

Heart attack

Definition

A heart attack occurs when blood flow to a part of your heart is blocked for a long enough time that part of the heart muscle is damaged or dies. Your doctor calls this a myocardial infarction.

Alternative Names

Myocardial infarction; MI; Acute MI; ST-elevation myocardial infarction; non-ST-elevation myocardial infarction

Causes

Most heart attacks are caused by a blood clot that blocks one of the coronary arteries. The coronary arteries bring blood and oxygen to the heart. If the blood flow is blocked, the heart is starved of oxygen and heart cells die.

A hard substance called plaque can build up in the walls of your coronary arteries. This plaque is made up of cholesterol and other cells. A heart attack can occur as a result of plaque buildup.

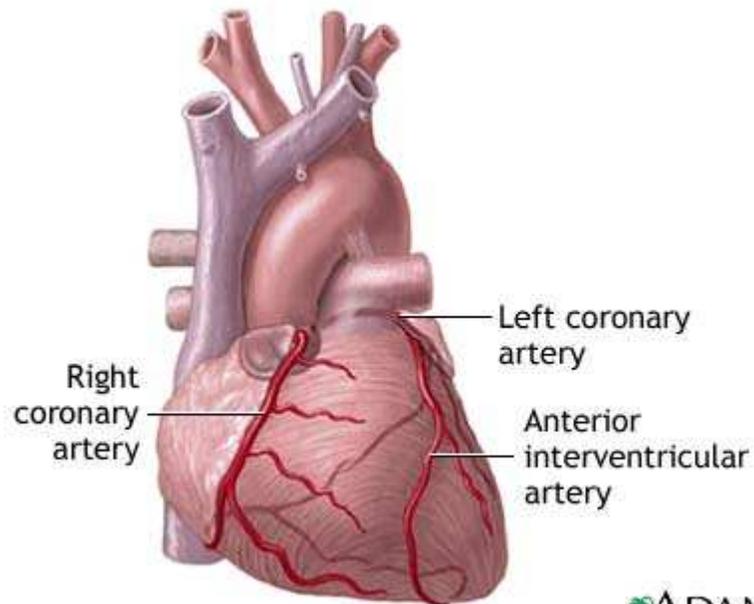
- The plaque can develop cracks or tears. Blood platelets stick to these tears and form a blood clot. A heart attack can occur if this blood clot completely blocks oxygen-rich blood from flowing to the heart. This is the most common cause of heart attacks.
- The slow buildup of plaque may almost block one of your coronary arteries. A heart attack may occur if not enough oxygen-rich blood can flow through this blockage. This is more likely to happen when your body is stressed (for example, by a serious illness).

The cause of heart attacks is not always known. Heart attacks may occur:

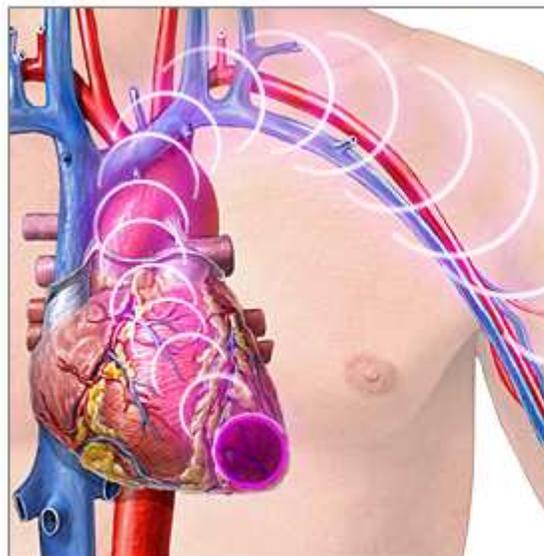
- When you are resting or asleep
- After a sudden increase in physical activity
- When you are active outside in cold weather
- After sudden, severe emotional or physical stress, including an illness

See: Coronary artery disease to learn about risk factors

Cardiogenic shock is a state in which the heart has been damaged so much that it cannot supply enough blood to the organs of the body. This condition is a medical emergency.



ADAM.



Pain in the chest radiating up to the jaw or down the left (or, less often, right) arm might signal a heart attack

ADAM.

Symptoms

A heart attack is a medical emergency. If you have symptoms of a heart attack, call 911 or your local emergency number right away.

- DO NOT try to drive yourself to the hospital.
- DO NOT DELAY. You are at greatest risk of sudden death in the early hours of a heart attack.

Chest pain is the most common symptom of a heart attack. You may feel the pain in only one part of your body, or it may move from your chest to your arms, shoulder, neck, teeth, jaw, belly area, or back.

The pain can be severe or mild. It can feel like:

- A tight band around the chest
- Bad indigestion
- Something heavy sitting on your chest
- Squeezing or heavy pressure

The pain usually lasts longer than 20 minutes. Rest and a medicine called nitroglycerin may not completely relieve the pain of a heart attack. Symptoms may also go away and come back.

Other symptoms of a heart attack include:

- Anxiety
- Cough
- Fainting
- Light-headedness, dizziness
- Nausea or vomiting
- Palpitations (feeling like your heart is beating too fast or irregularly)
- Shortness of breath
- Sweating, which may be very heavy

Some people (the elderly, people with diabetes, and women) may have little or no chest pain. Or, they may have unusual symptoms (shortness of breath, fatigue, weakness). A "silent heart attack" is a heart attack with no symptoms.

Exams and Tests

A doctor or nurse will perform a physical exam and listen to your chest using a stethoscope.

- The doctor may hear abnormal sounds in your lungs (called crackles), a heart murmur, or other abnormal sounds.
- You may have a rapid pulse.
- Your blood pressure may be normal, high, or low.

A troponin blood test can show if you have heart tissue damage. This test can confirm that you are having a heart attack.

Coronary angiography is often done right away or when you are more stable. You may also have tests such as an electrocardiogram (ECG).

- This test uses a special dye and x-rays to see how blood flows through your heart.
- It can help your doctor decide which treatments you need next.

Other tests to look at your heart that may be done while you are in the hospital:

- Echocardiography
- Exercise stress test
- Nuclear stress test

Treatment

You will most likely first be treated in the emergency room.

- You will be hooked up to a heart monitor, so the health care team can look at how your heart is beating.
- The health care team will give you oxygen so that your heart doesn't have to work as hard.
- An intravenous line (IV) will be placed into one of your veins. Medicines and fluids pass through this IV.
- You may get nitroglycerin and morphine to help reduce chest pain.

Abnormal heartbeats (arrhythmias) are the leading cause of death in the first few hours of a heart attack. These arrhythmias may be treated with medications or cardioversion.

EMERGENCY TREATMENTS

Angioplasty is a procedure to open narrowed or blocked blood vessels that supply blood to the heart. Usually a small, metal mesh tube called a stent is placed at the same time.

- Angioplasty is often the first choice of treatment. It should be done within 90 minutes after you get to the hospital, and no later than 12 hours after a heart attack.
- A stent is a small, metal mesh tube that opens up (expands) inside a coronary artery. A stent is often placed after angioplasty. It helps prevent the artery from closing up again.

You may be given drugs to break up the clot. It is best if these drugs are given within 3 hours of when you first felt the chest pain. This is called thrombolytic therapy.

Some patients may also have heart bypass surgery to open narrowed or blocked blood vessels that supply blood to the heart. This procedure is also called open heart surgery.

AFTER YOUR HEART ATTACK

The following drugs are given to most people after they have a heart attack. These drugs can help prevent another heart attack. Ask your doctor or nurse about these drugs:

- Antiplatelet drugs (blood thinners) such as aspirin, clopidogrel (Plavix), or warfarin (Coumadin), to help keep your blood from clotting
- Beta-blockers and ACE inhibitor medicines to help protect your heart
- Statins or other drugs to improve your cholesterol levels

You may need to take some of these medicines for the rest of your life. Always talk to your health care provider before stopping or changing how you take any medicines. Any changes may be life threatening.

After a heart attack, you may feel sad. You may feel anxious and worry about being careful in everything you do. All of these feelings are normal. They go away for most people after 2 or 3 weeks. You may also feel tired when you leave the hospital to go home.

Most people who have had a heart attack take part in a cardiac rehab program. While under the care of a doctor and nurses, you will:

- Slowly increase your exercise level
- Learn how to follow a healthy lifestyle

LIVING A HEALTHY LIFESTYLE

To prevent another heart attack:

- Keep your blood pressure, blood sugar, and cholesterol under control.
- Don't smoke.
- Eat a heart-healthy diet rich in fruits, vegetables, and whole grains, and low in animal fat.
- Get plenty of exercise, at least 30 minutes a day, at least 5 days a week (talk to your doctor first).
- Get checked and treated for depression.
- Limit yourself to no more than one drink a day for women, and no more than two drinks a day for men.
- Stay at a healthy weight. Aim for a body mass index (BMI) of between 18.5 and 24.9.

Support Groups

See: Heart disease -- resources

Outlook (Prognosis)

After a heart attack, your chance of having another one is higher.

How well you do after a heart attack depends on the damage to your heart muscle and heart valves, and where that damage is located.

If your heart can no longer pump blood out to your body as well as it used to, you may have heart failure. Abnormal heart rhythms can occur, and they can be life threatening.

Usually a person who has had a heart attack can slowly go back to normal activities, including sexual activity.

When to Contact a Medical Professional

Immediately call your local emergency number (such as 911) if you have symptoms of a heart attack.

References

Anderson JL, Adams CD, Antman EM, Bridges CR, Califf RM, Casey DE Jr., et al. ACC/AHA 2007 guidelines for the management of patients with unstable angina/non-ST-elevation myocardial infarction: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Writing Committee to Revise the 2002 Guidelines for the Management of Patients With Unstable Angina/Non-ST-Elevation Myocardial Infarction) developed in collaboration with the American College of Emergency Physicians, the Society for Cardiovascular Angiography and Interventions, and the Society of Thoracic Surgeons endorsed by the American Association of Cardiovascular and Pulmonary Rehabilitation and the Society for Academic Emergency Medicine. *J Am coll Cardiol.* 2007;50:e1-e157.

Kushner FG, Hand M, Smith SC Jr, King SB 3rd, Anderson JL, Antman EM, et al. 2009 Focused Updates: ACC/AHA Guidelines for the Management of Patients With ST-Elevation Myocardial Infarction (updating the 2004 Guideline and 2007 Focused Update) and ACC/AHA/SCAI Guidelines on Percutaneous Coronary Intervention (updating the 2005 Guideline and 2007 Focused Update): a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. *Circulation.* 2009 Dec 1;120(22):2271-306. Epub 2009 Nov 18.

Antman EM. ST-segment elevation myocardial infarction: pathology, pathophysiology, and clinical features. In: Bonow RO, Mann DL, Zipes DP, Libby P, eds. *Braunwald's Heart Disease: A Textbook of Cardiovascular Medicine.* 9th ed. Philadelphia, Pa: Saunders Elsevier; 2011:chap 54.

Cannon CP, Braunwald E. Unstable angina and non-ST elevation myocardial infarction. In: Bonow RO, Mann DL, Zipes DP, Libby P, eds. *Braunwald's Heart Disease: A Textbook of Cardiovascular Medicine.* 9th ed. Philadelphia, Pa: Saunders Elsevier; 2011:chap 56.



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