

### **Introduction**

Each year more than one million Americans have a heart attack. Of those, the ones who do not seek medical help usually die. Thanks to medical technology, most heart attacks can be successfully treated if immediate medical help is provided.

This reference summary will help you understand the signs and causes of heart attacks, in case you or your loved one is at risk. It will also help you prepare for such an emergency. Tips for preventing heart attacks will also be presented.



### **Symptoms**

Most patients feel severe chest pain or pressure during a heart attack. This pain can spread to the arms, neck, back, and jaw area. The pain is prolonged, lasting anywhere from 30 minutes to several hours. Resting does not stop the pain or provide very much relief. Changing the position of the body does not relieve or change the pain either.

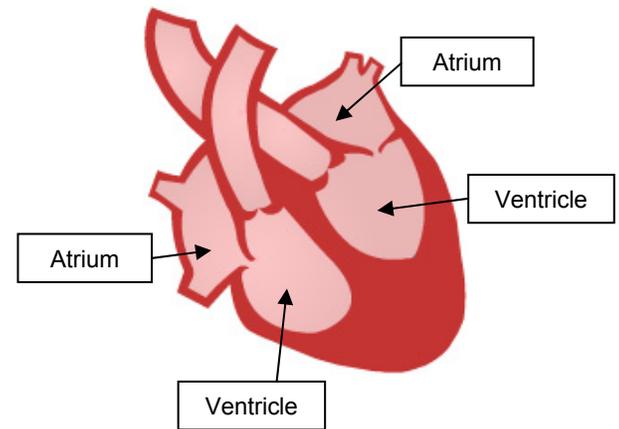
Some people feel indigestion and nausea during a heart attack. This may be coupled with sweating, dizziness, or shortness of breath. Some people do not feel any chest pain during a heart attack. This is especially true of diabetic people and people over the age of 75.

### **Heart Anatomy**

The heart is responsible for pumping blood to all the organs in the body. It is a highly specialized muscle that is expected to work continuously, without rest, for a lifetime!

The heart has a right and a left side. Each side has 2 chambers: the atrium and the ventricle. Special valves divide the chambers and prevent blood from flowing backward.

Blood loaded with oxygen comes from the lungs and enters the left atrium. It stays there until the mitral valve opens up and the atrium contracts. This forces the blood into the left ventricle. The blood is then pumped to the rest of the body through the aortic valve into the biggest blood vessel of the body, the aorta.



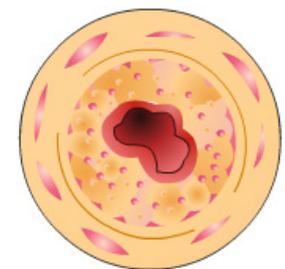
After the blood comes back from circulating through the body, it goes into the right atrium. From there, it is pumped into the right ventricle through the tricuspid valve and then to the lung through the pulmonic valve. In the lung, the blood picks up oxygen and returns to the left atrium, where the whole cycle starts again.

The heart needs a continuous supply of oxygen and sugar to be able to function. Oxygen-rich blood is delivered to the heart through the coronary arteries. These arteries branch off from the aorta.

The heart contracts automatically in a very coordinated manner. Special cells in the atrium set off the electric current needed to cause the atrium to contract. The electric current spreads to the ventricles through specialized cells. This causes the ventricles to contract after the atrium does.

## Causes

Fatty material, called plaque, can narrow the blood vessels of the heart. This is called atherosclerosis. Coronary artery disease develops if the blood vessels that carry oxygen to the heart become clogged.



Cross Section of an Artery  
with Atherosclerosis

Atherosclerosis can cause decreased blood flow and oxygen to the heart muscle; this is called ischemia. The first sign of coronary artery disease may be a chest pain

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called angina. Unlike a heart attack, angina disappears after about 10 minutes of rest or after taking special medications.

A coronary artery can become completely blocked by plaque or by a thrombus. A thrombus, or thrombosis, is when blood clots in an artery and totally blocks it; this usually happens in arteries that are already damaged and narrowed by plaque.

When thrombosis occurs, blood flow to that part of the heart stops. Without blood, the cells of the affected heart muscle will become permanently damaged; this is what happens during a heart attack.

### **Angina vs. Heart Attack**

The signs of a heart attack are similar to those of angina, with 3 main differences:

1. The pain is more severe.
2. The pain usually lasts longer than 5 minutes.
3. Nitroglycerin or rest does not relieve the pain.

As the coronary arteries get blocked, angina develops. If coronary artery disease is not controlled by changing to a healthier lifestyle, the blockage will get worse. Eventually, some of the coronary arteries will become completely blocked and cause a heart attack.



If you feel chest pain during a physical activity and the pain stops when you rest, you probably have angina. You should check with your doctor about the pain as soon as possible. If you have medication for angina, and neither resting nor taking the medicine relieve the pain, you could be having a heart attack and you should call for help immediately.

### **Treatment**

During angina, the heart does not receive enough oxygen. During a heart attack, the oxygen supply to part of the heart is completely blocked. The heart muscle starts to die by the minute. Within 6 hours, damage to the heart is extensive.

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If medical treatment is received within the first hour after a heart attack, the chances of survival and limiting damage to the heart are the best.

At the hospital, your doctor will do an electrocardiogram, or EKG, to help confirm whether you are having a heart attack. Blood tests are also done to check for heart muscle damage. Treatment is usually initiated before the results of the blood tests are back from the lab.



If a heart attack is confirmed, your doctor can:

- Give you medications to dissolve blood clots and open the arteries. These are known as thrombolytic drugs or “clot-busters”. Most of these medications are effective within ONE hour of the start of the heart attack. This is why it is **EXTREMELY** important to get to the hospital within an hour of the start of chest pain or other symptoms.
- Give you medication to relieve your pain.
- Stabilize your heart rhythm.
- Help you breathe better.

Cardiac catheterization may be done to look at the blood vessels of the heart. Depending on what that shows during this procedure, the cardiologist may be able to open the clogged or narrowed arteries with balloons and metallic meshes known as ‘stents’ during cardiac catheterization.

If the cardiac angiogram is not successful, or if the cardiologist decides that he or she cannot open the clogged artery with balloons or stents, open heart surgery may be recommended. During open heart surgery the clogged arteries are bypassed with leg veins or chest arteries.

If treated early, the heart will heal itself of any minor damage caused by a heart attack. If an effort is made to live a healthier lifestyle, future heart attacks can be prevented. A happy ending to the experience of a heart attack depends on getting medical attention as quickly as possible! If or when you have a heart attack, it will become more difficult for you to plan what to do while it is happening. It is best to have a plan ready in case it happens.

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## Your Emergency Plan

In case you feel signs of a heart attack, you need to know:

- WHO you are going to tell.
- WHEN you will go to receive medical care.
- WHICH medical facility you will go to and HOW you will get there.
- WHAT information you will need to provide your doctor with.

#1 is to tell someone how you are feeling and that you think you may be having a heart attack. In case you are alone when the signs of a heart attack start, decide now whom you will call and have his or her phone number on hand. This might be a friend or your doctor.

It is a good idea to share your health condition with a friend, spouse, roommate, or doctor; this could help to ensure that you get help when needed.

#2 is to decide when you should seek medical help. If you have already seen a doctor for angina, your doctor will tell you when to call for help. You should not wait more than 5 minutes before calling 911. This is especially true if the symptoms are severe and different from any milder angina pain you may have had in the past.



As you rest, untie any tight clothing and sit or lie in a comfortable position. Open a window if the room you are in is unventilated.

#3 is to decide how you are going to seek medical help:

- Which hospital emergency room are you going to go to?

Most hospitals nowadays are able to stabilize a patient with a heart attack. Because time is of the essence, the closest hospital is usually the best choice.

- Are you going to call 911 for an ambulance or have someone drive you there?

It is always better to call 911. In rare cases, some people who are very close to a hospital may be able to get to the hospital faster.

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The ambulance crew who will come to pick you up has specialized machines that can literally save your life if you were to suffer a sudden total cardiac arrest. However, if your condition is life threatening, and a person with you knows CPR, that person should call 911 for an ambulance and initiate CPR.

If you have already been prescribed medication, follow your doctor's instructions. In case you are taking nitroglycerin, this usually means calling for help if the pain lasts longer than five minutes and one dose of nitroglycerin does not relieve it. Do not wait for 5 minutes if the pain is of different type and intensity than angina. Call 911 immediately. It is always best to err on the safe side.



Remember it is always best to err on the safe side and call 911.

#4 is to know what information you should provide at the hospital. Be prepared to tell the emergency room doctor:

1. What type of pain you are feeling
2. When it started
3. If the pain changed since it started
4. What medications you have taken for the pain

You should also tell your emergency healthcare team:

1. If you have had a heart attack before
2. If you have had angina before and
3. What medications you take on a regular basis.

When you arrive at the emergency room, make sure you say, "I think I'm having a heart attack." If you don't and they have other emergencies, you may not get immediate attention.

Some people are afraid of being embarrassed if they say they are having a heart attack and it turns out that they are not. Others tend to deny having a heart attack by convincing themselves it is indigestion or a sore muscle. Nearly 1/3 of the people who do not seek treatment on time die.



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## Cardiac Arrest

A heart attack may cause a cardiac arrest. A cardiac arrest occurs when the heart stops pumping blood to organs of the body.

Ten seconds into a cardiac arrest, a person loses consciousness. If you shake or shout at the person, he or she will not respond.



As the heart stops, breathing may stop completely. When this happens, the person is having a cardiopulmonary arrest. Without cardiopulmonary resuscitation, or CPR, the patient dies!

Not all heart attacks lead to cardiac arrest. However, when it happens, the person or people you have chosen to share your health condition with should call 911, then immediately perform CPR.

The last few years have seen an increase in the availability of special machines that can shock the heart in cases of a cardiac arrest. These are known as Automated External Defibrillators or AED. These life-saving devices can now be found in many public places and airplanes.



If an Automated External Defibrillator is available, it should be used before CPR is initiated or 911 called.

These machines are very easy to use. It is important that you, your family members and friends learn how to use these machines. Ask your local hospital about special classes that teach the use of AEDs.

## Prevention

Medications, procedures, and surgeries do not cure coronary artery disease.

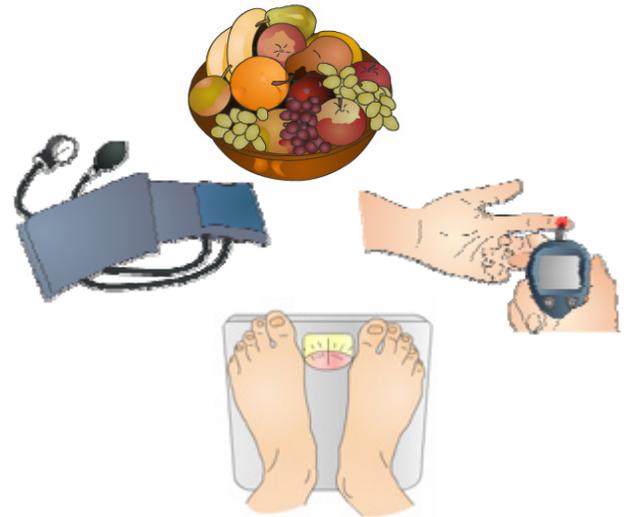
If healthy lifestyle changes are not adopted, blockage of coronary arteries will become even worse until a heart attack happens.

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The following are 9 important tips for living a healthier lifestyle that can improve the health of your heart.

1. Do not smoke.
2. Be physically active, under your doctor's supervision.
3. Eat a healthy, balanced diet that is rich in fiber and low in fat.
4. Check the level of cholesterol in your blood. If it is high, get it under control.
5. Check your blood pressure regularly. If it is high, keep it under control.
6. Lose weight if you are overweight.
7. Check the level of sugar in your blood. If it is high, keep it under control.
8. Get enough sleep at night.
9. Manage stress in your life.



If you have angina or other heart diseases, talk with your doctor before starting any exercise or weight loss program.

In addition to lifestyle changes, the right combination of medications can lower your risk of heart attack;

- **Vasodilators**, which lower blood pressure by causing the blood vessels to relax and widen
- **Aspirin**, which reduces the chances of the blood forming clots
- **Statins**, which lower your LDL, the “bad” cholesterol which can build up in your arteries
- **Beta blockers**, which relax the heart muscle and allows the heart to pump more easily

## Summary

Heart attacks are common among people with coronary artery disease. If not treated promptly, they could be fatal. There is a lot you can do to prevent a heart attack, including making changes in your lifestyle toward more healthy habits.

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If you have coronary artery disease, your chances of surviving a heart attack are much higher if you have a plan of action. This plan involves determining who to alert, when to seek emergency medical help, how to get there, and what to tell the emergency healthcare providers. Medical technology is available to help your heart recover. However, recovery depends on seeking help as soon as possible!

Check with your healthcare team about how they can help you learn to reduce your risk of heart attack.

In addition to your personal physician, your team may include:

- specialized nurse care managers
- pharmacists
- clinical health educators
- dietitians
- social workers, and
- specialists in behavioral medicine



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