

Myocardial Perfusion Imaging (MPI) Test

What is a myocardial perfusion imaging test?

Myocardial perfusion imaging (MPI) is a non-invasive imaging test that shows how well blood flows through (perfuses) your heart muscle. It can show areas of the heart muscle that aren't getting enough blood flow. This test is often called a nuclear stress test. It can also show how well the heart muscle is pumping.

There are 2 techniques for MPI: [single photon emission computed tomography \(SPECT\)](#) and [positron emission tomography \(PET\)](#).

MPI is useful in patients with chest discomfort to see if the discomfort comes from lack of blood flow to the heart muscle caused by narrowed or blocked heart arteries ([angina](#)). Myocardial perfusion imaging doesn't show the heart arteries themselves but can tell your doctor with good certainty if any heart arteries are blocked and how many. MPI can also show if you've previously had a [heart attack](#).

Depending on circumstances, for example if you have chest pain and an abnormal MPI study, the next step may be performing a [coronary angiogram \(PDF\)](#). On the other hand, if the MPI study is normal, your doctor can confidently look into other causes of chest pain that aren't related to the heart.

Quick facts

- An MPI test examines blood flow through your heart during exercise on a treadmill or exercise bicycle ("physical stress") and while you rest. If you can't exercise well, you'll get a medicine ("chemical/pharmacologic stress") to increase the blood flow to your heart muscle as if you were exercising.
- The test uses radioactive material called tracers. Tracers mix with your blood and are taken up by your heart muscle as the blood flows through your heart arteries.
- A special "gamma" camera takes pictures of your heart to show how well your heart muscle is perfused (supplied with blood)
- The pictures will help your doctor see if your heart muscle is getting enough blood, or if blood flow is reduced to parts of the heart muscle because of narrowed arteries. MPI can also tell if there are areas of dead cells (scars) from a past heart attack. Some forms of MPI can also tell your doctor if portion of the heart muscle that aren't working well after a heart attack have a chance of going back to normal if a coronary [stent](#) is place or [bypass surgery](#) is done ("viability imaging")
- The amount of radiation you get from an MPI test is small.

Why do people have MPI tests?

An MPI test shows how well blood flows through your heart muscle. If the test shows a lack of blood flow during exercise or stress, but is normal at rest, it could mean that an artery that carries blood to your heart is narrowed or blocked. If the test shows a lack of blood flow to a portion of the heart muscle during exercise or stress and at rest, it could mean that your heart muscle is scarred, possibly from a past [heart attack](#).

MPI tests can help your doctor:

- Find out if there are narrowings or blockages in your coronary (heart) arteries if you have chest discomfort
- If you have heart damage from a heart attack if your heart is not working normally
- Determine if you should undergo a coronary angiogram
- Decide whether you would benefit from coronary stent or bypass surgery to treat your chest discomfort or help an abnormal pumping function go back to normal
- If a heart procedure you had to improve blood flow (stent, bypass) is working
- How well your heart can handle physical activity

What are the risks of an MPI test?

MPI tests are generally safe for most people. MPI studies expose you to a low dose of X-rays. Experts disagree if X-rays at such low doses can cause cancer, but the possibility exists that no dose of X-rays, however low, is completely safe. Don't take the test if your risk for a heart attack is low, or if there is no other reason (chest discomfort) to think that you have heart trouble. If you're pregnant or think you might be pregnant, or if you're a nursing mother, tell your doctor before you have this test. It could harm your baby.

How do I prepare for my MPI test?

- Tell your doctor about any medicines you take, including over-the-counter medicines, herbs and vitamins. He or she may ask you not to take them before the test. Don't stop taking your medicine until your doctor tells you to.
- Your doctor may also ask you not to eat certain foods, such as caffeine-containing beverages (i.e. coffee, tea, soft drinks) or chocolate, for 24 hours before your test. The test may have to be postponed or cancelled if you did drink caffeine.
- Don't eat, and drink only water for 4 to 6 hours before your test.
- Wear comfortable, loose-fitting clothing and comfortable shoes to exercise in.

What happens during my MPI test?

Specially trained technicians usually perform the test in a hospital or clinic with special equipment.

- The technician places small metal disks (electrodes) on your chest, arms and legs. The disks have wires that hook up to a machine to record your electrocardiogram (ECG). The ECG keeps track of your heartbeat during your test and is used to tell the camera when to take a picture.
- You'll wear a cuff around your arm to keep track of your blood pressure.
- The technician will put an intravenous line (IV) in your arm.
- You'll exercise on either a treadmill or exercise bicycle
- If you cannot exercise, your IV line will be connected to a bag that has a medicine to increase the blood flow to your heart, similar to when you exercise, or make your heart go faster. This is called a chemical or pharmacologic stress test. These medicines may include adenosine, dipyridamole (Persantine) or dobutamine.
- When you reach your peak activity level, you'll stop and receive a small amount of radioactive material (tracer) through the IV line.

- You'll lie still on a table for 10- 30 minutes while the gamma camera takes pictures of your heart. Several scans are done during that time to provide pictures of thin slices of your entire heart from all angles. It's very important to hold completely still with your arms above your head while the pictures are being taken.
- During the resting part of the test, you'll receive more tracer and another set of pictures will be taken. This set of images will be compared to the images taken after exercise or stress.
- Some forms of the test do not use stress or exercise but take 2 sets of rest images with 2 different tracers.

The test takes between 3 and 4 hours. Some labs may do the resting part of the test first or do the resting and exercise tests on different days.

What happens after my MPI test?

- You can usually go back to your normal activities right away.
- Drink plenty of water to flush the radioactive material from your body.
- Make an appointment with your doctor to discuss the test results and next steps.

"My doctor showed me the pictures from my test and I could see where I had a lack of blood supply in my heart." Mitch, age 49.

How can I learn more about a MPI test?

Talk with your doctor. Here are some good questions to ask:

- Why are you doing this test rather than a different one without radiation?
- Do you think the small possible risk of cancer related to X-rays is justified compared to my condition and my risk of having heart trouble?
- What do I need to do to get ready for this test?
- When will I get the results of my test?
- Will I need to have more tests after this?
- What if I get chest pain or shortness of breath during the test?