PROCEDURE

Left heart catheterization

Left heart catheterization uses a thin tube passed through an artery to measure heart pressure and often image the coronary arteries.

PURPOSE
Measure left-heart pressures and assess coronary arteries or valves

PROCEDURE TYPE
Diagnostic, sometimes therapeutic; minimally invasive catheter procedure

WHERE IT IS DONE
Cardiac catheterization laboratory, usually as a day procedure

ANAESTHESIA
Local anaesthesia, often with moderate sedation

HOW LONG IT TAKES
About 30 to 60 minutes; treatment takes longer

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

RECOVERY
Usually same day; no driving for at least 24 hours

MAIN RISKS
Bleeding, artery injury, kidney injury, and contrast reaction

RESULTS
Pressure and angiogram findings are usually available immediately

Overview

Left heart catheterization is a procedure used to examine the left side of your heart. A clinician passes a thin, flexible tube called a catheter through an artery in your wrist, arm, or groin and guides it toward your heart.

The catheter can measure pressure inside the heart and across the aortic valve, which controls blood flow from the heart to the body. It may also be used to inject contrast dye so the heart chambers or coronary arteries appear on X-ray images.

Left heart catheterization and coronary angiography are closely related but are not exactly the same. Coronary angiography uses contrast dye to look for narrowed or blocked heart arteries. The procedures are often performed together.

If a significant narrowing is found, treatment with a balloon or stent may sometimes be performed during the same session. This is called percutaneous coronary intervention, or PCI.

Why the procedure is performed

You may be offered left heart catheterization when your healthcare team needs information that cannot be obtained clearly enough from symptoms, blood tests, or non-invasive heart scans.

Reasons may include:

In an emergency, coronary angiography and possible PCI may be used to find and open an artery involved in a heart attack.

- Finding narrowed or blocked coronary arteries
- Measuring pressure inside the left ventricle, the heart's main pumping chamber
- Assessing the aortic or mitral heart valves
- Investigating unexplained chest discomfort, breathlessness, or abnormal test results
- Planning valve surgery, coronary bypass surgery, or another heart procedure
- Evaluating certain heart muscle or congenital heart conditions
- Treating a coronary artery narrowing with a balloon or stent

Who should and should not have it

The procedure may be appropriate when the result is likely to change your diagnosis, treatment, or plans for another heart procedure. It can be especially useful when non-invasive tests are unclear or suggest a higher-risk heart problem.

It is not the right test for everyone. An elective procedure may be delayed or avoided if the expected information would not change your care.

Your team will consider extra precautions or a different test if you have:

A mechanical aortic valve generally should not be crossed with a catheter. Coronary angiography may still be possible without entering the left ventricle.

Some of these concerns are not absolute reasons to avoid catheterization. In urgent situations, the benefit may outweigh the added risk. Your team should explain why the procedure is being recommended in your circumstances.

- Active bleeding or a serious untreated bleeding problem
- Acute kidney injury or advanced kidney disease
- A previous serious reaction to contrast dye
- An active infection or unexplained fever
- Pregnancy, because the procedure uses X-rays
- Severe anaemia or another unstable medical condition
- Difficulty taking medicines needed after a possible coronary stent

How to prepare

Follow the treating facility's own instructions, because they take priority over general advice. Instructions can differ based on the planned procedure, your medicines, kidney function, and whether sedation will be used.

You may be asked not to eat or drink for several hours beforehand. Take only the medicines the facility has told you to take.

Make sure your team knows about:

Do not stop a blood thinner or antiplatelet medicine on your own. Stopping some heart medicines can be harmful, particularly if you already have a coronary stent.

Blood tests may be used to check kidney function, blood count, and clotting. An electrocardiogram, or ECG, may also be performed.

Arrange for someone to take you home. You should not drive yourself after sedation or immediately after an artery has been punctured.

- Blood thinners and antiplatelet medicines
- Diabetes medicines, including insulin
- Kidney disease or previous kidney injury
- Previous reactions to contrast dye
- Bleeding conditions
- Pregnancy or possible pregnancy
- All prescription medicines, non-prescription medicines, and supplements

What happens during the procedure

You will lie on an X-ray table in a cardiac catheterization laboratory. Staff will attach monitors to check your heart rhythm, blood pressure, and oxygen level. An intravenous line is usually placed in your arm.

The skin at your wrist or groin is cleaned. Local anaesthetic numbs the area. You may also receive moderate sedation, which helps you relax but usually leaves you awake and able to follow instructions.

A short tube called a sheath is placed into the artery. The clinician guides a catheter through the blood vessels using moving X-ray images. You should not feel the catheter travelling inside your arteries.

The catheter may be passed into the left ventricle to measure pressure. Contrast dye may be injected into the coronary arteries or heart chamber. The dye can cause a brief warm or flushed feeling.

You may notice pressure at the access site or a short-lived skipped heartbeat. Tell the team immediately if you develop chest pain, breathing difficulty, itching, or other discomfort.

If a narrowing needs treatment and this was discussed in advance, the clinician may perform balloon angioplasty and insert a stent. Otherwise, treatment options can be reviewed afterward.

At the end, the catheter and sheath are removed. Pressure, a wrist compression band, or a closure device is used to seal the artery.

Recovery and what to expect afterward

Mild soreness and bruising at the wrist or groin are common. The discomfort should gradually improve rather than become stronger. Follow your facility's advice about pain relief.

You can usually eat and drink once you are fully alert. Fluids may help your body clear the contrast, but do not increase fluids if you have been given a fluid restriction for heart or kidney disease.

Staff will monitor your pulse, blood pressure, access site, and circulation in the affected hand or leg. After a groin procedure, you may need to lie flat for a period. After a wrist procedure, a compression band is loosened gradually.

Avoid strenuous exercise, heavy lifting, and forceful use of the affected arm or leg for the period stated in your discharge instructions. Gentle walking is usually encouraged once staff say it is safe.

Do not drive yourself home. Many facilities advise no driving for at least 24 hours, with longer restrictions after a heart attack, PCI, or certain complications. Follow the restriction given to you.

People with desk-based jobs may return within a few days after an uncomplicated diagnostic procedure. Physical work may require more time, especially after groin access or PCI.

Risks and possible complications

Most people complete the procedure without a major problem, but complications are possible.

Bleeding, tenderness, and bruising can occur where the artery was entered. Less commonly, the artery may become blocked, develop a collection of blood, or require further treatment.

Other possible complications include:

Serious complications are uncommon, but your individual risk is affected by your general health, kidney function, bleeding risk, reason for the procedure, and whether treatment is also performed.

- An allergic-like reaction to contrast dye
- Temporary or lasting kidney injury from contrast
- Abnormal heart rhythms
- Infection at the access site
- Damage to a blood vessel or heart structure
- Blood clots or cholesterol debris travelling through an artery
- Heart attack or stroke
- Radiation-related harm
- Emergency surgery or death

Results and follow up

Pressure measurements and angiogram images are available during the procedure. The clinician may explain the main findings before you leave, although sedation can make details difficult to remember.

A formal report may describe heart pressures, valve findings, pumping function, and the location and severity of any coronary narrowing. Ask whether someone should be present

when the results are discussed.

Routine follow-up may involve reviewing medicines, risk factors, access-site healing, and treatment choices. Possible next steps include medicine changes, PCI, valve treatment, bypass surgery, further testing, or continued monitoring.

If a stent was inserted, take prescribed antiplatelet medicines exactly as directed. Do not stop them without advice from the team responsible for your heart care.

Alternatives

The best alternative depends on the question the procedure is meant to answer.

A coronary CT angiogram can show coronary artery narrowing without placing a catheter in an artery. It still uses contrast and radiation, cannot directly measure heart pressures, and cannot treat a blockage during the scan.

A stress test can show whether exercise or medicine causes reduced blood flow to the heart. It is less invasive but does not show coronary anatomy as directly and cannot treat a narrowing.

An echocardiogram uses ultrasound to assess heart pumping and valves. Cardiac MRI can provide more detailed images of heart muscle and blood flow. Neither directly measures pressure inside the left ventricle, and neither can place a coronary stent.

Medicine and observation may be reasonable when the chance of a serious blockage is low or when a result would not change treatment. This avoids an invasive test but may leave uncertainty about coronary anatomy or heart pressures.

In a suspected heart attack or another unstable condition, non-invasive tests may delay treatment and may not offer an equivalent alternative.

When to call your healthcare team

Call emergency services for:

Contact your healthcare team promptly for increasing swelling, a rapidly enlarging bruise, worsening access-site pain, fever, drainage, spreading redness, a new rash, or much less urine than usual.

A small stable bruise and mild tenderness can usually be discussed at routine follow-up if they are improving.

- Chest pain that is severe, persistent, or accompanied by sweating or breathlessness

- Sudden weakness, facial drooping, confusion, or trouble speaking
- Fainting or severe difficulty breathing
- Bleeding that does not stop after firm, continuous pressure
- A hand or foot that becomes cold, pale, blue, numb, or difficult to move

Common questions

Will I be asleep?

Usually not. Local anaesthetic numbs the access site, and moderate sedation may make you relaxed or sleepy. General anaesthesia is not routinely needed.

Can I drive home?

No. Arrange for someone else to drive you. Follow the facility's instructions about when you may drive again.

How painful is it?

You may feel a brief sting from the local anaesthetic and pressure where the catheter enters. Contrast can cause temporary warmth. Tell the team about significant pain at any time.

When will I know the results?

The main pressure and angiogram findings are usually known immediately. A fuller explanation may happen before discharge or at a follow-up appointment.

Can a stent be placed at the same time?

Sometimes. This must be clinically appropriate and should be discussed during consent whenever possible. A stent also means taking antiplatelet medicines afterward.

Is this the same as a coronary angiogram?

Not exactly. Left heart catheterization measures pressure inside the left heart. Coronary angiography images the heart arteries. They are often performed together.

Sources

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