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, lasts five minutes or less and is relieved with rest) 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 recommend certain lifestyle changes in addition to other treatment options, such as medication, surgery, or angioplasty and coronary stenting.

What is angina pectoris?

Angina pectoris, or just angina (http://www.radiologyinfo.org) , 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 (http://www.radiologyinfo.org) , 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) (http://www.radiologyinfo.org) : This test records the electrical activity of the heart, which is

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used to diagnose heart abnormalities such as arrhythmias or to show ischemia (http://www.radiologyinfo.org) (lack of oxygen and blood) to the heart.

- Stress test (http://www.radiologyinfo.org) 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, medications 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 (https://www.radiologyinfo.org/en/info/chestrad) :* 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 (https://www.radiologyinfo.org/en/info/safety-xray) for more information about x-rays*.
- *CT of the chest (https://www.radiologyinfo.org/en/info/chestct) :* 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 (https://www.radiologyinfo.org/en/info/bloodclot)* 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 (https://www.radiologyinfo.org/en/info/safety-xray) for more information about x-rays*.
- *Coronary computed tomography (CT) angiography: (https://www.radiologyinfo.org/en/info/angiocoroct)* This exam evaluates the coronary arteries (blood vessels that supply blood and oxygen to the heart) to determine the extent of narrowing of the arteries due to plaque without the need for an invasive catheter feed through the arteries into the heart. Contrast material (http://www.radiologyinfo.org) is injected through a small line in the arm vein, similar to the ones used to draw blood.
- *Magnetic resonance (MR) imaging (https://www.radiologyinfo.org/en/info/angiomr) :* 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 with the use of a contrast material. 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. This exam can also assess function of the heart and determine if there is any scar in the heart muscle. MRI machines use a powerful magnetic field, radio waves and a computer to produce detailed images. *See the MRI Safety page (https://www.radiologyinfo.org/en/info/safety-mr) for more information about MRI*.
- *Catheter angiography (https://www.radiologyinfo.org/en/info/angiocath) :* In this invasive imaging test, a thin, long plastic tube, called a catheter, is inserted into an artery in your groin or hand 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. Narrowed portions of the vessels can be reopened using either a balloon or stents.
- Echocardiogram (http://www.radiologyinfo.org) : 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. Imaging can also be performed with a pharmaceutical agent stressing the heart to detect decreased motion in a portion of the heart muscle with stress.
- Myocardial Single Photon Emission Computed Tomography (SPECT) (http://www.radiologyinfo.org) : This stress test with imaging is performed with a nuclear medicine tracer. 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. 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.

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How is angina pectoris treated?

Many doctors may 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.

Additionally, you may also be treated with:

- Medications such as aspirin, statins, beta-blockers, calcium channel blockers, or nitrates, as well as newer lipid-lower agents such as PCSK9 inhibitors.
- *Angioplasty and coronary stenting (https://www.radiologyinfo.org/en/info/angioplasty) :* In selected cases, following appropriate testing, your doctor may perform angioplasty and 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) (http://www.radiologyinfo.org) : 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.

Which test, procedure or treatment is best for me?

- *Chest Pain-Possible Acute Coronary Syndrome (https://www.radiologyinfo.org/en/info/acs-chest-pain-acute-coronary-syndrome)*
- *Chronic Chest Pain — High Probability of Coronary Artery Disease (https://www.radiologyinfo.org/en/info/acs-chronic-chest-pain)*

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