

CORONARY ARTERY DISEASE

Definition

Coronary artery disease develops when your coronary arteries — the major blood vessels that supply your heart with blood, oxygen and nutrients — become damaged or diseased. Cholesterol-containing deposits (plaque) in your arteries and inflammation are usually to blame for coronary artery disease.

When plaques build up, they narrow your coronary arteries, decreasing blood flow to your heart. Eventually, the decreased blood flow may cause chest pain (angina), shortness of breath, or other coronary artery disease signs and symptoms. A complete blockage can cause a heart attack.

Because coronary artery disease often develops over decades, it can go unnoticed until you have a heart attack.

But there's plenty you can do to prevent and treat coronary artery disease.

Symptoms

Start by committing to a healthy lifestyle.

If your coronary arteries narrow, they can't supply enough oxygen-rich blood to your heart — especially when it's beating hard, such as during exercise. At first, the decreased blood flow may not cause any coronary artery disease symptoms. As the plaques continue to build up in your coronary arteries, however, you may develop coronary artery disease signs and symptoms, including:

- **Chest pain (angina):** You may feel pressure or tightness in your chest, as if someone were standing on your chest. The pain, referred to as angina, is usually triggered by physical or emotional stress. It typically goes away within minutes after stopping the stressful activity. In some people, especially women, this pain may be fleeting or sharp and felt in the abdomen, back or arm.
- **Shortness of breath:** If your heart can't pump enough blood to meet your body's needs, you may develop shortness of breath or extreme fatigue with exertion.
- **Heart attack:** A completely blocked coronary artery may cause a heart attack. The classic signs and symptoms of a heart attack include crushing pressure in your chest and pain in your shoulder or arm, sometimes with shortness of breath and sweating. Women are somewhat more likely than men are to experience less

typical signs and symptoms of a heart attack, such as nausea and back or jaw pain. Sometimes a heart attack occurs without any apparent signs or symptoms.

When to see a doctor

If you suspect you're having a heart attack, immediately call 10111 or from any cell 112 or your local emergency number. If you don't have access to emergency medical services, have someone drive you to the nearest hospital. Drive yourself only as a last resort.

If you have risk factors for coronary artery disease — such as high blood pressure, high cholesterol, tobacco use, diabetes or obesity — talk to your doctor. He or she may want to test you for the condition, especially if you have signs or symptoms of narrowed arteries. Even if you don't have evidence of coronary artery disease, your doctor may recommend aggressive treatment of your risk factors. Early diagnosis and treatment may stop progression of coronary artery disease and help prevent a heart attack.

Causes

Coronary artery disease is thought to begin with damage or injury to the inner layer of a coronary artery, sometimes as early as childhood. The damage may be caused by various factors, including:

- Smoking
- High blood pressure
- High cholesterol
- Radiation therapy to the chest. As used for certain types of cancer
- Diabetes or insulin resistance
- Sedentary lifestyle

Once the inner wall of an artery is damaged, fatty deposits (plaques) made of cholesterol and other cellular waste products tend to accumulate at the site of injury in a process called atherosclerosis. If the surface of these plaques breaks or ruptures, blood cells called platelets will clump at the site to try to repair the artery. This clump can block the artery, leading to a heart attack.

Risk factors

Risk factors for coronary artery disease include:

- **Age:** Simply getting older increases your risk of damaged and narrowed arteries.

- **Sex:** Men are generally at greater risk of coronary artery disease. However, the risk for women increases after menopause.
- **Family history:** A family history of heart disease is associated with a higher risk of coronary artery disease, especially if a close relative developed heart disease at an early age. Your risk is highest if your father or a brother was diagnosed with heart disease before age 55 or your mother or a sister developed it before age 65.
- **Smoking:** Nicotine constricts your blood vessels, and carbon monoxide can damage their inner lining, making them more susceptible to atherosclerosis. The incidence of heart attack in women who smoke at least 20 cigarettes a day is six times that of women who've never smoked. For men who smoke, the incidence is triple that of nonsmokers.
- **High blood pressure:** Uncontrolled high blood pressure can result in hardening and thickening of your arteries, narrowing the channel through which blood can flow.
- **High blood cholesterol levels:** High levels of cholesterol in your blood can increase the risk of formation of plaques and atherosclerosis. High cholesterol can be caused by a high level of low-density lipoprotein (LDL), known as the "bad" cholesterol. A low level of high-density lipoprotein (HDL), known as the "good" cholesterol, also can promote atherosclerosis.
- **Diabetes:** Diabetes is associated with an increased risk of coronary artery disease. Both conditions share similar risk factors, such as obesity and high blood pressure.
- **Obesity:** Excess weight typically worsens other risk factors.
- **Physical inactivity:** Lack of exercise also is associated with coronary artery disease and some of its risk factors, as well.
- **High stress:** Unrelieved stress in your life may damage your arteries as well as worsen other risk factors for coronary artery disease.

Risk factors often occur in clusters and may build on one another, such as obesity leading to diabetes and high blood pressure. When grouped together, certain risk factors put you at an even greater risk of coronary artery disease. For example, metabolic syndrome — a cluster of conditions that includes elevated blood pressure, high triglycerides, elevated insulin levels and excess body fat around the waist — increases the risk of coronary artery disease.

Sometimes coronary artery disease develops without any classic risk factors. Researchers are studying other possible factors, including:

- **Sleep apnea:** This disorder causes you to repeatedly stop and start breathing while you're sleeping. Sudden drops in blood oxygen levels that occur during sleep apnea

increase blood pressure and strain the cardiovascular system, possibly leading to coronary artery disease.

- **C-reactive protein:** C-reactive protein (CRP) is a normal protein that appears in higher amounts when there's swelling somewhere in your body. High CRP levels may be a risk factor for heart disease. It's thought that as coronary arteries narrow, you'll have more CRP in your blood.
- **High triglycerides:** This is a type of fat (lipid) in your blood. High levels may raise the risk of coronary artery disease, especially for women.
- **Homocysteine:** Homocysteine is an amino acid your body uses to make protein and to build and maintain tissue. But high levels of homocysteine may increase your risk of coronary artery disease.
- **Lipoprotein:** This substance forms when a low-density lipoprotein (LDL) particle attaches to a specific protein. Lipoprotein may disrupt your body's ability to dissolve blood clots. High levels of lipoprotein may be associated with an increased risk of cardiovascular disease, including coronary artery disease and heart attack.

Complications

Coronary artery disease can lead to:

- **Chest pain (angina):** When your coronary arteries narrow, your heart may not receive enough blood when demand is greatest — particularly during physical activity. This can cause chest pain (angina) or shortness of breath.
- **Heart attack:** If a cholesterol plaque ruptures and a blood clot forms, complete blockage of your heart artery may trigger a heart attack. The lack of blood flow to your heart may damage your heart muscle. The amount of damage depends in part on how quickly you receive treatment.
- **Heart failure:** If some areas of your heart are chronically deprived of oxygen and nutrients because of reduced blood flow, or if your heart has been damaged by a heart attack, your heart may become too weak to pump enough blood to meet your body's needs. This condition is known as heart failure.
- **Abnormal heart rhythm (arrhythmia):** Inadequate blood supply to the heart or damage to heart tissue can interfere with your heart's electrical impulses, causing abnormal heart rhythms.

Treatments and Drugs

Treatment for coronary artery disease usually involves lifestyle changes and, if necessary, drugs and certain medical procedures.

Lifestyle changes

Making a commitment to the following healthy lifestyle changes can go a long way toward promoting healthier arteries:

- Quit smoking
- Eat healthy foods
- Exercise regular
- Lose excess weight
- Reduce stress

Drugs

Various drugs can be used to treat coronary artery disease, including:

- **Cholesterol-modifying medications:** By decreasing the amount of cholesterol in the blood, especially low-density lipoprotein (LDL, or the “bad”) cholesterol, these drugs decrease the primary material that deposits on the coronary arteries. Your doctor can choose from a range of medications, including statins, niacin, fibrates and bile acid sequestrants.
- **Aspirin:** Your doctor may recommend taking a daily aspirin or other blood thinners. This can reduce the tendency of your blood to clot, which may help prevent obstruction of your coronary arteries. If you’ve had a heart attack, aspirin can help prevent future attacks. There are some cases where aspirin isn’t appropriate, such as if you have a bleeding disorder or you’re already taking another blood thinner, so ask your doctor before starting to take aspirin.
- **Beta blockers:** These drugs slow your heart rate and decrease your blood pressure, which decreases your heart’s demand for oxygen. If you’ve had a heart attack, beta blockers reduce the risk of future attacks.
- **Nitroglycerin:** Nitroglycerin tablets, sprays and patches can control chest pain by opening up your coronary arteries and reducing your heart’s demand for blood.
- **Angiotensin-converting enzyme (ACE) inhibitors and angiotensin II receptor blockers (ARBs):** These similar drugs decrease blood pressure and may help prevent progression of coronary artery disease. If you’ve had a heart attack, ACE inhibitors reduce the risk of future attacks.

Procedures to restore and improve blood flow

Sometimes more aggressive treatment is needed. Here are some options:

- **Angioplasty and stent placement (percutaneous coronary revascularization):** Your doctor inserts a long, thin tube (catheter) into the narrowed part of your artery.

- **Coronary artery bypass surgery:** A surgeon creates a graft to bypass blocked coronary arteries using a vessel from another part of your body.

This allows blood to flow around the blocked or narrowed coronary artery. Because this requires open-heart surgery, its most often reserved for cases of multiple narrowed coronary arteries.

Lifestyle and home remedies

Lifestyle changes can help you prevent or slow the progression of coronary artery disease.

- **Stop smoking:** Smoking is a major risk factor for coronary artery disease. Nicotine constricts blood vessels and forces your heart to work harder, and carbon monoxide reduces oxygen in your blood and damages the lining of your blood vessels. If you smoke, quitting is one of the best ways to reduce your risk of a heart attack.
- **Control your blood pressure:** Ask your doctor for a blood pressure measurement at least every two years. He or she may recommend more frequent measurements if your blood pressure is higher than normal or you have a history of heart disease. The ideal blood pressure is below 120 systolic and 80 diastolic, as measured in millimeters of mercury (mm Hg).
- **Check your cholesterol:** Ask your doctor for a baseline cholesterol test when you’re in your 20s and at least every five years after. If your test results aren’t within desirable ranges, your doctor may recommend more frequent measurements. Most people should aim for an LDL level below 130 milligrams per deciliter (mg/dL), or 3.4 millimoles per liter (mmol/L). If you have other risk factors for heart disease, your target LDL may be below 100 mg/dL (2.6 mmol/L).
- **Get moving:** Exercise helps you achieve and maintain a healthy weight and control diabetes, elevated cholesterol and high blood pressure — all risk factors for coronary artery disease. With your doctor’s OK, aim for 30 to 60 minutes of physical activity most or all days of the week.
- **Eat healthy foods:** A heart-healthy diet, such as the Mediterranean diet, that emphasizes plant-based foods, such as fruits, vegetables, whole grains, legumes and nuts — and is low in saturated fat, cholesterol and sodium — can help you control your weight, blood pressure and cholesterol. Eating one or two servings of fish a week also is beneficial.
- **Maintain a healthy weight:** Being overweight increases your risk of coronary artery disease. Losing even just a few pounds can help lower your blood pressure and reduce your risk of coronary artery disease.
- **Manage stress:** Reduce stress as much as possible. Practice healthy techniques for managing stress, such as muscle relaxation and deep breathing.

- Keep diabetes under control: If you have diabetes, tight blood sugar control can help reduce the risk of heart disease.
- In addition to healthy lifestyle changes, remember the importance of regular medical checkups. Some of the main risk factors for coronary artery disease — high cholesterol, high blood pressure and diabetes — have no symptoms in the early stages. Early detection and treatment can set the stage for a lifetime of better heart health.

Also ask your doctor about a yearly flu vaccine. Coronary artery disease and other cardiovascular disorders increase the risk of complications from the flu.

Alternative medicine

Omega-3 fatty acids are a type of unsaturated fatty acid that's thought to reduce inflammation throughout the body, a contributing factor to coronary artery disease. However, recent studies have not shown them to be beneficial. More research is needed.

- Fish and fish oil are the most effective sources of omega-3 fatty acids. Fatty fish — such as salmon, herring and, to a lesser extent, tuna — contain the most omega-3 fatty acids and, therefore, the most benefit. Fish oil supplements may offer benefit, but the evidence is strongest for eating fish.
- Flax and flaxseed oil also contain beneficial omega-3 fatty acids, though studies have not found these sources to be as effective as fish. The shell on raw flaxseeds also contains soluble fiber, which can help lower blood cholesterol.
- Other dietary sources of omega-3 fatty acids include walnuts, canola oil, soybeans and soybean oil.

These foods contain smaller amounts of omega-3 fatty acids than do fish and fish oil, and evidence for their benefit to heart health isn't as strong.

Other supplements may help reduce your blood pressure or cholesterol level, two contributing factors to coronary artery disease. These include:

- Alpha-linolenic acid (ALA)
- Artichoke
- Barely
- Beta-sitosterol (found in oral supplements and some margarines, such as Promise Activ)
- Blond psyllium
- Coca
- Coenzyme Q10
- Garlic
- Oat bran (found in oatmeal and whole oats)

- Sitostanol (found in oral supplements and some margarines, such as Benecol)

Prevention

The same lifestyle habits that can help treat coronary artery disease can also help prevent it from developing in the first place. Leading a healthy lifestyle can help keep your arteries strong and clear of plaques. To improve your heart health, you can:

- Quit smoking.
- Control conditions such as high blood pressure, high cholesterol and diabetes.
- Stay physically active.
- Eat a low-fat, low-salt diet that's rich in fruits, vegetables and whole grains.
- Maintain a healthy weight.
- Reduce and manage stress.

Source: The Mayo Clinic

Contact us

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