TEST

Heart PET scan

A heart PET scan uses a radioactive tracer to assess heart blood flow, muscle function, metabolism, or inflammation.

WHAT IT MEASURES
Heart blood flow, muscle function, metabolism, or inflammation

SAMPLE
None

FASTING NEEDED?
Sometimes, usually 4-18 hours based on scan purpose

HOW LONG IT TAKES
About 1-3 hours

RESULTS IN
Usually 1-3 days; laboratory turnaround varies

USED FOR
Diagnosis, treatment planning, and monitoring

MAIN LIMITATION
Preparation errors can hide or mimic abnormal tracer uptake

Overview

A heart positron emission tomography, or PET, scan creates pictures of how your heart muscle is working. It uses a small amount of radioactive material called a tracer . The tracer collects in heart tissue and gives off signals that a scanner turns into images.

The scan is usually combined with computed tomography, called PET/CT. The CT part helps locate the PET findings and may also provide information about the heart's structure. A low-dose CT used for positioning is different from a full diagnostic heart CT.

There are several types of heart PET scan. A myocardial perfusion PET examines blood flow to the heart muscle, often at rest and during medicine-induced stress. Other PET scans assess whether damaged-looking muscle is still alive or look for unusual inflammation, such as inflammation associated with cardiac sarcoidosis.

The purpose of your scan determines the tracer, preparation, images, and meaning of the results.

Why the test is ordered

A heart PET scan may be ordered to:

PET may be selected when another heart test was unclear or when image quality is likely to be better with PET. Measuring blood flow can also reveal widespread disease that may be difficult to see by comparing images alone.

- Look for reduced blood flow caused by narrowed coronary arteries
- Measure blood flow through small as well as large heart vessels
- Assess heart muscle after a heart attack or when pumping is reduced
- Find heart muscle that may recover after blood flow is restored
- Look for or monitor inflammation in the heart
- Help plan treatment or assess how well treatment is working

Who should have the test

This is not a routine screening test for everyone. It is generally used when your symptoms, medical history, examination, or results from another test suggest that detailed information about heart blood flow or tissue activity would help guide care.

Your clinician may choose another test instead. Options include an exercise stress test, stress echocardiogram, cardiac MRI, coronary CT angiography, or coronary angiography. Each answers a different question.

Tell the imaging team before the appointment if you are pregnant, could be pregnant, or are breastfeeding. Also tell them if you have diabetes, asthma or other serious lung disease, kidney disease, or difficulty lying flat. These details can affect preparation or the medicine used for stress.

How to prepare

Follow the instructions from your imaging center. Preparation is not the same for every heart PET protocol.

For a blood-flow or stress PET scan, you will usually need to avoid food for several hours. Many centers require no caffeine for at least 12 hours, and sometimes 24 hours. Coffee, tea, cola, energy drinks, chocolate, decaffeinated products, and some medicines can contain caffeine.

For an inflammation scan using the tracer fluorodeoxyglucose, or FDG, you may receive special instructions about eating fewer carbohydrates, eating more fat, and fasting. This reduces normal heart muscle uptake so that inflammation is easier to see. A scan assessing living heart muscle may use different glucose or insulin preparation.

Ask for specific instructions about:

Do not stop heart or diabetes medicines unless the team arranging the test tells you how to manage them. Wear comfortable clothing and leave metal jewelry at home if requested.

- Prescription and non-prescription medicines
- Diabetes medicines and insulin
- Caffeine, nicotine, food, and drinks
- Exercise before the scan

What happens during the test

A member of the team places a small intravenous line, or IV, in your arm. You lie on a narrow table that moves through the PET scanner. The scanner is shaped like a wide ring rather than a long enclosed tunnel.

For a blood-flow study, images are often taken at rest and during stress. Instead of exercising, most PET centers give medicine through the IV to increase blood flow through the coronary arteries. You may briefly feel flushed, short of breath, light-headed, or notice chest pressure. Your heart rhythm, blood pressure, and symptoms are monitored.

The tracer is injected through the IV. You need to lie still while the scanner records its distribution. Depending on the protocol, there may be a waiting period between the injection and imaging.

An FDG scan may involve a longer waiting period while the tracer moves through your body. The scan itself is painless, although lying still can be uncomfortable.

Understanding your results

A specialist in nuclear medicine or heart imaging interprets the pictures and sends a report to the clinician who ordered the test.

A perfusion report may describe:

Reduced flow during stress that improves at rest may suggest ischemia , meaning the heart

muscle is not receiving enough blood when demand rises. A fixed area of reduced tracer uptake can be associated with scar, but artifacts and other conditions can look similar.

An FDG report describes where active glucose uptake is present. The pattern must be interpreted alongside your preparation, other scans, symptoms, and medical history. Uptake does not by itself prove a particular cause.

Ranges and interpretation vary by imaging laboratory, age, sex, pregnancy status, medicines, tracer, scanner, and clinical context. A result should not be interpreted from one number alone.

- Blood flow at rest and during stress
- Areas with reduced blood flow during stress
- Areas with reduced flow at both rest and stress
- Overall blood flow and blood-flow reserve
- Heart size, wall movement, and pumping function

What affects the results

Preparation has an unusually important effect on heart PET results.

Caffeine can block the effect of medicines used to produce stress. This may hide reduced blood flow and make a stress scan look more reassuring than it should.

Food, blood glucose, insulin, and diabetes medicines affect FDG uptake. High blood glucose may reduce image quality. For inflammation imaging, normal heart muscle can take up FDG if the diet and fasting preparation did not suppress it. This can mimic inflammation or make the scan difficult to interpret.

Other influences include:

Kidney function usually affects heart PET less than tests requiring iodinated CT contrast. However, kidney disease can influence overall cardiovascular findings and the choice of additional imaging. Tell the team about any recent procedures or major changes in treatment.

- Strenuous recent exercise, which changes muscle glucose use
- Nicotine, which affects heart rate and blood vessels
- Medicines that alter blood flow, heart rate, glucose, or inflammation
- Movement, breathing, or difficulty staying in one position
- Misalignment between the PET and CT images

- Body size and implanted devices, which may create image artifacts
- The timing and dose of the tracer

Accuracy and limitations

Heart perfusion PET generally produces clear images and can measure blood flow rather than only comparing one area with another. This can help identify disease affecting several coronary arteries or the heart's smallest vessels.

No scan is completely accurate. PET can miss reduced blood flow if caffeine interferes with the stress medicine, stress is inadequate, or abnormalities are small. Movement and PET/CT misalignment can create an apparent defect even when blood flow is normal.

FDG PET can show uptake when there is no active heart inflammation, especially when normal muscle uptake was not fully suppressed. It can also miss inflammation that is small, inactive, or reduced by treatment.

PET shows tissue activity and blood flow but does not provide the same anatomical detail as coronary CT angiography or invasive coronary angiography. Cardiac MRI may be better for some questions about scar, structure, or inflammation and does not use ionizing radiation. Coronary angiography may be needed when a detailed view of an artery or immediate treatment is required.

Risks and complications

The IV can cause a small bruise or soreness, and some people feel faint during needle placement. Infection from an IV is uncommon.

The scan exposes you to a limited amount of ionizing radiation from the tracer and usually the CT component. The amount differs by protocol. The tracer does not remain radioactive permanently and leaves the body over time.

Stress medicines commonly cause brief flushing, headache, breathlessness, dizziness, or chest discomfort. The team monitors you because significant heart rhythm, breathing, or blood pressure reactions can occur, although serious complications are uncommon.

Seek emergency help for chest pain that does not settle, severe trouble breathing, fainting, or swelling of the face or throat after leaving the center. Mild IV-site tenderness or a small bruise can usually be discussed during routine follow-up; increasing redness, swelling, or pain should be reported promptly.

What happens next

You can usually return to normal activities after the scan. Drinking fluids may help your body clear the tracer, unless you have been told to limit fluids.

The clinician who ordered the test will review the report with your symptoms and other results. A normal study may need no further testing, or follow-up may continue for the original symptoms. An abnormal or uncertain study may lead to medicine changes, another imaging test, coronary angiography, or monitoring.

Do not change treatment based only on wording in the report. Findings such as "reduced uptake" or "abnormal FDG activity" have several possible explanations.

Common questions

Can I drink coffee before a heart PET scan?

Usually not before a stress PET scan. Even decaffeinated coffee contains some caffeine. Follow the center's cutoff, which is often 12 to 24 hours.

Can I exercise beforehand?

Avoid strenuous exercise if instructed, especially before an FDG scan. Exercise changes how muscles use glucose and may affect tracer uptake.

Does the time of day matter?

Usually less than fasting, caffeine, and medicine timing. Diabetes management or a long fasting protocol may determine when your appointment is scheduled.

Can I take my usual medicines?

Some medicines can interfere with stress or FDG preparation. Take or hold them only according to the instructions provided by the imaging team.

Can I drive home afterward?

Most people can drive because sedation is not usually used. Arrange help if you receive a sedative or continue to feel unwell after stress medicine.

Should I avoid contact with children after the scan?

The center may give short-term precautions around young children or pregnant people, depending on the tracer and dose. Follow the written radiation-safety instructions you receive.

Sources

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