissue sample, called a biopsy, may also be taken.

Treatment can sometimes be performed during the procedure. Angioplasty uses a small balloon to widen a narrowed coronary artery, and a mesh tube called a stent may be placed to keep it open.

Why the procedure is performed

Your healthcare team may recommend cardiac catheterization to:

In an emergency, it may identify and open an artery causing a heart attack. In nonurgent cases, the findings may support treatment with medicines, lifestyle changes, a later procedure, or surgery.

- Look for narrowed or blocked coronary arteries
- Investigate chest discomfort, breathlessness, or abnormal test results
- Measure pressures and oxygen levels inside the heart
- Assess heart valves, congenital conditions, or heart function
- Take a sample of heart muscle
- Open a narrowed artery with angioplasty and a stent

Who should and should not have it

Cardiac catheterization may be appropriate when less invasive tests cannot provide enough information or treatment may be needed at the same time. The expected benefit must be weighed against the risks.

A nonurgent procedure may be delayed because of active bleeding, infection near the insertion site, severely uncontrolled blood pressure, or another condition that needs stabilizing first.

Tell your team if you have kidney disease, a previous contrast dye reaction, a bleeding disorder, difficulty lying flat, or pregnancy or possible pregnancy. These issues do not always prevent catheterization, but preparation, contrast use, radiation protection, insertion site, or monitoring may need to change.

Some people may be better served by noninvasive testing, medicines, or heart bypass surgery. The choice depends on symptoms, test findings, general health, preferences, and whether catheter treatment is likely to help.

How to prepare

Follow your treating facility's instructions, because preparation varies by procedure, medicines, and type of sedation.

You may need to stop eating and drinking for several hours. Follow the exact fasting time provided. Do not stop prescription medicines unless the treating team specifically tells you to.

Make sure the team knows about:

You may have blood tests to check kidney function, blood counts, and clotting, as well as an electrocardiogram.

Arrange for someone to take you home. If sedation is planned, you may also need a responsible adult to stay with you after discharge.

- Blood thinners, including antiplatelet medicines
- Diabetes medicines or insulin
- Kidney problems or dialysis
- Allergies or previous reactions to contrast dye
- Bleeding problems
- Pregnancy or possible pregnancy
- All prescription medicines, nonprescription medicines, and supplements

What happens during the procedure

You will lie on an X-ray table in a cardiac catheterization laboratory. Patches monitor your heart rhythm, a cuff checks your blood pressure, and an intravenous line provides medicines and fluids.

The insertion site is cleaned and numbed with local anaesthetic. Sedation may make you relaxed or sleepy, but many people remain awake.

The doctor places a short tube into a blood vessel, usually at the wrist or groin, then guides the catheter using live X-ray images. You generally cannot feel it moving inside the blood vessels.

Contrast dye used during coronary angiography may cause brief warmth or flushing. You may be asked to hold your breath or cough. The team can measure pressures, take blood samples, perform imaging, or collect tissue. Angioplasty and stent placement may follow if planned or covered during consent.

After the catheter is removed, pressure, a wrist compression band, or a closure device controls bleeding.

Recovery and what to expect afterward

Pain: Mild tenderness or bruising is common and should gradually improve. Tell the team promptly if pain or swelling increases.

Eating: You can usually eat and drink once alert unless another procedure is planned. Fluids may be encouraged after contrast dye when appropriate.

Activity: After a groin procedure, you may need to lie flat temporarily. After a wrist procedure, limit use of that arm. Avoid strenuous exercise and heavy lifting for the period in your discharge instructions, and keep the site clean and dry.

Driving: Do not drive yourself home. Sedation can affect judgment and reaction time even if you feel normal. Follow instructions about when driving can resume.

Work: Many people return to light work within a few days. Recovery may take longer after angioplasty, for jobs involving lifting, or if complications occur.

You may go home the same day or stay overnight after treatment, a late procedure, or when closer observation is needed.

Risks and possible complications

Bleeding and bruising at the catheter site are among the main risks. Less often, the blood vessel may be damaged or blood may collect under the skin.

Other possible complications include:

Serious complications are uncommon. Risk may be higher with kidney disease, bleeding problems, older age, severe heart disease, or an emergency procedure. Your team should explain your individual risks before consent.

- Infection
- An allergic reaction to contrast dye or medicines
- Temporary or lasting kidney injury
- An abnormal heart rhythm
- A blood clot or blood vessel injury
- Damage to a heart artery or structure
- Heart attack or stroke
- Radiation exposure
- Emergency surgery or death

Results and follow up

Initial findings are usually available immediately. The doctor may explain whether arteries are narrowed, pressures are abnormal, or treatment was performed. Biopsy results usually take several days.

Before discharge, you should receive instructions about wound care, activity, medicines, and follow-up. If you received a stent, take prescribed antiplatelet medicines exactly as directed. Do not stop them without speaking with the team responsible for your heart care.

Follow-up may review the insertion site, symptoms, medicines, and longer-term treatment plan.

Alternatives

Alternatives depend on whether catheterization is being considered for diagnosis, pressure measurement, or treatment.

An ECG, echocardiogram, or stress test can assess rhythm, heart structure, pumping function, or reduced blood flow without a catheter, but cannot provide the same direct images or pressure measurements.

CT coronary angiography can show coronary arteries but still uses X-rays and usually contrast dye. It cannot open an artery. Cardiac MRI provides detailed images without X-rays but cannot replace every catheter measurement or place a stent.

Medicines and risk-factor changes may be suitable for some stable coronary artery problems. Coronary artery bypass surgery is more invasive but may provide better results for several or complex blockages.

In some nonurgent situations, delaying testing may be reasonable, although this can prolong uncertainty or delay treatment of a significant problem.

When to call your healthcare team

Contact your healthcare team promptly for increasing tenderness, redness, warmth, drainage, or a new lump at the insertion site. Also call about fever, worsening bruising, new hand or leg numbness, or pain that is not controlled as instructed.

Seek emergency help for:

- Bleeding that does not stop with firm pressure
- Rapidly increasing swelling at the insertion site
- New chest pain, severe breathlessness, or fainting
- Sudden weakness, facial drooping, confusion, or trouble speaking
- A hand, arm, foot, or leg that becomes cold, pale, blue, or severely painful

Common questions

Will I be asleep?

Usually not. Local anaesthetic numbs the site, and moderate sedation may make you relaxed or sleepy. General anaesthesia is used only in selected cases.

Can I drive home?

No. Arrange a ride and follow your discharge instructions about when driving can resume.

How painful is cardiac catheterization?

You may feel the numbing injection, pressure at the insertion site, and brief warmth from contrast dye. Most people do not feel the catheter moving.

When will I know the results?

Main findings are usually explained soon afterward. Biopsy results and some treatment decisions may take several days.

What happens if the doctor finds a blockage?

It may be treated immediately with angioplasty and a stent if discussed beforehand. Otherwise, treatment may involve medicines, a later catheter procedure, or bypass surgery.

Will I have a scar?

The puncture may leave a tiny mark, but the procedure does not usually require a large incision.

Sources

- National Heart, Lung, and Blood Institute. Cardiac Catheterization
- American Heart Association. Cardiac Catheterization
- NHS. Cardiac catheterisation and coronary angiography
- Mayo Clinic. Cardiac catheterization

- American College of Radiology. Manual on Contrast Media
- American College of Cardiology, American Heart Association, and Society for Cardiovascular Angiography and Interventions. 2021 Guideline for Coronary Artery Revascularization