PROCEDURE

# Myocardial biopsy

A myocardial biopsy uses a thin catheter to remove tiny heart muscle samples for laboratory testing.

**PURPOSE**
Remove heart muscle samples for laboratory diagnosis

**PROCEDURE TYPE**
Diagnostic, minimally invasive catheter procedure

**WHERE IT IS DONE**
Cardiac catheterization laboratory, usually outpatient

**ANAESTHESIA**
Local anaesthesia; moderate sedation may be offered

**HOW LONG IT TAKES**
About 30 to 60 minutes

**PREPARATION**
Fasting and medication changes according to facility instructions

**RECOVERY**
Usually same day; arrange a ride home

**MAIN RISKS**
Bleeding, abnormal heart rhythm, perforation, blood vessel injury

**RESULTS**
Initial findings soon; laboratory analysis usually within several days

## Overview

A myocardial biopsy, usually called an endomyocardial biopsy , removes very small pieces of tissue from the heart muscle. A laboratory examines the samples for inflammation, infection, abnormal deposits, transplant rejection, or other changes.

The procedure is usually performed through a blood vessel rather than through an incision in the chest. A specialist passes a thin tube called a catheter through a vein, often in your neck or groin, and guides it into your heart. A small instrument at the catheter tip takes several tissue samples.

A biopsy can provide information that scans and blood tests cannot. However, it is not a routine test for everyone with heart failure, an abnormal heart rhythm, or suspected inflammation of the heart.

## Why the procedure is performed

Your healthcare team may recommend a myocardial biopsy when identifying the exact type of heart damage could change your treatment. Current guidance supports selective use rather than biopsy for every unexplained heart problem.[1-3]

Reasons can include:

The procedure is especially useful when a tissue diagnosis could lead to a specific treatment. For example, some uncommon forms of inflammation need different care from more typical forms of myocarditis.

- Investigating certain cases of sudden or unexplained heart failure
- Looking for specific forms of myocarditis, meaning heart muscle inflammation
- Checking for diseases that leave abnormal material in the heart
- Investigating heart damage linked to certain medicines or immune conditions
- Monitoring for rejection after a heart transplant
- Examining a suspected heart mass in selected situations

## Who should and should not have it

A myocardial biopsy may be appropriate if your symptoms, heart tests, and medical history suggest a condition that can only be confirmed-or can be classified more accurately-by examining heart tissue.

It may not be the right test when non-invasive testing already provides enough information, the result would not change treatment, or the chance of obtaining useful tissue is low. Heart disease can be patchy, so a tiny sample may miss the affected area.

The procedure may be delayed or a different approach may be chosen if you have:

These issues are not always permanent barriers. Your team may adjust medicines, use another blood vessel, target a different part of the heart, or choose another test.

- A bleeding or clotting problem that cannot first be made safer
- A blood clot along the planned catheter route or inside the heart
- An infection where the catheter would enter the skin
- Heart valve surgery, an artificial valve, or anatomy that blocks the usual route
- A medical condition that makes catheter placement unsafe at that time

## How to prepare

Follow the treating facility's instructions, even if they differ from general information here. Its own instructions take priority because preparation depends on the planned access site, anaesthesia, and your medicines.

You may be asked not to eat or drink for several hours. Ask which usual medicines you should take on the day of the procedure.

Tell the team about all prescription medicines, over-the-counter products, and supplements you use. Blood thinners and medicines that affect platelets may require a specific plan. Do not stop them on your own because stopping can also carry risks.

Tell the facility if you have a bleeding disorder, allergies, kidney disease, an implanted heart device, or any previous reaction to sedation or medical contrast. Contrast dye is not required for every biopsy.

Arrange for someone to take you home. Wear comfortable clothing and leave jewellery and valuables at home.

## What happens during the procedure

You will change into a gown and usually have an intravenous line placed. The team monitors your heart rhythm, blood pressure, and oxygen level.

You are generally awake. The skin over the access site is cleaned, and local anaesthetic numbs the area. You may also receive medicine to help you relax. General anaesthesia is sometimes used in children or in specific clinical situations.

The specialist places a short tube called a sheath into a blood vessel, most often a vein in the neck or groin. Using live X-ray imaging, and sometimes ultrasound, the specialist guides a catheter into the heart.

A small grasping instrument called a bioptome passes through the catheter. It removes several tiny samples, usually from the wall between the heart's lower chambers. You may notice pressure, but taking the samples should not feel like tissue being cut.

Most biopsies sample the right side of the heart. Selected conditions may require tissue from the left side, which usually involves entry through an artery.

After the samples are taken, the catheter and sheath are removed. The team applies pressure or uses a closure device to reduce bleeding.

## Recovery and what to expect afterward

The access site may feel tender or bruised. Mild soreness usually improves over the next few days. Tell the team before leaving if pain is increasing rather than settling.

You can usually drink and eat once you are fully alert, unless another test or medical condition requires continued fasting.

You will rest while staff monitor your heart rhythm and check the access site. Follow the facility's instructions about lifting, exercise, bathing, and wound care. Strenuous activity and heavy lifting are commonly restricted for a short period.

Do not drive yourself home. If you received sedation, do not drive for at least 24 hours or for longer if your facility instructs you to wait.

Many people return to desk work within a day or two. Work involving heavy lifting or strenuous activity may require more time. An overnight stay may be needed if you are unwell, have a complication, or are already in hospital for a heart condition.

## Risks and possible complications

Most people complete the procedure without a serious problem, but it involves placing instruments inside the heart.

Possible complications include bleeding, bruising, infection, or damage to the blood vessel used for access. Neck access can occasionally cause air to collect around a lung, called a pneumothorax.

The bioptome can trigger an abnormal heart rhythm. It can also injure a heart valve or make a small hole in the heart wall. Blood may then collect around the heart and interfere with its pumping, a condition called cardiac tamponade. This requires urgent treatment.

Blood clots, stroke, heart attack, or emergency surgery are also possible, particularly when the left side of the heart is sampled, but these are not expected outcomes. Your individual risk is affected by the biopsy route, your heart condition, and other health problems.

## Results and follow up

A pathologist examines the samples under a microscope. The laboratory may use special stains, immune markers, genetic methods, or tests for infectious material when appropriate.

Some information may be available quickly, especially after a transplant. A fuller report usually

takes several days, and specialised tests can take longer.

A negative result does not always rule out disease. Some conditions affect scattered areas, and the samples may come from tissue that looks normal. Your healthcare team will interpret the biopsy alongside scans, blood tests, heart rhythm testing, and your clinical history.

Routine follow-up should cover what the tissue showed, whether the result is conclusive, and whether treatment or further testing is needed. Keep the access site clean and attend any planned heart or transplant appointments.

## Alternatives

The alternatives depend on what your team is trying to find. No single test provides exactly the same information as heart tissue.

Cardiac magnetic resonance imaging , or cardiac MRI, can show inflammation, scarring, and abnormal deposits without entering the heart. It cannot always identify the exact cell type or cause, and it may miss small or patchy areas.

An echocardiogram , which uses ultrasound, shows heart structure, pumping, valves, and fluid around the heart. It does not provide a microscopic diagnosis.

Blood tests can look for infection, inflammation, abnormal proteins, immune disease, or genetic changes. They are less invasive but may only support a diagnosis rather than confirm what is happening inside the heart muscle.

Observation or treatment based on the most likely diagnosis avoids the procedure. The trade-off is uncertainty, including the possibility of delaying a treatment that depends on identifying a specific disease.

After heart transplantation, blood-based monitoring tests may reduce the need for routine biopsies in some people. They are not suitable in every situation, and an abnormal result may still need confirmation with a biopsy.[4]

## When to call your healthcare team

Call emergency services if you develop:

Contact your healthcare team promptly for increasing pain, a growing lump, repeated palpitations, fever, drainage, spreading redness, or worsening swelling at the access site. These need attention but are not automatically emergencies.

For routine questions about bruising, activity, wound care, or results, use the contact details

provided by the treating facility.

- Severe or persistent chest pain
- Major trouble breathing, fainting, or sudden weakness
- Bleeding that does not stop after firm pressure
- Signs of stroke, such as facial drooping or difficulty speaking

## Common questions

Will I be asleep?

Usually not. Local anaesthetic numbs the access site, and you may receive moderate sedation to help you relax. General anaesthesia is reserved for selected situations.

Can I drive home?

No. Arrange for someone to take you home. Sedation, the catheter site, and your underlying heart condition can make driving unsafe immediately afterward.

How painful is a myocardial biopsy?

The numbing injection may sting briefly, and you may feel pressure as the catheter is placed. The heart tissue itself does not sense cutting in the same way as skin. Mild access-site soreness afterward is common.

When will I know the results?

Your specialist may share initial findings within a short time, but laboratory examination generally takes several days. Special infection, immune, or genetic testing may take longer.

Can the biopsy miss the problem?

Yes. Only tiny areas are sampled, and some heart conditions are patchy. Imaging may help guide sampling, but a normal biopsy does not exclude every possible condition.

## Sources

- [1] Cooper LT, Baughman KL, Feldman AM, et al. "The Role of Endomyocardial Biopsy in the Management of Cardiovascular Disease." Circulation . 2007;116:2216-2233.
- [2] Seferovi PM, Tsutsui H, McNamara DM, et al. "Heart Failure Association of the ESC, Heart Failure Society of America and Japanese Heart Failure Society Position Statement on Endomyocardial Biopsy." European Journal of Heart Failure . 2021;23:854-871.

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- [4] Velleca A, Shullo MA, Dhital K, et al. "The International Society for Heart and Lung Transplantation Guidelines for the Care of Heart Transplant Recipients." Journal of Heart and Lung Transplantation . 2023;42:e1-e141.