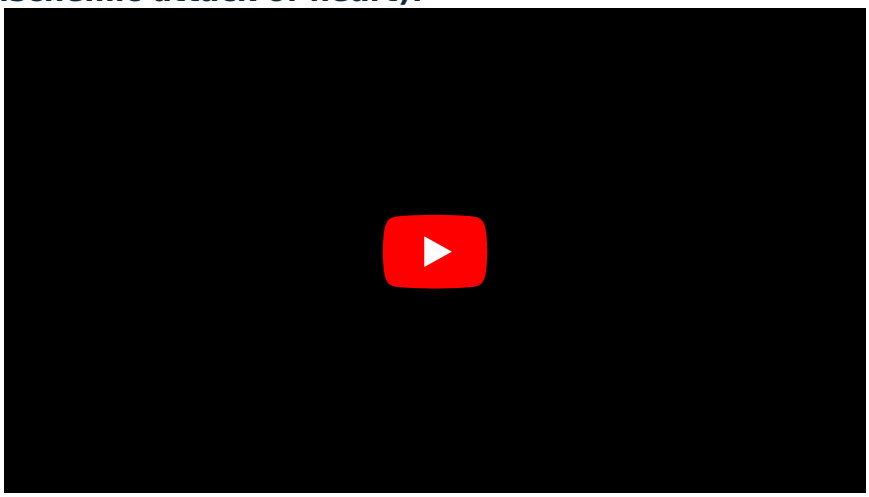
Angina Pectoris

Angina pectoris, usually known as just angina, is chest pain or discomfort that occurs when an area of heart muscle doesn't get enough oxygen-rich blood. Angina may feel like **pressure or squeezing in the chest**. The pain also may occur in the shoulders, arms, neck, jaw, or back. It can feel like indigestion. Angina itself isn't a disease. Rather, it is a **symptom** of an underlying heart problem. Angina is usually a symptom of coronary artery disease (CAD), the most common type of heart disease. CAD occurs when a fatty material called plaque builds up on the inner walls of the coronary arteries, a condition called atherosclerosis. These arteries carry oxygen-rich blood to the heart. When plaque builds up in the arteries, they become narrow and stiff, and the flow of oxygen-rich blood to the heart muscle is reduced. This can cause pain and can lead to a heart attack.

Angina pectoris (ischemic attack of heart):



Types of Angina

The three types of angina are stable, unstable, and variant (Prinzmetal's). They have different symptoms and require different treatment.

Stable angina

Stable angina is the most **common** type. It occurs when the heart is working harder than usual, and it has a **regular** pattern. Patients with stable angina can learn to recognize the pattern and predict when the pain will occur. Stable angina is often provoked by physical exertion, but then goes away in a few minutes after rest or with angina medicine, such as nitroglycerin. Stable angina isn't a heart attack, but because it means there is plaque in the arteries, it makes a heart attack more likely in the future.

Stable Angina pectoris:

Unstable angina

Unlike stable angina, unstable angina doesn't follow a pattern. It may feel different than what a patient with stable angina usually feels. It lasts longer than 15 to 20 minutes. It can occur **at rest** as well as during physical exertion and, unlike stable angina, isn't relieved by rest or medicine. Unstable angina is dangerous and needs **emergency** treatment. It's a sign that a heart attack may happen soon.

Variant (Prinzmetal's) angina

Variant angina is **rare** and is caused by a spasm of the coronary artery in people with either healthy or atherosclerotic arteries. It usually occurs at rest. The pain can be severe. It usually happens between midnight and early morning. This type of angina is relieved by medicine

Causes

Underlying causes

Angina is a symptom of an underlying heart condition. Angina pain is the result of reduced blood flow to an area of heart muscle. Coronary artery disease (CAD) usually causes the reduced blood flow. This means that the underlying causes of angina are generally the same as the underlying causes of CAD.

Research suggests that damage to the inner layers of the coronary arteries causes CAD. **Smoking**, high levels of **fat and cholesterol** in the blood, **high blood pressure,** and a **high level of sugar** in the blood (due to insulin resistance or diabetes) can damage the coronary arteries.

When damage occurs, the body starts a healing process—and, ironically, the healing can lead to more problems. Excess fatty tissues release compounds that promote this healing process. The healing causes plaque to build up where the arteries are damaged. Plaque narrows or blocks the arteries, reducing blood flow to the heart muscle. The buildup of plaque on the arteries' inner walls can cause angina in two ways. It can:

- Narrow the arteries and greatly reduce blood flow to the heart. This type of plaque is hard and stable and leads to narrowed and hardened arteries.
- Form blood clots that partially or totally block the arteries. This type of plaque is soft and more likely to break open. Broken plaque stimulates blood clots, and the clot blocks off the artery even more.

Immediate causes

There are different triggers for angina pain, depending on the type of angina.

Stable angina

Physical exertion is the most common trigger of stable angina. Severely narrowed arteries may allow enough blood to reach the heart when the heart's need for oxygen is low (such as when sitting). But with exertion, like walking up a hill or climbing stairs, the heart works harder and needs more oxygen. Other triggers of stable angina include:

- Emotional stress
- Exposure to very hot or cold temperatures
- Heavy meals
- Smoking

Unstable angina

Blood clots that partially or totally block an artery cause unstable angina. If plaque in an artery ruptures or breaks open, blood clots may form. This creates a larger blockage. A clot may grow large enough to completely block the artery and cause a heart attack. To see how this happens, watch the animation in "What Causes a Heart Attack (https://web.archive.org/web/20121016221601/http://www.nhlbi.nih.gov/health/health-topics/topics/heartattack/)?" Blood clots may form, partly dissolve, and later form again. Angina can occur each time a clot blocks an artery.

Variant angina

A spasm in a coronary artery causes variant angina. The spasm causes the walls of the artery to tighten and narrow. Blood flow to the heart slows or stops. Variant angina may occur in people with or without CAD. It is significantly more common in females compared to males. Causes of spasms in the coronary arteries are:

- Exposure to cold
- Emotional stress
- Medicines that tighten or narrow blood vessels
- Smoking
- Cocaine

Chances of Developing Angina

Angina is a symptom of an underlying heart condition, usually coronary artery disease (CAD). Risk factors for CAD include:

- Unhealthy cholesterol levels.
- High blood pressure.
- Cigarette smoking.
- Insulin resistance or diabetes.
- Overweight or obesity.
- Metabolic syndrome.
- Lack of physical activity.
- Age. (The risk increases for men after 45 years of age and for women after 55 years of age.) Unstable angina occurs more often in older adults.
- Family history of early heart disease.

People sometimes think that because men have more heart attacks than women, men also suffer from angina more often. In fact, angina occurs equally among women and men. It can be a sign of heart disease even when initial tests don't show evidence of CAD.

Variant angina is rare, though more common in the Japanese population.[1] People who have variant angina are often younger than those who have other forms of angina.

Heredity

Family history of coronary artery disease is a definite risk factor in developing coronary artery disease. In the context of increased risk, a **first-degree male relative (father or brother) younger than 55** with CAD or a **first-degree female relative younger than 65** with CAD is considered a positive family history.

Most people with a family history also have other risk factors. However, many otherwise young, healthy, and physically fit individuals have developed heart disease, and have even died, with a positive family history being their only risk factor.

Incidence

The incidence of a disease is the number of new cases each year. In the U.S., about 400,000 patients go to their doctors with new-onset angina every year. In the United Kingdom, about 174,000 people had new-onset angina over a two-year period.[2]

Prevalence

The prevalence of a disease is the number of people who have it at any given time. In the U.S., it's thought that about 9,100,000 people suffer from angina.[3] In a 2005 survey,[4] 4.4% of the US population over age 18 reported that they'd been told they had either angina or coronary heart disease. Men had a higher prevalence than women (5.5% compared to 3.4%), and people with less education had a higher prevalence than people who had more education. African-Americans and white had similar rates, but American Indians/Alaska Natives and multiracial persons had higher rates than non-Hispanic whites.

In the U.K., the prevalence is thought to be about 4.8% of men and 3.4% of women.[2]

Signs and Symptoms

- **Pain and discomfort** are the hallmark of angina. Angina is often described as **pressure, squeezing, burning, or tightness** in the chest. It usually starts in the chest behind the breastbone.
- Pain from angina also can occur in the **arms, shoulders, neck, jaw, throat, or back**. It may feel like **indigestion**.
- Some people say that angina discomfort is hard to describe or that they can't pinpoint the exact location of the pain.
- Symptoms such as **nausea** (feeling sick to the stomach), fatigue (tiredness), **shortness of breath, sweating, lightheadedness, or weakness** also may occur. Women are more likely to feel discomfort in their back, shoulders, and abdomen.
- Symptoms vary based on the type of angina.

Stable angina

The pain or discomfort:

- Occurs when the heart must work harder, usually during physical exertion
- Doesn't come as a surprise, and episodes of pain tend to be alike
- Usually lasts a short time (5 minutes or less)
- Is relieved by rest or medicine
- May feel like gas or indigestion
- May feel like chest pain that spreads to the arms, back, or other areas

Unstable angina

The pain or discomfort:

- Often occurs at rest, while sleeping at night, or with little physical exertion

- Comes as a surprise
- Is more severe and lasts longer (as long as 30 minutes) than episodes of stable angina
- Is usually not relieved with rest or medicine
- May get continually worse
- May mean that a heart attack will happen soon

Variant angina

The pain or discomfort:

- Usually occurs at rest and during the night or early morning hours
- Tends to be severe
- Is relieved by medicine

Lasting chest pain

Chest pain that lasts longer than a few minutes and isn't relieved by rest or angina medicine may mean the patient is having (or is about to have) a heart attack and should call **911** right away.

Diagnosis

When chest pain occurs, the most important two questions are:

- What's causing the chest pain, and
- Whether the patient is having or is about to have a heart attack.

Angina is a symptom of an underlying heart problem, usually coronary artery disease (CAD). The type of angina can be a sign of how severe the CAD is and whether it's likely to cause a heart attack. The doctor will want to find out whether chest pain is a result of angina, and whether the angina is stable or unstable. If it's unstable, emergency medical attention is needed to try to prevent a heart attack. To diagnose chest pain as stable or unstable angina, the doctor will do a physical exam, ask about symptoms, risk factors, and family history of CAD or other heart disease. He or she may also ask questions about symptoms, such as:

- What brings on the pain or discomfort and what relieves it?
- What does the pain or discomfort feel like (for example, heaviness or tightness)?
- How often does the pain occur?
- Where is the pain or discomfort felt?
- How severe is the pain or discomfort?
- How long does the pain or discomfort last?

Diagnostic tests and procedures

If the doctor suspects unstable angina or that the angina is related to a serious heart condition, he or she may order one or more tests.

EKG (electrocardiogram)

An EKG is a simple test that detects and records the **electrical activity of the heart**. An EKG shows how fast the heart is beating and whether it has a regular rhythm. It also shows the strength and timing of electrical signals as they pass through each part of the heart. Certain electrical patterns that the EKG detects can suggest whether CAD is likely. An EKG also can show signs of a previous or current heart attack. However, some people with angina, and even some people who are having a heart attack, have a normal EKG.

Stress testing

During stress testing, **exercise** makes the heart work hard and beat fast while heart tests are performed. If the patient can't exercise, medicine is given to speed up the heart rate. During exercise stress testing, blood pressure and EKG readings are checked while walking or running on a treadmill or pedalling a bicycle. Other heart tests, such as nuclear heart scanning or echocardiography, can be done at the same time.

In those unable to exercise, a **medicine can be injected** into the bloodstream to make the heart work hard and beat fast. Nuclear heart scanning or echocardiography is then usually done. When the heart is beating fast and working hard, it needs more blood and oxygen. Arteries narrowed by plaque can't supply enough oxygen-rich blood to meet the heart's needs.

A stress test can show possible signs of CAD, such as:

- Abnormal changes in heart rate or blood pressure
- Symptoms such as shortness of breath or chest pain
- Abnormal changes in the heart's rhythm or its electrical activity

Chest x-ray

A chest x-ray takes a picture of the organs and structures inside the chest, including the heart, lungs, and blood vessels. It can reveal signs of heart failure, as well as lung disorders and other causes of symptoms that aren't due to CAD.

Coronary angiography and cardiac catheterization

Coronary angiography may be needed if other tests or factors show possible CAD. This test uses dye and special x-rays to show the insides of the coronary arteries.

To get the dye into the coronary arteries, the doctor will use a procedure called cardiac catheterization. A long, thin, flexible tube called a catheter is put into a blood vessel in the arm, groin (upper thigh), or neck. The tube is then threaded into the coronary arteries, and the dye is released into the bloodstream. Special x-rays are taken while the dye is flowing through the coronary arteries.

Cardiac catheterization is usually done in a hospital, while awake. It usually causes little to no pain, although there may be some soreness in the blood vessel at the location of the catheter.

Blood tests

Blood tests check the levels of certain fats, cholesterol, sugar, and proteins in the blood. Abnormal levels may show risk factors for CAD. The doctor may order a blood test to check the level of C-reactive protein (CRP) in the blood. Some studies suggest that high levels of CRP in the blood may increase the risk for CAD and heart attack. The doctor also may order a blood test to check for low hemoglobin in the blood. Hemoglobin is an iron-rich protein in the red blood cells that carries oxygen from the lungs to all parts of the body. If there is low hemoglobin, that may mean there is a condition called anemia.

Treatment

Treatments for angina include **lifestyle changes, medicines, medical procedures, and cardiac rehabilitation (rehab)**. The main goals of treatment are to:

- Reduce pain and discomfort and how often it occurs
- Prevent or lower the risk of heart attack and death by treating the underlying heart condition

Lifestyle changes and medicines may be the only treatments needed if symptoms are mild and aren't getting worse. When lifestyle changes and medicines don't control angina, medical procedures or cardiac rehab may be needed.

Unstable angina is an emergency condition that requires treatment in the hospital.

Lifestyle changes

Making lifestyle changes can help prevent episodes of angina. Patients should:

- Slow down or take rest breaks if angina comes on with exertion.
- Avoid large meals and rich foods that leave if angina comes on after a heavy meal.
- Try to avoid stressful situations if angina comes on with stress. They should also practice ways to handle stress that can't be avoided.

Lifestyle changes that help lower the risk of heart disease. An important lifestyle change is adopting a **healthy diet**. This will help prevent or reduce high blood pressure, high blood cholesterol, and obesity.

Diet should favor fruits, vegetables, whole grains, low-fat or no-fat diary products, and lean meat and fish. The plan also should be low in salt, saturated fat, trans fat, and cholesterol. Examples of healthy diets are the National Heart, Lung, and Blood Institute's Therapeutic Lifestyle Changes (TLC) diet and the Dietary Approaches to Stop Hypertension (DASH) eating plan. TLC may be recommended with high cholesterol, or the DASH eating plan with high blood pressure. Even without these conditions, patients can still benefit from these heart healthy plans.

Other important lifestyle changes include:

- **Quitting smoking** and avoiding secondhand smoke.
- Being **physically active** (patients should check with the doctor to find out safe levels of exercise)
- **Losing weight**, if overweight or obese.
- **Taking all medicines** as prescribed, especially if there is also diabetes.

Medications

Nitrates

Nitrates are the most commonly used medicines to treat angina. They relax and widen blood vessels. This allows more oxygen-rich blood to flow to the heart while reducing its workload. Nitroglycerin is the most commonly used nitrate for angina.

Nitroglycerin that dissolves under the tongue or between cheek and gum is used to relieve an angina episode. Nitroglycerin in the form of pills and skin patches is used to prevent attacks of angina, but act too slowly to relieve pain during an angina attack.

Ranolazine (Ranexa)

Ranolazine is a recent addition to the spectrum of cardivascular medications, and is one of a new class known as "channel blockers." Ranolazine is an approved oral medication in the US and selected European countries, which is taken twice daily for the treatment of angina. It is an especially useful prescription choice in patients who do not respond to the typical classes of medication described below.

Other medications

Other medicines to treat angina may be needed. These medicines may include the following:

- beta blockers
- calcium channel blockers
- ACE inhibitors
- antiplatelet medicines
- Anticoagulants

These medicines function by:

- Lowering blood pressure and cholesterol levels
- Slowing the heart rate
- Relaxing blood vessels
- Reducing strain on the heart
- Preventing blood clots from forming

Medical procedures

When medicines and other treatments don't control angina, a medical procedure to treat the underlying heart disease may be needed.

Angioplasty and coronary artery bypass grafting (CABG) are both commonly used to treat angina. Angioplasty opens blocked or narrowed coronary arteries. During angioplasty, a thin tube with a balloon or other device on the end is threaded through a blood vessel to the narrowed or blocked coronary artery. Once in place, the balloon is inflated to push the plaque outward against the wall of the artery. This widens the artery and restores blood flow.

Angioplasty can improve blood flow to the heart, relieve chest pain, and possibly prevent a heart attack. Sometimes a small mesh tube called a stent is placed in the artery to keep it open after the procedure. During CABG, healthy arteries or veins taken from other areas in the body are used to bypass (that is, go around) narrowed coronary arteries. Bypass surgery can improve blood flow to the heart, relieve chest pain, and possibly prevent a heart attack.

Cardiac rehabilitation

Doctors may prescribe cardiac rehabilitation for angina or after angioplasty, CABG, or a heart attack. The cardiac rehab team may include doctors, nurses, exercise specialists, physical and occupational therapists, dietitians, and psychologists or other behavioral therapists.

Rehab has two parts:

- Exercise training. This part helps the patient learn how to exercise safely, strengthen muscles, and improve stamina. An exercise plan will be based on individual abilities, needs, and interests.
- Education, counseling, and training. This part of rehab teaches the patient more about the condition and finds ways to reduce the risk of future heart problems.

Related Problems

Not all chest pain or discomfort is angina. A heart attack, lung problems (such as an infection or a blood clot), heartburn, or a panic attack also can cause chest pain or discomfort. All chest pain should be checked by a doctor.

Complications

Possible complications of angina include:

- progression of stable angina to unstable angina
- heart attack
- lethal arrhythmias (heart rhythm disturbances)

Comorbidity

Many other medical conditions, or comorbidities, are commonly found in individuals with angina. These conditions play a role in causing the atherosclerosis which leads to angina in the first place, and they may also make it more likely that angina will progress to a heart attack. Some of these conditions include **high cholesterol, high blood pressure, obesity, and diabetes**.

Related disorders

Angina is a symptom that results from atherosclerosis of the arteries that lead to the heart. Atherosclerosis of arteries elsewhere in the body can lead to medical problems as well. For example:

- **Stroke or transient ischemic attack** (TIA, or "mini-stroke") can result from blockage of the arteries to the brain.
- **Peripheral arterial disease** occurs when arteries to the legs become blocked. This can lead to amputation.
- Blindness can result from blockage of the small arteries to the eyes.
- Kidney failure can result from blockage of the small arteries to the kidneys. This may lead to dialysis and kidney transplantation.

Prevention

Risk for angina and coronary artery disease (CAD) can be lowered by making lifestyle changes and treating related conditions.

Lifestyle changes

Healthy lifestyle choices can help prevent or delay angina and CAD. Review these in the "Lifestyle Changes" section of the "Treatment" section.

Treating related conditions

Angina and CAD may be prevented or delayed by treating related conditions, such as high cholesterol, high blood pressure, obesity, and diabetes.

Living With Angina

Angina isn't a heart attack, but it does mean a greater risk of having a heart attack compared to someone who doesn't have angina. The risk is even higher with unstable angina. Therefore, patients should know:

- The usual pattern of angina, if it occurs regularly.
- What medicines they take (patients should keep a list) and how to take them.
- How to control the angina.
- The limits of physical activity.
- How and when to seek medical attention.

Knowing the pattern of angina

Stable angina usually occurs in a pattern. Patients should know:

- What causes the pain to occur
- What angina pain feels like
- How long the pain usually lasts
- Whether rest or medicine relieves the pain

Knowing medicines

Patients should know what medicines they're taking, the purpose of each, how and when to take them, and possible side effects. It's very important to know exactly when and how to take fast-acting nitroglycerin or other nitrates to relieve chest pain. It's also important to know how to correctly store angina medicines and when to replace them. Some medicines can cause serious problems if they're taken with nitrates or other angina medicines. All medications should be reviewed with a doctor.

Knowing how to control angina

Certain levels of activity, stress, large meals, and other factors that can bring on angina. By knowing this, steps can be taken to prevent or lessen the severity of episodes.

Knowing how and when to seek medical attention

People with angina are at a higher risk for a heart attack than someone who doesn't have angina. They should make an emergency action plan. The plan should include making sure the patient and family members know:

- The signs and symptoms of a heart attack
- How to use aspirin and nitroglycerin when needed
- How to access emergency medical services in the community

- The location of the nearest hospital that offers 24-hour emergency heart care

Action should be taken quickly if chest pain becomes severe, lasts longer than a few minutes, or isn't relieved by rest or medicine. Sometimes it's hard to tell the difference between unstable angina and a heart attack. Either way, it's an emergency situation and 911 should be called.

Expected Outcome

The outcome depends on many different things, including:

- The severity of the underlying coronary artery disease
- The severity of the most recent unstable angina attack
- Whether the patient has ever had a heart attack
- The medicines being taken when the angina started

Research

"The Angina File (https://web.archive.org/web/20120614134908/http://www.lifestages.com/health/angina.html)" contains summaries by the latest in medical research related to coronary artery disease. It also has archives that enable viewing of past research.

Clinical Trials

For a list of completed, ongoing, and upcoming trials related to angina, see Angina Clinical Trials.

References

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External Links

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