Heart Attack

What is a heart attack?

A heart attack is also called a myocardial infarction (MI). It happens when one or more parts of the heart muscle don't get enough oxygen. That occurs when blood flow to the heart muscle is narrowed or blocked.

If the blood and oxygen supply is cut off, muscle cells of the heart begin to suffer damage and start to die (infarct). Permanent damage begins within 30 minutes of blockage. The heart muscle may then no longer work as it should.

What causes a heart attack?

A blockage in the coronary arteries that supply blood to the heart muscle can lead to a heart attack. A blockage is caused by a buildup of plaque. This is called atherosclerosis. Plaque is made up of deposits of cholesterol and other substances. When a plaque breaks (ruptures), a blood clot quickly forms. The blood clot is the usual cause of the heart attack.

Who is at risk for a heart attack?

A heart attack can happen to anyone. But certain factors can raise your risk for one. Some of these factors you can't change. Others you may be able to manage through lifestyle changes and medical care.

You may be at higher risk for a heart attack if you:

- Have high blood pressure
- Have low levels of high-density lipoprotein (HDL) cholesterol, high levels of low-density lipoprotein (LDL) cholesterol, or high levels of triglycerides.
- Have a family history of heart disease. This is especially true if the heart disease started before age 55.
- Are older in age. Generally, men are at risk at a younger age than women. After menopause, women are equally at risk.
- Have diabetes.
- Smoke, including chewing tobacco and electronic cigarettes (vaping)
- Are under a lot of stress
- Drink too much alcohol or use illegal drugs
- Are not active
- Are overweight
- Eat a diet high in saturated fat and low in fiber

What are the symptoms of a heart attack?

Each person may have slightly different symptoms of a heart attack. But these are the most common symptoms:

- Severe pressure, fullness, squeezing, pain, or discomfort in the center of the chest that lasts for more than a few minutes
- Pain or discomfort that spreads to the shoulders, neck, arms, or jaw

- Chest pain that gets worse with exertion
- Chest pain that doesn't get better with rest or by taking nitroglycerin
- Chest pain that happens along with any of these symptoms:
    - Sweating
    - Cool, clammy skin or paleness
    - Shortness of breath
    - Nausea or vomiting
    - Dizziness or fainting
    - Unexplained weakness or fatigue
    - Fast or irregular pulse

Chest pain is the key warning sign of a heart attack, but it may be confused with other conditions. These include heartburn, pleurisy, and pneumonia. Since you don't always know the reason for the chest pain, always call 911 for emergency care to diagnose the problem.

How is a heart attack diagnosed?

If you or someone you know has any of the warning signs for a heart attack, act right away. Call 911 or your local emergency number. Don’t drive yourself to the hospital or emergency department if you think you are having a heart attack.

Diagnosing a heart attack often happens in an emergency department. There, a healthcare provider will ask you about your symptoms and health history and do a physical exam. You may also need some tests, such as:

- **Electrocardiogram (ECG).** This test checks the electrical activity of your heart. It can find signs of a heart attack.
- **Blood work.** These tests can find certain proteins that the body may make during a heart attack.
- **Coronary angiography.** During this test, a tiny plastic tube (catheter) is put into an artery in your groin or arm. It's moved to the heart while monitored with fluoroscopy (video X-ray). X-ray dye (contrast medium) is then put into your coronary arteries. Special X-rays (angiograms) are then taken. They show how well blood is flowing through your heart and blood vessels. The test can find blockages in an artery.

How is a heart attack treated?

The goal of treatment for a heart attack is to ease pain, restore blood flow to the coronary artery, preserve the heart muscle function, and prevent death. Treatment may include:

- **IV (intravenous) therapy.** Medicines, such as nitroglycerin and morphine, are given through a tube into a vein for pain relief and to relax the heart arteries.
- **Oxygen therapy.** This treatment can give the damaged heart muscle more oxygen.
- **Cardiac medicine, such as beta-blockers.** These can help the heart muscle rest, prevent an irregular heartbeat and decrease heart rate and blood pressure.
- **Fibrinolytic therapy.** Medicine is given by an intravenous line (IV) to dissolve the blood clot, restoring blood flow.
- **Antithrombin or antiplatelet therapy with aspirin or clopidogrel/ticagrelor.** This is used to prevent more blood clotting.
- **Medicines that lower cholesterol, particularly LDL cholesterol.** These include medicines, such as statins. Newer medicines called PCSK9-inhibitors are for people with inherited high cholesterol. Ask

your healthcare provider if these medicines may help prevent a heart attack.

You may also need other procedures to restore blood flow to the heart. These are described below.

Percutaneous coronary intervention (PCI) or coronary angioplasty

This is the preferred treatment for an acute heart attack. It involves opening up a blocked or narrowed coronary artery. There are several ways to do so. After coronary angiography has found a blockage, a new catheter with a small balloon at its tip may be inflated inside the blocked artery to open the blocked area. Or the blocked area may be cut away with a special device or vaporized with a laser. A tiny metal coil called a stent is often expanded inside the artery. The stent remains in place to help keep the artery open.

Coronary artery bypass graft (CABG)

This surgery is also called coronary artery bypass surgery or CABG (pronounced "cabbage"). It is often done in people who have chest pain (angina) and severe coronary artery disease that can't be treated with PCI. During the surgery, the surgeon makes a bypass to let blood flow around the blockage. This is done by grafting a piece of a vein from the aorta to the coronary artery beyond the blocked part of the artery. The surgeon often takes veins from a leg. Arteries from the chest or an arm may also be used to bypass blockages. These bypasses last longer than vein grafts and are, therefore, preferred.

What are possible complications of a heart attack?

Possible complications of a heart attack include:

- Damage to the heart or heart valves
- Abnormal heart rhythms
- Another heart attack
- Heart failure because the heart doesn't pump as well as it once did
- Shock and other organ failure
- Death

What can I do to prevent a heart attack?

Talk with your healthcare provider about your risk for a heart attack. You may be able to prevent a heart attack by:

- Lowering the levels of your blood pressure, LDL cholesterol, and triglycerides, if needed
- Not smoking
- Lowering your stress levels
- Not drinking too much alcohol
- Being more physically active
- Losing weight, if needed
- Eating a healthy, low-fat diet

Key points about a heart attack

- A heart attack happens when one or more areas of the heart muscle don’t get enough oxygen. This happens when blood flow to the heart muscle is narrowed or blocked. This causes areas of the heart muscle to become damaged or die (infarct).
- A blood clot is the usual cause of a heart attack. It can form when there is a blockage in the arteries from plaque buildup.
- Having high blood pressure and a family history of heart disease can raise your risk for a heart attack.
- Severe chest pain or discomfort is often a symptom of a heart attack. But you may also feel short of breath, nauseous, fatigued, or dizzy.
- A coronary angiogram can find blockages in an artery.
- Treatment includes medicines and procedures to restore blood flow to the heart.

Next steps

Tips to help you get the most from a visit to your healthcare provider:

- Know the reason for your visit and what you want to happen.
- Before your visit, write down questions you want answered.
- Bring someone with you to help you ask questions and remember what your provider tells you.
- At the visit, write down the name of a new diagnosis, and any new medicines, treatments, or tests. Also write down any new directions your provider gives you.
- Know why a new medicine or treatment is prescribed, and how it will help you. Also know what the side effects are.
- Ask if your condition can be treated in other ways.
- Know why a test or procedure is recommended and what the results could mean.
- Know what to expect if you do not take the medicine or have the test or procedure.
- If you have a follow-up appointment, write down the date, time, and purpose for that visit.
- Know how you can contact your healthcare provider if you have questions.