



Angina Pectoris

Angina pectoris or angina is temporary chest pain or discomfort as a result of decreased blood flow to the heart muscle. Angina is not a heart attack, but it is a sign of increased risk for heart attack. Angina may be stable (develops during physical activity and lasts five minutes or less) or unstable (occurs during periods of rest, lasts longer and symptoms may be more severe).



Your doctor may perform an electrocardiogram (ECG), a stress test without imaging or blood tests to help diagnose your condition. Additionally, chest x-ray, chest CT, coronary CT angiography, cardiac MRI, coronary angiography, echocardiogram or stress test with imaging may be performed. Your physician may treat your condition by recommending certain lifestyle changes. Other treatment options may include medication, surgery, or angioplasty and vascular stenting.

- What is angina pectoris?
- How is angina pectoris diagnosed and evaluated?
- How is angina pectoris treated?

What is angina pectoris?

Angina pectoris, or just angina, is temporary chest pain or discomfort caused by decreased blood flow to the heart muscle. Because of the decreased flow of blood, there is not enough oxygen to the heart muscle resulting in chest pain. Coronary artery disease, which can result in narrowing of the coronary arteries that carry blood and oxygen to the heart muscle, is one of the most common causes of angina. While angina is not a heart attack, it does signal an increased risk for a heart attack. Seek immediate medical attention if you experience any chest pain or discomfort.

There are two main types of angina—stable and unstable. Stable angina, the most common type, develops during physical activity and usually lasts a short time (approximately five minutes or less) if the physical activity has ended. Unstable angina is less common and usually occurs during periods of rest. Unstable angina usually lasts longer and symptoms may be more severe.

Symptoms of angina include:

- Chest pain or discomfort, such as tightening of the chest
- Discomfort in the jaw, neck, arms, upper abdomen, shoulder or back
- Fatigue
- Sweating
- Nausea
- Dizziness

There are many risk factors associated with angina including, but not limited to, high blood pressure, diabetes, obesity, family history, tobacco use, stress and age.

How is angina pectoris diagnosed and evaluated?

In order to diagnose the cause of angina, the following tests may be performed:

- **Electrocardiogram (ECG):** This test records the electrical activity of the heart, which is used to diagnose heart abnormalities such as arrhythmias or to show ischemia (lack of oxygen and blood) to the heart.
- **Stress test without imaging:** This heart-monitoring test is used to help evaluate how well the heart performs with activity. During a stress test, you will usually be asked to perform physical exercise, like walking on a treadmill. An ECG is recorded during the period of exercise. The ECG is assessed by your doctor to see if your heart reached an appropriate heart rate and if there were any changes to suggest decreased blood flow to your heart. If you are unable to perform exercise, pharmaceuticals that mimic the heart's response to exercise may be used.
- **Blood tests:** The tests can identify certain enzymes such as troponin that leak into the blood after your heart has suffered severe angina or a heart attack. Blood tests can also identify elevated cholesterol, LDL and triglycerides that place you at higher risk for coronary artery disease and therefore angina.

Additionally, the following imaging tests may be performed:

- **Chest x-ray:** This noninvasive imaging test helps your doctor rule out other sources of chest pain such as pneumonia. Imaging with x-rays involves exposing the chest to a small dose of radiation to produce pictures of the chest and heart. See the Safety page for more information about x-rays.
- **CT of the chest:** Chest CT is a more sensitive test than chest x-ray that can identify other causes of chest pain such as aortic disease or blood clots in the blood vessels of the lungs. This imaging test combines special x-ray equipment with sophisticated computers to produce multiple images of the chest and heart. See the Safety page for more information about x-rays.
- **Coronary computed tomography (CT) angiography:** This imaging test can determine if plaque

buildup has narrowed the coronary arteries and resulted in decreased blood flow to the heart, without the need for a catheter feed through the arteries into the heart. Contrast material is injected through a small line in the arm vein, similar to the ones used to draw blood.

- **Magnetic resonance (MR) imaging/angiography:** This exam is usually performed with contrast material. The primary purpose of this exam is to determine whether there is good blood flow to the heart muscle. If there are areas with decreased blood flow, this could indicate plaque with blood vessel narrowing. This blood flow evaluation may be done twice during the exam. The first time may be performed after the administration of a pharmaceutical, which stresses the heart like exercise. The second time will be at rest. Performing the evaluation both with stress and rest helps determine if the decreased blood flow only occurs with exercise. The coronary arteries (blood vessels that supply blood and oxygen to the heart) can also be imaged similar to CT angiography to look for any plaque buildup, which may result in narrowing of the blood vessels. MRI machines use a powerful magnetic field, radio waves and a computer to produce detailed images. See the [Safety page](#) for more information about MRI.
- **Catheter angiography:** In this invasive imaging test, a thin, long plastic tube, called a catheter, is inserted into an artery in your groin using a needle. The catheter is guided with a wire into the coronary arteries and is used to inject contrast material directly into the coronary arteries to determine whether there is any narrowing of the blood vessels. Images of the contrast material in the blood vessels are captured using x-rays.
- **Echocardiogram:** During this test, a transducer that produces high-frequency sound waves is used to create moving images of the heart. The motion of the walls of the heart is evaluated. If there is decreased motion within a portion of the wall of the heart, this could indicate decreased blood flow from narrowing of the coronary artery. An echo contrast material, which is a fluid with very tiny bubbles, may be injected in a vein of your arm to see if there is decreased blood flow to any area of your heart.
- **Stress test with imaging:** Imaging may be performed with a nuclear medicine tracer, echocardiography, CT or MRI. During an imaging stress test, the patient is usually asked to perform some kind of physical exercise like walking on a treadmill. If the patient is unable to perform exercise for any reason, drugs that mimic the heart's response to exercise may be used. If nuclear medicine is used for imaging, a radioactive tracer will be injected into the blood during the peak of exercise and images of the heart will be taken. The radioactive tracer flows with the blood and will show whether there is an area of the heart with decreased blood flow. During echocardiography, you will be asked to stop and lie down on a table during the peak of exercise so the wall of the heart can be imaged. The physician will look for any area that does not move well, which may indicate decreased blood flow from narrowing in the coronary artery. MRI stress testing is performed similar to MR angiography.

How is angina pectoris treated?

Many doctors may first recommend certain lifestyle changes such as maintaining a healthy weight, consuming a balanced diet low in fats, discontinuing the use of tobacco products and finding ways to

reduce stress.

Other treatments options include:

- **Medication:** Various medications can be recommended or prescribed such as aspirin, statins, beta-blockers, calcium channel blockers, or nitrates.
- **Angioplasty and vascular stenting:** This procedure, which uses balloons and/or stents, is performed to open the blockage in the coronary arteries and improve blood flow to the heart.
- **Coronary artery bypass graft surgery (CABG):** This surgery increases blood flow to the heart by using a vein, or an artery from elsewhere in the body to divert blood flow around the area of narrowing or blockage in the coronary arteries of the heart.

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