

Patient information from the BMJ Group

Heart attack

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Heart attack

Excellent treatments are available for heart attacks, and they're improving all the time. These treatments not only help you through the heart attack, but also limit damage to your heart and can help you live longer afterwards.

We've brought together the best research about heart attacks and weighed up the evidence about how to treat them. You can use our information to talk to your doctor and decide which treatments are best for you.

What is a heart attack?

You have a heart attack when your heart doesn't get enough oxygen and part of it dies. This happens when one of the vessels that take blood and oxygen to your heart is suddenly blocked. You may be able to tell you're having a heart attack. You may feel severe pain in your chest that sometimes spreads down your arms.

If you think you're having a heart attack, call 999 at once. No one will blame you if it's a false alarm. And if it is a heart attack, every minute counts. At the hospital, doctors can run tests and treat you straight away. Acting quickly could save your life.

Key points about heart attacks

- A heart attack is life-threatening, but treatment can help you get through it.
- Most treatments work best if you get them quickly. If you think you're having a heart attack, call 999 straight away.
- If your artery is blocked and you are having a heart attack doctors will open the blocked blood vessel. They may do this with drugs. A heart specialist may do an operation or carry out a procedure to widen your blood vessel. Later, other treatments can help you stay healthy.
- A few changes in your lifestyle can make you feel better after a heart attack. They can also lower your risk of having another heart attack. If you smoke, stop now. Talk to your doctors about getting help.

Heart attack

- You may have to take medicine for a long time after a heart attack. Always talk to your doctor before you stop taking your medicine or change your dose.

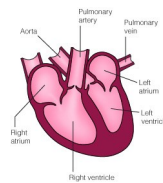
Your heart and what it does

Your heart is in the middle of your chest, under your breastbone. It's a muscle that is shaped like a fist. But your heart is different from the muscles in your arms and legs. It works automatically. You don't have to think about making it beat.

Your heart works like a pump. Every time it beats, it pushes blood around your body. Blood carries oxygen and food to your cells. The cells in your body will die if they don't get a constant supply of both.

Your heart works harder than any other organ in your body. If your heart stops working, every other part of your body will die within minutes. To learn more, see [How your heart moves blood around your body](#) .

The parts of your heart



Your heart works like a pump.

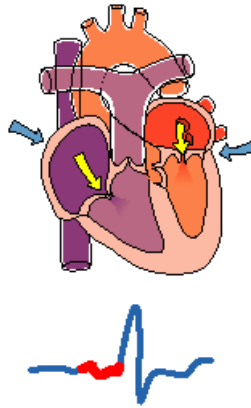
Your heart has thick muscular walls. It's divided into two sides, right and left. Each side has an upper section and a lower section. Doctors call these chambers.

The two chambers on the right side of your heart pump blood to your lungs, where the blood picks up oxygen. Blood then returns to the two chambers on the left side, which pump the blood to the rest of your body, taking oxygen and food to your cells.

The two upper chambers of your heart are called the **right atrium** and the **left atrium**. The two larger chambers in the lower part of your heart are called the **right ventricle** and the **left ventricle**.

Heart attack

What happens when your heart beats



Your heart's upper chambers pump first, then the lower chambers.

Every time your heart beats, three things happen:

- The heart relaxes so blood can enter it
- The two upper chambers then get smaller, squeezing blood into the two lower chambers
- The two lower chambers then get smaller and pump blood out to your lungs and the rest of your body.

Your heart beats around 60 times to 80 times a minute. But it can beat as many as 150 times a minute if you're exercising hard and your body needs more food and oxygen.

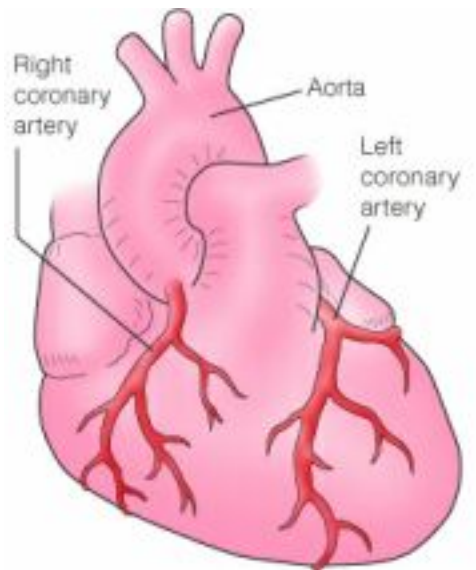
To learn more, see [How blood moves through your heart](#) and [How your heart moves blood around your body](#) .

How your heart gets its own supply of blood

To do its job, your heart needs its own supply of blood. It gets this from the **coronary arteries** . These are two major blood vessels that supply the heart's muscular wall with blood that is rich in oxygen.

In most people the left coronary artery is bigger than the right.

Heart attack



Coronary arteries bring your heart the blood it needs.

The left coronary artery has two main branches. One is called the left anterior descending artery (or LAD). It supplies most of the blood to the left ventricle, the part of the heart that pumps blood out to your body. This job makes this artery very important to your health.

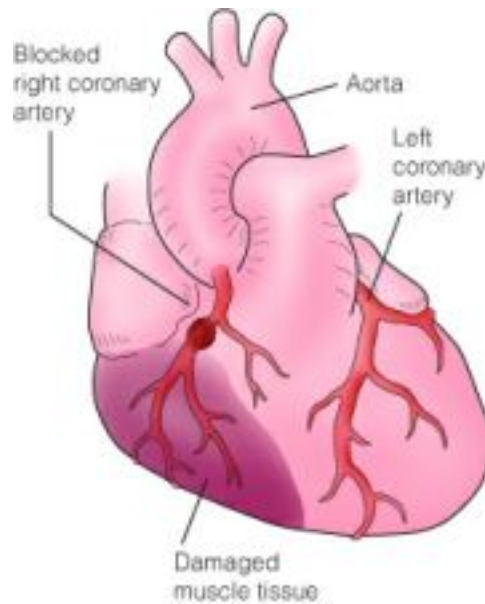
The right coronary artery is smaller. Its branches carry blood to the back of the heart.

Both of these arteries divide into a network of smaller vessels that take blood deeper into the heart muscle.

Your heart needs more oxygen from blood than other muscles do. If you have a heart attack and that supply is cut off, parts of your heart muscle are in danger of dying rapidly.

Heart attack

What happens during a heart attack



A blocked coronary artery causes heart damage.

During a heart attack, a blood clot blocks one of the arteries that deliver blood to your heart (coronary arteries).

If the blood supply is cut off for too long, part of the heart will die. The dead part of the heart heals into a scar. This causes permanent damage since heart muscle doesn't grow back. Doctors call a heart attack an **acute myocardial infarction** (or AMI).

Heart attacks are always dangerous.

They can cause many different problems for your heart. They can be especially dangerous if they mean your heart:

- Beats abnormally
- Can't pump properly. This is called heart failure
- Stops completely. Doctors call this **cardiac arrest**
- Ruptures. This means that the heart muscle tears
- Stops working properly because its valves aren't working as they should. Your heart valves keep blood flowing in the right direction through the pump mechanism.

If you have a heart attack that damages a lot of muscle, you're more likely to get serious complications. That's why it's important to **get treatment for a heart attack early**. The sooner blood and oxygen start flowing to your heart again, the less damage your heart is likely to have.

Heart attack

To learn more, see [Complications after a heart attack](#) .

How a clot forms

Your blood sticks together (or clots) whenever you have an injury, no matter where it is. Blood clots are important because they help stop you bleeding too much. But when the injury happens inside a coronary artery, the blood clot can lead to a heart attack.

All arteries have a smooth lining. This helps the blood flow through them and stops it clotting. But in some people, clumps of fatty deposits (plaques) build up on the lining. Over time, they make the artery narrower, stiffer, and less smooth than it should be. Doctors call this condition **atherosclerosis** . You might also have heard it called hardening of the arteries. Almost everyone who has a heart attack has atherosclerosis in the vessels that take blood to his or her heart (coronary arteries).

Sometimes one of these fatty deposits (plaques) cracks, and a blood clot forms over it just as it would over a cut in the skin. When this clot forms in an artery that is already narrow because of plaques, the clot may block your artery. We don't know why some plaques suddenly crack while others cause no trouble for years.

We do know that atherosclerosis is common. It can occur in arteries anywhere in your body. If you have atherosclerosis in your coronary arteries, you have heart disease. You may hear doctors call this ischaemic heart disease, coronary artery disease, coronary heart disease or coronary vascular disease. All these names mean the same thing.

You may have heart disease for many years without knowing it. A heart attack may be the first sign of trouble. Or you may get a type of chest pain called **angina** . This type of pain is a warning sign of a heart attack. You get angina when not enough blood gets to your heart. It's usually caused by atherosclerosis. But unlike a heart attack, pain from angina usually goes away if you rest.

Different types of heart attacks

Doctors call heart attacks by different names, depending on the part of your heart that's affected and how badly it's damaged. To learn more, see [Different types of heart attacks](#) .

Heart attack: why me?

Most heart attacks are caused by fatty deposits (plaques) building up in the arteries that supply the heart. We don't know exactly why they build up in some people's arteries and not others. But we do know that some things make it more likely you'll have heart disease and a heart attack. Doctors call these things **risk factors** .

We've listed the most important risk factors below. The more risk factors you have, the more likely you are to have a heart attack. You can't change the first three risk factors on our list. Being on a low income is also difficult to change. But you and your doctor can work to make the others less dangerous and reduce your chances of having a heart attack.

Heart attack

Risk factors for heart attacks include:

- Being male
- Being middle-aged or older
- Having people in your family who've had a heart attack
- Having a low income
- Smoking
- Having high cholesterol
- Having high blood pressure
- Being overweight
- Not getting enough exercise
- Having diabetes
- Being under stress
- Getting erection problems.

To read more about each of these, see [Risk factors for a heart attack](#) .

If you've had a heart attack recently, your life will be on hold for several weeks or longer while your heart recovers and you get over the shock. Many people use this time to make changes in their lifestyles to improve their health.

But you may feel low or depressed after your heart attack. Getting treatment for depression may help you cope better with your illness. See our information on [Depression in adults](#) to learn more.

There's a lot you can do to reduce your chances of having another heart attack. If you smoke, now is the time to stop. Eating better, controlling stress and exercising will all help. To learn more, see [What you can do after a heart attack](#) .

What are the symptoms of a heart attack?

Feeling a bad pain in your chest is the most common sign that you're having a heart attack.

If you have severe chest pain and you're not sure what is causing it, don't waste time. Call 999. Acting quickly might save your life. Once you get to hospital, doctors can run tests and treat you straight away.

Not everyone has bad chest pain

Not everyone who has a heart attack has bad chest pain. Some people have mild pain at first. Some have no pain at all. If you don't have pain, it's not easy to tell if you're having a heart attack. You might not know you need medical help. Up to one-quarter of all people who have a heart attack don't realise they've had one. ^[12]

There are other warning signs, such as having mild pain in your chest, arms, back, neck, jaw, or stomach. If you know about these it can help you decide if you're having a heart attack. It's worth learning about these symptoms, especially if you've already had a heart attack or if your doctor has told you you're at risk of having one.

Below you'll find a list of the most common symptoms of a heart attack.

Once you get to hospital, tests can tell doctors whether you're having a heart attack. If you are, they'll probably do more tests to find out what type of heart attack you've had. To learn more, see [Tests for a heart attack](#) .

Warning signs of a heart attack

Pain

The pain of a heart attack can stop you in your tracks. It can feel as if someone has tied a belt around your chest and is pulling it tighter and tighter until your breath is gone. People have described the pain as crushing, tightening, constricting, and pressing.

Your heart is a muscle and needs oxygen to keep working properly. During a heart attack, blood and oxygen can't get through to your heart. This causes pain around it.

You may have warning signs a few days before you have a heart attack. You may have chest pain that is uncomfortable but not severe. You may have a pain that feels like your chest is being crushed and you can't get enough air. If you have a type of chest pain called **angina**, the pain might keep getting worse. Angina is usually caused by hardening of the arteries (**atherosclerosis**). It happens because your heart isn't getting enough blood.

During a heart attack, you'll usually have pain in the centre of your chest. It often spreads down one arm, usually the left. Sometimes the pain is in both arms. Sometimes it spreads up into your jaw. The pain doesn't go away if you rest. It doesn't disappear if you take painkillers or medicine prescribed for a type of chest pain called **angina** . The pain usually lasts half an hour or more.

If you think you're having a heart attack, get help straight away. Don't delay.

Doctors call this kind of chest pain typical or classic. But for many people, heart attack pain is mild. Some people have no pain at all. If you're a woman, are older or have **diabetes** , you're less likely to have typical chest pain. ^[12]

To learn more, see [How to tell the difference between a heart attack and other pain](#) .

Heart attack

Feeling short of breath

If you feel short of breath, it could be because your pain is severe. It could be because you're anxious. It may also be a sign that your heart is not pumping properly.

Normally, the left side of your heart fills up with blood that is returning from your lungs. If the left side of your heart is damaged, pressure builds up and fluid is forced out of your blood vessels and into your lungs. When this fluid is forced into your lungs, it makes it hard for you to breathe.

Feeling faint or dizzy

Your **blood pressure** can drop during a heart attack. If your blood pressure gets too low, your brain doesn't get enough blood. This makes you feel dizzy or faint. You might even black out.

During a heart attack, your blood pressure may drop for a number of reasons. For example, your heart may be beating too quickly or too slowly because the nerves that control how fast your heart beats have been damaged. Your blood pressure can also drop if your heart is so badly damaged it stops working properly.

Sweating, nausea, and vomiting

During a heart attack, your body is in a state of emergency. Some of the nerves that control the functions of your body (such as your **temperature**) can go into overdrive. You may sweat or look very pale.

Your nervous system may also play a part in making you vomit or feel sick during a heart attack. We don't know the exact reason for these symptoms.

Irregular heartbeat

Doctors call an irregular heartbeat **arrhythmia**. When your heart is beating very fast, you may feel a fluttering in your chest or even a rapid thumping. Your heart can also beat too slowly after a heart attack. This happens if the nerves that control the speed of your heartbeat are damaged.

Blue tinge to your skin

Sometimes people's skin looks bluish when they're having a heart attack. During a heart attack your body shuts down the blood vessels in your hands and feet and directs blood to more important parts of your body. So your hands and feet may look pale and feel cold. If you have a blue tinge around your lips, your blood is not picking up enough oxygen in your lungs. If this happens, you may be given extra oxygen to breathe on the way to hospital.

Losing consciousness

Most people stay awake during a heart attack. But if someone passes out and can't be woken, it means their heart isn't beating well enough to supply their brain with the oxygen it needs. If this happens, the person needs emergency treatment.

Heart attack

The most dangerous type of abnormal heartbeat is called **ventricular fibrillation**. It happens when the walls of the lower parts of the heart are quivering instead of beating, and the heart can't pump blood properly. An abnormal heartbeat is the most common cause of death during or after a heart attack. Doctors and paramedics can get a regular rhythm going again by using a machine that delivers an electric shock to your heart. But they must do this within a few minutes of the abnormal heart rhythm starting.

In the meantime, other people can keep the blood flowing through your body if they know how to do a type of first aid called **CPR**. It stands for cardiopulmonary resuscitation. You need training to do CPR well.

The more people who know about CPR, the better. If you learn CPR you may be able to help save someone's life. Your doctor will be able to give you information on local classes.

After a heart attack

Many people make a full recovery after a heart attack. But some people continue to have health problems. These may include:

Chest pain (angina)

You might get a condition called **angina** after you've had a heart attack.

Angina is chest pain that happens when your heart doesn't get enough blood and oxygen. It's caused by your arteries becoming narrower and harder (a condition called **atherosclerosis**). This makes it more difficult for blood to get to your heart.

Angina tends to come on when your heart needs extra blood. For example, when you exercise or go out in cold weather. And it goes away when you rest. Your doctor can also give you medicine to help stop angina.

Changing your lifestyle can also help angina. For example, you can stop smoking and start eating more healthily. Joining a class to learn how to take care of your heart may also help. ^[13] Your doctor may be able to help you find one.

Feeling short of breath

You may feel short of breath occasionally. In one study of people who had a heart attack, 6 in 10 said they felt breathless at times. ^[14] If you feel short of breath, it could mean the left side of your heart is not pumping very well. Though this is called heart failure, it doesn't mean your heart is about to stop or that you are in immediate danger. But it can affect the quality of your life. To learn more, see our articles on [Heart failure](#).

Feeling depressed

You may feel depressed or low after you've had a heart attack. It's understandable. You've been seriously ill. About one-third of people who have heart attacks say they feel depressed soon afterwards. And 1 in 6 people get seriously depressed.

Heart attack

If you feel depressed, talk to your doctor. There are effective treatments for depression. And since being depressed can affect your recovery, it's important to get help early. ^[15]

To read more, see our information on [Depression in adults](#) .

How common are heart attacks?

Each year about 103,000 people in the UK have a heart attack. There are around 1.5 million people in the UK who have lived through a heart attack. ^[17]

Many people who have heart attacks also have **coronary heart disease**, a common condition that is the leading cause of death among adults in the UK. You get coronary heart disease when your **coronary arteries** narrow. (These arteries supply your heart with blood.) Every year 94,000 people die from coronary heart disease in the UK. ^[18]

Each year, more people live through a heart attack. ^[19] Researchers think this is because treatments are getting better. But there may be other reasons, too. The heart attacks that people have today seem to cause less damage to hearts than they did in the past. Researchers think this is because people's arteries are in better shape these days, thanks to lifestyle changes. For example, fewer people smoke now.

Research also shows that if you've had one heart attack, you are less likely than ever before to have another. ^[20]

What treatments work for a heart attack?

A heart attack is serious. But if you get treatment quickly, you have a good chance of living through it.

The first treatments you're likely to have will help clear the blockage that is stopping blood getting through to your heart. They will also stop the pain and limit the damage caused by your heart attack.

There are other treatments that can help with the pain and help your heart pump blood more easily. And there are treatments that can lower your chances of having another heart attack.

You can do a lot to help your heart recover. By keeping healthy you can make it less likely that you'll have another heart attack. You can ask your doctor about joining a **cardiac rehabilitation programme** to learn how to care for your heart and your health. To find out more, see [What you can do after a heart attack](#) .

You may have to take medicine for a long time after your heart attack. Don't stop taking your medicine without talking to your doctor first. If side effects bother you, see your doctor as soon as you can. You may be able to take a different medicine or a different dose.

Key points about treating heart attacks

- Treatments work best if you get them quickly. If you think you may be having a heart attack, call 999 straight away.
- While you're waiting for help, chew an aspirin. Aspirin can help you make it through your heart attack. But always call for help first, before looking for an aspirin.
- In hospital, two treatments can increase your chances of a good recovery. They are **clot-busting (thrombolytic) drugs** and an operation to open up blocked arteries. Both work well.
- Drugs called **beta-blockers** can reduce your risk of dying after a heart attack. They may also lower your chances of having another heart attack.
- After a heart attack, drugs called **ACE inhibitors** can help you live longer and may prevent another heart attack.
- You and your doctor can take steps to prevent another heart attack. For example, you will probably be given a drug called a **statin** before you leave hospital. Statins are drugs that are used to treat high cholesterol, but they can also help people who have had a heart attack. For more information, see [Statins for people with heart disease](#) in our section on high cholesterol.

Which treatments work best? We've looked at the best research and given a rating for each treatment according to how well it works.

For help in deciding which treatment is best for you, see How to use research to support your treatment decisions.

Treatment Group 1

Treatments for heart attacks

Treatments that work

- [Aspirin](#) : This is a drug that makes your blood less likely to clot. [More...](#)
- [Clot-busting \(thrombolytic\) drugs](#) : These break up the blood clot that is stopping blood reaching your heart. Common clot-busting drugs (and their brand names) include alteplase (Actilyse), reteplase (Rapilysin), streptokinase (Streptase), and tenecteplase (Metalyse). [More...](#)
- [Beta-blockers](#) : These are drugs that slow down your heartbeat. Common beta-blockers (and their brand names) include atenolol (Tenormin), metoprolol (Lopresor), propranolol (Inderal), and timolol (Betim). [More...](#)

Heart attack

- [ACE inhibitors](#) : These are drugs that relieve the strain on your heart after a heart attack. Common ACE inhibitors (and their brand names) include captopril (Capoten), enalapril (Innovace), lisinopril (Zestril), and ramipril (Tritace). [More...](#)
- [Angioplasty](#) : This surgery widens a blocked artery in your heart. [More...](#)

Treatments that are likely to work

- [Nitrates \(if you haven't been treated with clot-busting drugs\)](#) : These are drugs that widen your heart's blood vessels. Common nitrates (and their brand names) include isosorbide dinitrate (Isoket Retard), isosorbide mononitrate (Elantan, Ismo, Imdur), and glyceryl trinitrate (GTN tablets, Nitrolingual pump spray, Nitromin). [More...](#)
- [Antiplatelet agent treatment after a heart attack](#) : These are drugs taken with aspirin to prevent blood clots after a heart attack. Antiplatelet agents (and their brand names) include clopidogrel (Plavix), prasugrel (Effient), and ticagrelor (Brilique). [More...](#)

Treatments that work, but whose harms may outweigh benefits

- [Glycoprotein IIb/IIIa inhibitors](#) : These drugs help stop clots forming in your arteries. There are three glycoprotein IIb/IIIa inhibitors: abciximab (ReoPro), eptifibatide (Integrilin), and tirofiban (Aggrastat). [More...](#)

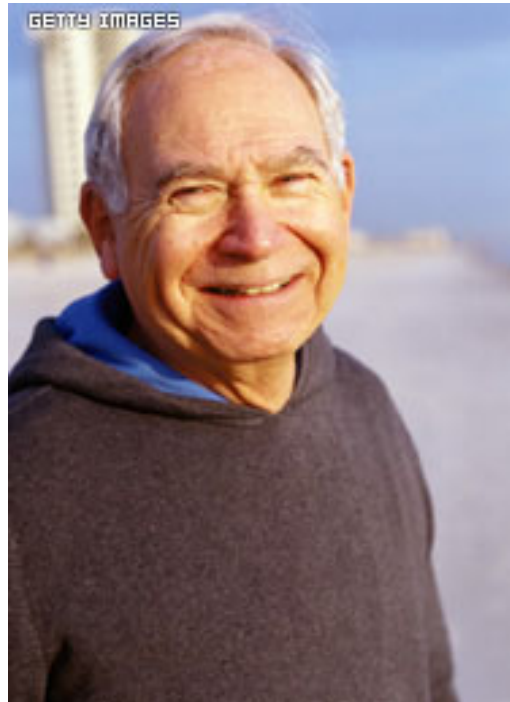
Treatments that are likely to be ineffective or harmful

- [Calcium channel blockers](#) : These are drugs that make your heart beat less strongly. Common calcium channel blockers (and their brand names) include: diltiazem (Tildiem), felodipine (Plendil), nifedipine (Adalat, Coracten SR), and verapamil (Cordilox, Univer). [More...](#)

What will happen to me?

A heart attack is serious. If you've had one, you're probably worried that you might have another.

Heart attack



A heart attack is serious, but modern treatments can help you recover.

No one can tell you for certain what will happen to you. But treatments for heart attacks work, and they are improving all the time. These treatments can help you survive a heart attack. They can also limit the damage done to your heart and help you live longer. To learn more, see [What treatments work for a heart attack?](#)

If you're reading this and you've already had a heart attack, you've cleared the first hurdle: you've survived. Now your doctor will keep a careful eye on you to see if any problems come up. But it's not just up to your doctor to keep you healthy after a heart attack. You can make a real difference to how well you live and how long you live. To learn more, see [What you can do after a heart attack](#) .

The first few weeks after a heart attack

If nothing else goes wrong after your heart attack, your heart will go on pumping normally and you have a good chance of recovering quickly. You may need one or two days of bed rest in hospital. After that you'll probably be allowed out of bed but spend four or five extra days in hospital.

During this time, doctors will do more tests to try to find out exactly what happened. They'll also find out which part of your heart has been damaged and whether the damage is severe or mild. To find out more, see [Tests for a heart attack](#) .

If all is well, you'll go home about a week after your heart attack. You'll probably be advised to slowly become more active. Most people who live through a straightforward heart attack can return to their normal level of activity within six weeks. Younger people are usually back at work within three months.

Heart attack

During your first few weeks at home, you can expect to feel tired, but you shouldn't feel exhausted. You may be emotional, too. You're likely to feel angry, frightened, and anxious about the future. Some people describe this time as an "emotional rollercoaster". Talking about your feelings to friends and family may help.

If your mood doesn't improve within a couple of weeks and you [feel depressed](#), it's important to talk to your doctor straight away. Depression may make your recovery more difficult, and good treatments are available. ^[15]

Your future

How you get along after the first few weeks since you had a heart attack depends on many things, including how much of your heart has been damaged. Your recovery also depends on how well you stick with your drug treatment and how much you stick with your plans to have a more healthy life. Talk to your doctor about what to expect during your recovery. To learn more, see [What can affect your recovery from a heart attack](#).

Your doctor may want to discuss:

- How severe your heart attack was and which part of your heart has been damaged
- Any complications that could keep you from making a full recovery or might mean that you need more treatment. (For more information, see [Complications](#))
- Other medical problems that you have, including whether you've had a heart attack or a stroke before or whether you have a type of chest pain known as [angina](#)
- What you and your doctor can do to stop you having another heart attack.
- Whether you should consider an operation called a coronary artery bypass graft (a heart bypass). This operation improves the blood flow to your heart. (For more information, see [Having a coronary artery bypass](#).)

Get advice from your doctor on things that may affect your chances of having another heart attack. You may need to get your [blood pressure](#) and [cholesterol](#) under control, give up smoking, eat healthily, lose weight, start exercising or learn how to deal with stress better. Your doctor may suggest that you take a class to learn how to take care of your heart. Hospitals often offer these kinds of classes. (For more information, see [What you can do after a heart attack](#).)

Can I have sex?

If you've had a heart attack, you may wonder whether having sex can trigger another. Sex is safe for most people after a heart attack. Some people feel ready to have sex just a couple of weeks after a heart attack. Talk to your doctor about when it will be safe for you. Sex is a form of exercise, so you should tell your doctor if physical activity brings on chest pain or makes you feel short of breath.

Heart attack

Heart attacks in women

Women, whatever their age, are less likely to have heart attacks than men. But when women have heart attacks, they're often more serious. Women are more likely than men to die from a heart attack.^[21] Women who live through a heart attack are more likely than men to have a second heart attack within four years. This might be because their heart disease is often more severe by the time they have their first heart attack.

If you're a woman who has lived through a heart attack, it's especially important that you help your heart recover. To learn more, see [What you can do after a heart attack](#) .

Women are less likely than men to have chest pain, which is the usual symptom of a heart attack. So it's important for women to be aware of other possible warning signs, such as feeling short of breath. To read more about warning signs, see [What are the symptoms of a heart attack?](#)

Positive changes in your life

Believe it or not, once the pain and shock are over, positive changes can come from a heart attack. In one survey in New Zealand, 70 in 100 people said they had made positive changes in their lives after their heart attack. One-quarter said they became closer to their loved ones.^[22]

There's even some evidence that positive thinking can help you recover from a heart attack.^[23]

Questions to ask your doctor

If you've had a heart attack, you may want to talk to your doctor to find out more.

Here are some questions that you might want to ask:

- How much has my heart been damaged? Where is the damage?
- Is my heart pumping properly?
- Am I likely to have complications from my heart attack, such as an abnormal heartbeat?
- Could my heart stop beating?
- Did I have treatment to unblock the artery that carries blood to my heart (the **coronary artery**)? If I haven't, will I have treatment to unblock it?
- If I had drug treatment, why did you choose that over surgery to clear the blockage? Why did you choose it over an operation to widen my artery so that more blood can pass through (known as [coronary angioplasty](#))?

Heart attack

- If I had surgery or coronary angioplasty, why did you choose that over drug treatment?
 - Will I have to take drugs for the rest of my life?
 - When can I go home?
 - What are my chances of having another heart attack?
 - What things can I do to avoid having another heart attack?
 - When will I be able get back to work or my hobbies?
 - Will my children be more likely to have a heart attack when they're older?
-

Treatments:

Aspirin

In this section

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[What is it?](#)

[How can it help?](#)

[How does it work?](#)

[Can it be harmful?](#)

[How good is the research on aspirin?](#)

This information is for people who have had a heart attack. It tells you about aspirin, a treatment used for heart attack. It is based on the best and most up-to-date research.

Does it work?

Yes. If you take an aspirin soon after your chest pain begins, you'll have a better chance of living through a heart attack. If you think you're having a heart attack, call 999 and then take an aspirin tablet while you wait for help. Chew the aspirin before swallowing it, or dissolve soluble tablets in water. It will get into your bloodstream faster.

Aspirin can also help if you've had a heart attack before. Taking an aspirin a day helps reduce the chances you'll have another heart attack.

What is it?

Most of us think of aspirin as a painkiller. But it's also an **antiplatelet** drug. **Platelets** are sticky particles that help your blood clot when you're injured. But sometimes platelets also form clots in the vessels that supply blood to your heart (your **coronary arteries**). This can cause a heart attack. Aspirin stops platelets from sticking together, making your blood less likely to clot.

You can buy aspirin at chemists and supermarkets, and you can also get it on prescription from your doctor. You can get aspirin as:

Heart attack

- Tablets to swallow whole
- Tablets that you chew
- Tablets to dissolve in water
- Tablets with a special coating to protect the lining of your stomach
- Suppositories (larger, bullet-shaped drugs that go in your rectum).

You can take any type of aspirin during a heart attack. But it's best to chew an aspirin tablet instead of swallowing it whole.

Always tell your doctor or dentist that you are taking aspirin. Aspirin can make you bleed more than usual during dental or medical operations.

If you're allergic to aspirin or can't take it for some other reason, your doctor may give you another antiplatelet agent to stop your blood clotting. Your doctor may suggest you take clopidogrel (Plavix) or dipyridamole (Persantin). Clopidogrel is often given to patients who are allergic to aspirin.

These drugs seem to work just as well as aspirin. ^[36]

How can it help?

If you take aspirin while you're having a heart attack, it can help you live through it. But aspirin won't help the symptoms of a heart attack (such as pain or feeling short of breath), so you won't notice it working.

If you take aspirin during or soon after a heart attack, and for at least a month afterwards, it will: ^[36]

- Cut your chances of having another heart attack by about one-third
- Cut your chances of having a stroke by about one-third
- Cut your chances of dying from a heart attack, a stroke or another problem with your heart or circulation by about one-sixth.

To learn more about aspirin and strokes, see [What treatments work for stroke?](#)

Aspirin starts to work a few hours after you take your first dose. But the benefits of using it for just one month last for up to four years. ^[37] But we don't know how long you should keep taking aspirin after you have a heart attack. Research suggests you should take it for at least several years or perhaps for the rest of your life.

How does it work?

Aspirin stops your blood clotting by making **platelets** less sticky. Platelets are tiny blood cells in your bloodstream. They help blood clot when you are injured. The less sticky your platelets are, the less likely they are to form clots in the blood vessels that supply your heart with blood (your **coronary arteries**). If you have a clot in one of these blood vessels, then blood can't reach your heart and you will have a heart attack.

During a heart attack, aspirin doesn't break up the clot, but it can stop it getting bigger. After you've had a heart attack, aspirin helps prevent other clots forming.

Can it be harmful?

All drugs have side effects, including aspirin. But if you're having a heart attack, it is not the time to worry about them. The two most common side effects are:

- [Bleeding](#)
- [An upset stomach](#).

How good is the research on aspirin?

The evidence for using aspirin to treat heart attacks is very good. We know it saves lives and can lower your chances of having another heart attack or a **stroke**.

Most of the evidence comes from a study of more than 17,000 people who made it to hospital within hours of having a heart attack.^[26] Four treatments were compared (aspirin, a clot-busting drug called streptokinase, aspirin plus streptokinase or no treatment). People who were treated with aspirin did much better than those who did not get aspirin. Aspirin plus streptokinase worked the best.

Eight other studies confirmed that aspirin helped to treat heart attacks.^[36] However, we are still not sure how much aspirin to take and for how long to take it. Doses of aspirin between 75 milligrams and 325 milligrams worked well. One study showed that doses between 160 milligrams and 325 milligrams worked promptly to thin the blood.

Clot-busting (thrombolytic) drugs

In this section

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[How do they work?](#)

[Can they be harmful?](#)

[How good is the research on clot-busting \(thrombolytic\) drugs?](#)

This information is for people who have had a heart attack. It tells you about clot-busting (thrombolytic) drugs, a treatment used for heart attack. It is based on the best and most up-to-date research.

Heart attack

Do they work?

Yes. If you have a heart attack, clot-busting drugs can save your life. They work best if you get them as soon as possible after your heart attack (within a few hours of your first symptoms). They not only improve your chances of living through a heart attack, they also reduce your risk of dying from heart problems later. All the drugs in this group seem to work equally well.

Doctors call clot-busting drugs **thrombolytics** or **thrombolytic drugs**.

What are they?

As their name suggests, clot-busting drugs break up blood clots. If you've had a heart attack, doctors use these drugs to dissolve the clot that caused it.

Doctors inject these drugs directly into your bloodstream, usually through a tube in one of the veins of your lower arm. For some of these drugs, you only need one injection. With others, you may be put on a drip (also called an IV or **intravenous infusion**) for an hour or so.

Here are some examples of thrombolytic drugs (with brand names in brackets).

- alteplase (tissue-type plasminogen activator) (Actilyse)
- reteplase (Rapilysin)
- streptokinase (Streptase)
- tenecteplase (Metalyse)

You might get another drug, called heparin, along with or after treatment with a clot-busting drug. Heparin is a 'blood-thinner', which means it stops blood clots forming. Adding a blood-thinner to a clot-busting drug is likely to be better than just using a clot-buster.

Treatment with heparin may last just a day or two, or until you leave hospital. There are two types of heparin: **unfractionated (or standard) heparin** and **low-molecular-weight heparin** (or LMWH).

Unfractionated heparin has the brand names Monoparin and Multiparin. It can be given as an injection or a drip.

The only LMWH used to treat heart attacks is called enoxaparin (brand name Clexane). Enoxaparin can be given as an injection or a drip.

How can they help?

If you've had a heart attack, research shows us that getting clot-busting drugs can:

- Increase your chances of surviving your heart attack. ^[27]

Heart attack

- Increase your chances of being alive 12 years after your treatment. ^[38]

You can take these drugs as long as 12 hours to 18 hours after a heart attack and they'll still work. But they work better if you take them earlier. ^[27] ^[39]

All the clot-busting drugs seem to work as well as each other. ^[39]

Clot-busting drugs:

- Work for all types of heart attacks
- Can help people who have **diabetes** or who have had heart attacks before
- May be more helpful to people who have damage to the front of their hearts than to people who have damage to the back or base of their hearts. ^[27] To learn more, see [Different types of heart attacks](#) .

Getting a type of blood-thinner called heparin after being treated with a clot-busting drug can reduce your chances of having another heart attack in the next 30 days. ^[40] Low molecular weight heparin seems to work better than unfractionated heparin. ^[41] ^[42]

Your chances of surviving a heart attack may not be as good with a clot-busting drug as they are if you have an operation to clear your arteries. ^[43] This may only be the case, however, if you're treated by experienced surgeons. Also, you need to have this operation quickly (as soon as possible after you get to hospital), and this may not always be possible.

How do they work?

Thrombolytic drugs work by attacking fibrin, the substance in your blood that keeps a clot together. Once a clot-busting drug gets into your bloodstream, it takes just a few seconds to reach your **coronary arteries** . The drug then starts dissolving the clot that is blocking your artery. This lets blood flow to your heart again.

Blood clots cause heart attacks by blocking one of the blood vessels that supply your heart with blood (your coronary arteries). Clot-busting drugs are also called **fibrinolytic drugs** because they break up **fibrin**, the main substance in blood clots.

If the blood supply to part of your heart is cut off, your heart muscle in that area will die within six hours. Clearing the blockage quickly means that your heart will have less damage. If the damage is limited, you're less likely to have dangerous complications, such as heart failure or an abnormal heartbeat. This may explain why clot-busting drugs reduce your risk of dying straight after a heart attack and why they help patients who have had a heart attack live longer.

Heparin is sometimes used along with, or after, a thrombolytic drug. It stops clots forming. Doctors think that giving heparin to people after they have had a treatment with a

Heart attack

thrombolytic drug will help to keep the blood vessels clear of clots and reduce the chances of another heart attack.

To learn more, see [Complications after a heart attack](#) .

Can they be harmful?

Clot-busting drugs can have serious side effects. If it's at all possible, discuss them with your doctor before treatment. The two main side effects are:

- [Strokes](#)
- [Bleeding](#) .

How good is the research on clot-busting (thrombolytic) drugs?

The evidence from research on clot-busting drugs is very good. These drugs can help save your life after a heart attack.

We found a summary of nine studies involving nearly 60,000 people. ^[27] These studies compared clot-busting drugs with either a dummy treatment (a placebo) or no treatment. About 90 percent of the people in the studies lived for at least one month after their heart attack. But the group that got the clot-busting drugs did better than the other two groups. People in a recent study who took clot-busting drugs were 20 percent less likely to die during the study. ^[27]

Most of the people in these studies got clot-busting drugs within a few hours of having a heart attack. But about 13,000 people didn't get the drugs for up to 12 hours. Even in these cases, people who got the drugs were more likely to live through their heart attack than those who got the placebo or no treatment at all.

Clot-busting drugs may still help if you get them more than 12 hours after a heart attack, but there isn't enough research to be certain. It's possible the risks of having a stroke or bleeding caused by clot-busting drugs outweigh the benefits if the drugs are used so many hours after a heart attack.

The benefit of a single treatment with these drugs probably lasts for several years. One study which tracked 219 patients for nearly 12 years showed that people who got the drugs were more likely to be alive 12 years later than those given a placebo. ^[38]

Five studies comparing different clot-busting drugs found that they all work about the same. ^{[44] [45] [46] [28] [47]}

The most important thing is to get treatment.

Adding heparin to treatment with clot-busting drugs

There are two types of heparin: **standard (unfractionated) heparin** and **low molecular weight heparin (LMWH)**. The only LMWH used to treat heart attacks is called enoxaparin.

Heart attack

One big study (496 people) compared what happened when enoxaparin was added to standard clot-busting drugs. It showed people who had enoxaparin were less likely to have a second heart attack during the 30 days after the first heart attack. But there was no difference in how likely people were to live at least 30 days. ^[40]

Two summaries of the evidence (**systematic reviews**) covering eight studies looked at whether unfractionated heparin was better or worse than low molecular weight heparin. Both showed that LMWH was better at preventing heart attacks, but that there was not a big difference in how likely people were to live longer. ^{[41] [42]}

Another summary of 23 good studies (called **randomised controlled trials**) found that an operation to clear blocked arteries reduced the chances of having another heart attack, dying or having a stroke more than being treated with a clot-busting drug. ^[43] But how good surgery is compared with drug treatment may depend on how experienced the surgeon is and how quickly you have the operation.

Beta-blockers

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[Can they be harmful?](#)

[How good is the research on beta-blockers?](#)

This information is for people who have had a heart attack. It tells you about beta-blockers, a treatment used for heart attack. It is based on the best and most up-to-date research.

Do they work?

Yes, if you take beta-blockers you have a better chance of living through a heart attack. The benefits start in the first week of treatment. And, because the benefits continue for months or even years, beta-blockers can help keep you from having another heart attack.

Beta-blockers help you even if you are given the newer clot-busting drugs (also called **thrombolytic drugs**). For more information, see [Clot-busting \(thrombolytic\) drugs](#) and [Getting beta-blockers as added treatment](#) .

What are they?

Beta-blockers are a group of drugs that are used to treat heart problems. Doctors prescribe them after a heart attack to lower the chances of further damage to the heart muscle.

Beta-blockers:

- Slow your heart down
- Make it beat less strongly

Heart attack

- Make it work less hard
- Reduce the amount of oxygen it uses.

Some common beta-blockers (and their brand names) are listed below.

- acebutolol (Sectral)
- atenolol (Tenormin)
- betaxolol (Kerlone)
- bisoprolol (Cardicor, Emdor)
- carvedilol (Eucardic)
- celiprolol (Celectol)
- esmolol (Brevibloc)
- labetalol (Trandate)
- metoprolol (Lopresor)
- nadolol (Corgard)
- oxprenolol (generic version available)
- pindolol (Visken)
- propranolol (Inderal)
- sotalol (Beta-Cardone, Sotacor)
- timolol (Betim)

Some beta-blockers can be injected directly into your bloodstream. Others come as pills. Doctors usually give injections of beta-blockers in the first few hours after a heart attack. This is because injections work faster than tablets.

Most people should start taking beta-blockers as soon as possible after your heart attack. It's usually best to start taking them within a day. However, doctors need to be sure that your blood pressure is not too low, and that your heart has started pumping properly again.

Heart attack

Some people who have had heart attacks are not given beta-blockers and may be missing out on the drugs' benefits. This is partly because doctors used to think beta-blockers could stop your heart working properly after a heart attack. We now know this isn't the case. If you have had a heart attack and are not on beta-blockers, talk to your doctor about it.

How can they help?

Beta-blockers can help you survive a heart attack. They can also reduce your risk of having another. Beta-blockers begin helping you in the first week after your heart attack. And their benefits may last for several months or years if you continue to take them. ^[48]
^[49]

Getting treatment early (starting on the day of your heart attack) seems to work better than getting treatment later for most people. But any treatment with beta-blockers is better than not getting them at all. ^[50]

Even if you have a small operation or clot-busting drugs to clear the blocked coronary artery, adding beta-blockers to your treatment may make it more likely that you'll live through your heart attack. ^[51] For more information, see [Getting Beta-blockers as added treatment](#) .

Beta-blockers can help you even if you have heart failure. ^[51] For more information, see [Heart failure and beta-blockers](#) .

Beta-blockers can help ease the pain of a heart attack. They may also limit the amount of damage to your heart, leaving a smaller scar. If the scar is smaller, you are less likely to have serious complications from your heart attack. This is probably why these drugs help you live longer after your heart attack.

How do they work?

Beta-blockers stop the action of chemicals called **adrenaline** and **noradrenaline**. Your body produces these chemicals when you are scared, angry, or in pain. They put your blood pressure up and make your heart race. The pain and anxiety you feel when you have a heart attack make your body produce adrenaline and noradrenaline.

Beta-blockers reduce the effects that these chemicals have on your heart. So they slow your heart down and stop it working too hard. A slower, more relaxed heart uses less oxygen. And that's important if the vessels that carry blood to your heart (your coronary arteries) are narrower than normal because of a clot. Your heart gets oxygen from your blood. When your heart needs less oxygen, the pain from your heart attack eases off.

Because they stop your heart from working too hard, beta-blockers also:

- Lower your blood pressure and stop it rising suddenly when you feel anxious, under stress or in pain. This can help prevent another heart attack

Heart attack

- Help control your heartbeat so you have less chance of developing a fast abnormal heartbeat (arrhythmia). To learn more about what can happen after a heart attack, see our page on [Complications](#) .

Can they be harmful?

For most people, the benefits of beta blockers outweigh the risks. But they can cause problems immediately after a heart attack if your blood pressure is still too low, or your heart isn't pumping correctly. Beta blockers can increase the chances of a problem called **cardiogenic shock**. This happens when the heart can't pump enough blood around the body. ^[52]

Beta-blockers also have side effects in the long term. For most people they tend to be mild. Some studies show that only about 6 in every 100 people stop taking beta-blockers because of side effects. ^{[48] [49] [51]}

Some of the side effects of taking beta-blockers are listed below. ^[51]

- Low blood pressure: If you stand up quickly, you may feel dizzy. You may also feel more tired than usual. If your **blood pressure** drops very far, you may faint. Your doctor will help you avoid these problems by choosing the right dose for you.
- Losing your sex drive or having difficulty keeping an erection: People taking older types of beta-blockers sometimes had these problems. You can usually avoid them if your doctor prescribes a beta-blocker that acts on your heart more than on other parts of your body. It will also help if you're taking the lowest dose that you can.
- Lung problems getting worse: If you have **asthma** or **chronic bronchitis** , you may not be able to take beta-blockers. Discuss your chest problems with your doctor. Some beta-blockers work better than others for people with lung problems.

How good is the research on beta-blockers?

The research on beta-blockers is extremely good.

Two studies of beta-blockers have been done since clot-busting (thrombolytic) drugs became the usual treatment for heart attacks. They are:

- A study of nearly 1,500 people that compared early treatment with beta-blockers to treatment started six days after a heart attack. People who were treated early had less chest pain and were less likely to have another heart attack. ^[50] This study lasted about a year
- A study of nearly 2,000 people treated up to three weeks after a heart attack. Half were given a beta-blocker, the other half were given a dummy treatment for comparison (a **placebo**). The beta blocker cut the risk of death during the study by

Heart attack

about one-fifth, and cut the risk of another heart attack by about one-third.^[51] This study lasted for more than a year.

Which beta-blocker is best?

Some research has looked at whether one beta-blocker works better than another. But they all seemed to work equally well. Your doctor will help you choose one that is best for you.^[48]

ACE inhibitors

In this section

[Do they work?](#)

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[How good is the research on ACE inhibitors?](#)

This information is for people who have had a heart attack. It tells you about ACE inhibitors, a treatment used for heart attack. It is based on the best and most up-to-date research.

Do they work?

Yes. Taking an ACE inhibitor may help you survive a heart attack.

What are they?

ACE inhibitors are drugs that are used to treat heart problems. They help stop your blood vessels getting narrower. This makes it easier for blood to flow through them.

ACE inhibitor is a shortened version of the drugs' full name: angiotensin-converting enzyme inhibitors.

Angiotensin is a chemical made by your body. It helps keep your **blood pressure** within the normal range. Usually, it works well. But if you've had a heart attack, or if your blood pressure is too high, angiotensin puts strain on your heart. ACE inhibitor drugs stop angiotensin from raising your blood pressure.

Some common ACE inhibitors (and their brand names) are listed below.

- captopril (Capoten)
- cilazapril (Vascase)
- enalapril (Innovace)
- fosinopril (generic)

Heart attack

- imidapril (Tanatril)
- lisinopril (Zestril)
- moexipril (Perdix)
- perindopril (Coversyl Arginine)
- quinapril (Accupro)
- ramipril (Tritace)
- trandolapril (Gopten, Odrik)

How can they help?

If you have had a heart attack, taking ACE inhibitors may save your life and help you live longer. ^[53] You're more likely to be alive after your heart attack if you take an ACE inhibitor than if you have a dummy treatment (placebo). ^[53] To get the most benefit, you should take an ACE inhibitor within 24 hours of your heart attack starting.

How do they work?

Researchers are still not sure why ACE inhibitors help people live through a heart attack. They think that these drugs may limit the size of the scar that is left on your heart, help your heart recover, or prevent damaging chemicals from being released by your body. They may also improve the supply of blood to your heart muscle and so help get more oxygen to your heart.

Can they be harmful?

Yes, like most drugs, ACE inhibitors have side effects. There can be short-term side effects and long-term side effects. ^[32] You shouldn't take ACE inhibitors if you're pregnant or planning to get pregnant. These drugs can harm your unborn baby. ^[54]

Short-term side effects

These usually happen within the first week or so after you begin treatment. If you've had a heart attack, the two most important side effects to know about are:

- [Low blood pressure](#)
- [Kidney problems](#) .

Long-term side effects

If you take ACE inhibitors for a long time, these are some of the side effects that you may have:

- [Dry cough](#)
- [Nausea, diarrhoea and high levels of potassium in your blood](#)
- [Swelling of your lips, eyes and face](#) .

How good is the research on ACE inhibitors?

The evidence for ACE inhibitors is good.

We found one large overview (called a [systematic review](#)) that included information on 15 studies involving 15,000 people. ^[53]

In these studies, some patients were given ACE inhibitors within 14 days of a heart attack and the other patients were given a dummy treatment ([placebo](#)). The researchers followed the patients for between 2 months and 42 months. During that time, about 17 in 100 people given the placebo died, while only 14 in 100 people given the ACE inhibitors died. ^[53]

Most of the research suggests that treatment works best if it is started within 24 hours of a heart attack.

Despite this research, important questions remain. Doctors don't know:

- Who should be treated. Should they treat everyone who has had a heart attack, or just the people with the most to gain, including people with heart failure?
- How long after a heart attack is too late to start treatment
- How long treatment should continue.

There isn't enough research to say that everyone should take ACE inhibitors.

Angioplasty

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[How good is the research on an operation to widen blocked arteries?](#)

Heart attack

This information is for people who have had a heart attack. It tells you about an operation to widen blocked arteries, a treatment used for heart attack. It is based on the best and most up-to-date research.

Does it work?

Yes. If you have a heart attack, an operation to widen blocked arteries can save your life. The operation is called a **coronary angioplasty**. You might also hear it called **percutaneous coronary intervention**.

Sometimes an operation works better than clot-busting drugs, the other emergency treatment for a heart attack. But if you can't get to a hospital where heart specialists are used to doing this operation, then clot-busting drugs may be better.

To learn more, see [Clot-busting \(thrombolytic\) drugs](#) .

What is it?

This operation can open up the blocked arteries that caused your heart attack. Blood can then flow to your heart again.

During the operation, a doctor uses a tiny deflated balloon that is attached to the end of a thin tube. This tube is inserted into your body, usually near your groin. It is then fed through your blood vessels until it reaches the part of your artery that is blocked. The doctor then inflates and deflates the balloon several times, widening the artery and getting blood flowing through it again. Sometimes doctors insert a small metal tube (called a stent) to keep the artery open.

The Department of Health said in October 2008 that it wanted coronary angioplasty to be the first emergency treatment for most people having a heart attack. It said that ambulances should take people who'd had heart attacks straight to the first hospital that can do angioplasty, rather than the closest hospital. ^[55]

We've prepared some extra information for people thinking of having this operation. To read more, see [Coronary angioplasty](#).

How can it help?

Having an operation to widen blocked arteries can help you survive a heart attack. ^[34] It can also reduce your chances of dying, having another heart attack or having a stroke between six months to 18 months after your heart attack. ^[34]

Treatment with clot-busting drugs can also help you survive a heart attack. But, which is best for you, an operation or drugs?

An operation can work better than drug treatment, but only if it's done soon after your heart attack by experienced doctors in a well-equipped hospital. Older people and people who can't take clot-busting drugs may benefit the most from having an operation. ^[35]

Heart attack

One study comparing an operation with clot-busting drugs showed that people were more likely to survive for at least a month after having an operation. ^[56] A longer term study found more people were alive eight years after angioplasty, compared with people who had drug treatment. ^[57]

Even so, for most people, it's not clear whether an operation is better than drug treatment or not. If you are offered an operation, ask your doctor to explain why it might be better for you than treatment with clot-busting drugs. Not all hospitals in the UK offer procedures like angioplasty as a treatment for heart attacks.

To learn more, see [When is an operation to widen blocked arteries better than clot-busting drugs?](#)

How does it work?

An operation can get rid of the blockage that caused your heart attack. It lets more blood reach your heart. If you have it done soon enough, this operation can save parts of your heart that would otherwise die.

This operation also widens a coronary artery (a vessel that brings blood to your heart). In the long run, this means that more blood can flow to your heart. This helps prevent another heart attack.

Can it be harmful?

One of the biggest advantages of angioplasty is that it seems to be safer than clot-busting drugs. About 2 in 100 people have a stroke after being given clot-busting drugs. Only 1 in 100 people have a stroke after an operation. ^[34]

But all operations carry risks. With coronary angioplasty, the main risks are:

Small risks

- You may have pain in your chest during the operation. You may also feel discomfort where the tube is inserted. Painkillers will help.
- Doctors give you drugs to stop your blood clotting after you have this operation. These drugs may make you bleed at the place where the tube was put in.

Major risks

- Sometimes doctors have to give up during the operation because they can't get the tube into your coronary artery. This is rare.
- In a few people, the coronary artery that's been reopened quickly closes again. ^[58] If this happens, your doctor may suggest that you need emergency open heart surgery. In this operation, doctors take a vein from another part of your body, usually your leg, and stitch it around the blockage to get blood flowing to your heart again.

Heart attack

To learn more about how risks can affect you, see [Understanding risks](#) .

How good is the research on an operation to widen blocked arteries?

All the research compares an operation to widen blocked arteries (coronary angioplasty) with [clot-busting \(thrombolytic\) drugs](#) . The research shows that, in some circumstances, an operation can be better than clot-busting drugs at saving lives and stopping people having another heart attack.

We found two summaries of the research (called [systematic reviews](#)). The first summary included more than 7,500 people. This review showed that having the operation means you are less likely to die, have another heart attack or have a stroke in the short or long term.

Some of the studies in the summary followed people for between four to six weeks. They found that about 86 in 100 people who had treatment with drugs lived and didn't have another attack or a stroke, compared to 92 in 100 who had the operation. Other studies followed people for between six and 18 months. They found that 80 in 100 who got drugs lived and didn't have another attack or a stroke, compared to 89 in 100 who had the operation. ^[34]

The second summary looked at all the studies from the first summary, plus another three more recent studies. It concentrated on how likely people were to be alive one month after their heart attack. It showed that people were much more likely to have survived if they had the operation. ^[56]

There aren't enough studies to say for certain who should have an operation and who should have clot-busting drugs. The studies in the big summary of research were carried out where doctors do lots of these operations. So we don't know if these results can apply to most hospitals where doctors do fewer of them. For more information on this, see [When is an operation to widen blocked arteries better than clot-busting drugs?](#)

The biggest advantage of surgery is its safety record. In all of the studies that we looked at, it caused far fewer strokes than drug treatment did.

Nitrates (if you haven't been treated with clot-busting drugs)

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[Can they be harmful?](#)

[How good is the research on nitrates?](#)

This information is for people who have had a heart attack. It tells you about nitrates, a treatment sometimes used for heart attack. It is based on the best and most up-to-date research.

Do they work?

Yes. If you haven't been treated with clot-busting drugs, then nitrates may stop the chest pain you have with a heart attack. They may also help you live through your heart attack. But nitrates are an old treatment. Newer treatments, such as [clot-busting \(thrombolytic\) drugs](#) or [an operation to widen blocked arteries](#) , work better.

What are they?

Nitrates are drugs that widen blood vessels. This lets more blood flow through them. Doctors call these drugs **vasodilators**. They work on your arteries and your veins. If you had a type of chest pain called **angina** before your heart attack, you may already be taking a nitrate drug called glyceryl trinitrate (GTN). The same drug is commonly used to treat people after a heart attack.

If you are in a lot of pain, the quickest and most effective way to get nitrates is through a drip in a vein in your lower arm. This is called an **intravenous infusion** , or IV. The drip will usually stay in for at least 24 hours.

Your doctor may prescribe nitrates as a tablet, as a spray, as a skin patch or as an ointment. The tablets and spray dissolve under your tongue, getting into your bloodstream through the lining of your mouth. Both act quickly to widen your **coronary arteries** and reduce your chest pain. (Your coronary arteries supply your heart with blood.)

Both the patches and the ointment are used to prevent pain. Skin patches deliver the drug slightly more slowly, but they last longer.

If you get a nitrate as an ointment, you will carefully apply it to a hairless place on your body, such as your stomach, chest, or thigh. You will need to use an applicator to keep the ointment off your hands.

Some common nitrates (and their brand names) are listed below.

Tablets

- isosorbide dinitrate (Isoket Retard)
- isosorbide mononitrate (Modisal, Monomax, Monosorb)
- glyceryl trinitrate (GTN)

Sprays

- glyceryl trinitrate (Glytrin, Coro-Nitro, Nitrolingual, Nitromin)

Skin patches

- glyceryl trinitrate patches (Nitro-Dur, Transiderm-Nitro)

Ointment

- glyceryl trinitrate ointment (Percutol)

How can they help?

Nitrates may help relieve the pain of a heart attack, but they don't work for everybody. Before clot-busting drugs (thrombolytic drugs) were developed, nitrates helped people live through the first few days after a heart attack. ^[59]

But if you've been treated with aspirin or clot-busting drugs, then nitrates won't help you any more. ^{[60] [61]}

How do they work?

Nitrates widen your blood vessels by relaxing the muscles in their walls. They relieve chest pain because they widen the coronary artery that is blocked. And this lets more blood pass through it. More blood means more oxygen for your heart. And that means less pain.

Nitrates don't have any effect on the clot that's causing your heart attack. But they do stop your coronary arteries from tightening around the blockage and making it worse.

We don't know exactly why nitrates make it more likely that you'll live through your heart attack. But it's probably because they:

- Lower your blood pressure. If your blood pressure is lower, your heart doesn't have to work as hard and uses less oxygen
- Widen your veins. This takes pressure off your heart, so it doesn't have to work as hard to pump blood around.

Can they be harmful?

Like all drugs, nitrates have side effects. But they are mild compared to some other drugs that are used to treat heart attacks. Doctors think that nitrates are generally safe because researchers have not found any serious side effects during studies.

Mild side effects that may bother you include:

- Headaches: Nitrates widen the blood vessels in your brain. This can cause a throbbing headache that starts soon after treatment
- Dizziness and fainting: If you get up too quickly after being on a nitrate drip, you may feel dizzy or even faint. Normally, your leg veins tighten up as you stand up to stop blood from pooling in your legs. Nitrates keep this from happening, so your blood pressure drops and you feel faint

Heart attack

- Reddening or flushing of your skin: Nitrates widen the small blood vessels in your skin. And this can make it turn red and feel warm, like when you blush.

Most nitrates act for a short time, so the side effects wear off quickly. If you have side effects while you're on a nitrate drip, they may last until the drip is stopped.

How good is the research on nitrates?

Most of the research on nitrates was done more than 10 years ago, before modern treatments for heart attacks were introduced. This early research shows that nitrates are much better than having no treatment at all. ^[59] But is there any point taking nitrates as well as modern treatments, such as clot-busting (thrombolytic) drugs?

We found only two studies that help answer that question. ^[60] ^[61] The studies included more than 75,000 people. Most of them were taking aspirin and clot-busting drugs. Nitrates made no difference to how long people lived in either study. These studies included a large number of people, but there were mistakes in the way they were set up. Because of this, they may not have been able to tell us whether nitrates can help, especially if they only help a bit.

We found no new studies that compared different ways of taking nitrates.

For more information, see [Aspirin](#) and [Clot-busting \(thrombolytic\) drugs](#) .

Glycoprotein IIb/IIIa inhibitors

In this section

[Do they work?](#)

[What are they?](#)

[How can they help?](#)

[How do they work?](#)

[Can they be harmful?](#)

[How good is the research on glycoprotein IIb/IIIa inhibitors?](#)

This information is for people who have had a heart attack. It tells you about glycoprotein IIb/IIIa inhibitors, a treatment used for heart attack. It is based on the best and most up-to-date research.

Do they work?

Maybe. If you've already had a full-blown heart attack, these drugs might reduce your chances of having another. But we don't know for certain, because there isn't enough research. These drugs probably won't affect your chances of living through your heart attack. And they may cause bleeding, which can be dangerous.

What are they?

Glycoprotein IIb/IIIa inhibitors are drugs that help stop the blood in your arteries clotting. There are three (their brand names are in brackets):

Heart attack

- abciximab (ReoPro)
- eptifibatide (Integrilin)
- tirofiban (Aggrastat).

All of them go directly into your bloodstream through a drip (also called an 'IV' or [intravenous infusion](#)). Like other treatments for a heart attack, you need them as soon as possible after your symptoms start.

Your doctor may suggest a glycoprotein IIb/IIIa inhibitor if: ^[62]

- You urgently need an operation to clear the blocked artery that's causing your heart attack (see [An operation to widen blocked arteries](#))
- Your heart wall hasn't been damaged all the way through yet
- Your heart has been damaged but your doctor does not think you need an urgent operation.

Glycoprotein IIb/IIIa inhibitors are always given with other treatments, such as [clot-busting drugs](#) , [aspirin](#) , or [surgery](#) .

The National Institute for Health and Care Excellence (NICE), the government body that decides which treatments should be available on the NHS, says that doctors should think about giving a glycoprotein IIb/IIIa inhibitor if: ^[62]

- You've had a mild heart attack and are in danger of having a bigger one
- You're due to have an operation to clear a blocked artery, but your operation has been delayed
- You've got diabetes and are due to have an operation (not an emergency one) to clear a blocked artery
- The operation to clear a blocked artery is thought to be complicated.

How can they help?

If you've had a heart attack, glycoprotein IIb/IIIa inhibitors taken with other treatments such as clot-busting drugs may reduce your chances of having another. ^[63] ^[64] ^[65] They probably can't help you live longer. But there isn't enough research to give a clear answer.

If you've had a heart attack and need an operation to clear the blocked artery that's caused it, glycoprotein IIb/IIIa inhibitors may or may not help you live longer and stay well. ^[66] ^[67] There isn't enough research to give a clear answer.

Heart attack

Doctors aren't sure whether the best time to give these drugs is early (in the accident and emergency department) or later (after having an operation to widen blocked arteries).
[68] [69]

How do they work?

Glycoprotein IIb/IIIa inhibitors attack **platelets**, tiny blood cells that help your blood to clot. Your heart attack was caused by a blood clot in one of your **coronary arteries**. Glycoprotein IIb/IIIa inhibitors won't help break it up, but they could stop it getting bigger. They could also stop new clots from forming. Aspirin does this too, but in a different way.
[70]

Can they be harmful?

Yes. All glycoprotein IIb/IIIa inhibitors can cause bleeding. Small bleeds, such as bruises or oozing around the tube in your arm, are easy to deal with. Bigger bleeds or internal bleeding in your gut or brain are more dangerous. Even a small bleed in your brain can cause a stroke.

- In one study, between 4 in 100 and 5 in 100 people who had abciximab (ReoPro) had a bad bleed somewhere. Between 2 in 100 and 3 in 100 people who had clot-busting drugs had bad bleeds.^[63] But in this study, abciximab did not cause any strokes.
- In another study, people who had abciximab during an operation to unblock their coronary artery were more likely to bleed or need a blood transfusion than those who didn't have abciximab.^{[66] [67]}

How good is the research on glycoprotein IIb/IIIa inhibitors?

The research on glycoprotein IIb/IIIa inhibitors is good, but we need more of it before we can say for certain whether these treatments work for people with heart attacks.

Most of the research we found looked at the drug abciximab.

We looked at three big, high-quality studies comparing clot-busting drugs (with or without extra treatment) with abciximab.^{[63] [64] [65]} Over 24,000 people took part.

- About 5 in 100 to 7 in 100 patients died less than a month after their heart attack.
- The abciximab made no difference to their chances of survival. But it did slightly reduce the number of people who had another heart attack.
- About 1 percent of the people who took part had a **stroke**, whether or not they took abciximab.

Heart attack

One summary of the research (called a **systematic review**) which included four studies and an extra study (randomised controlled trial) looked at people who were having an operation to unblock their artery.^[71] ^[72] These studies found that abciximab may reduce the risk of another heart attack or the arteries becoming blocked again. But the treatment also increased the risk of bleeding.

Two other studies found that it didn't make any difference when you took a glycoprotein IIb/IIIa inhibitor called tirofiban: in the accident and emergency department or before or after an operation to unblock the coronary arteries.^[68] ^[73]

Calcium channel blockers

In this section

[Do they work?](#)

[What are they?](#)

[How can they help?](#)

[How do they work?](#)

[Can they be harmful?](#)

[How good is the research on calcium channel blockers?](#)

This information is for people who have had a heart attack. It tells you about calcium channel blockers, a treatment sometimes used for heart attack. It is based on the best and most up-to-date research.

Do they work?

No. Research shows that if you've had a heart attack, these drugs do not improve your chances of living through it. In fact, they may reduce your chances.

What are they?

Calcium channel blockers are drugs that are used to treat other heart problems, such as irregular heartbeats. They disrupt the electrical activity in your heart and blood vessels. Heart muscle cells, like nerves, are driven by electrical activity. By interfering with this, calcium channel blockers can:

- Make your heart beat more slowly
- Make your heart pump less hard.

They can also:

- Relax some arteries and make them wider
- Lower your blood pressure.

There are two kinds of calcium channel blockers: those that work mainly on arteries to lower your blood pressure and those that work mainly on your heart.

Heart attack

Some common calcium channel blockers (and their brand names) are listed below.

- amlodipine (Istin)
- diltiazem (Tildiem, Adizem, Dilzem)
- felodipine (Plendil)
- isradipine (Prescal)
- lacidipine (Motens)
- lercanidipine (Zanidip)
- nicardipine (Cardene)
- nifedipine (Adalat, Coracten, Procardia)
- verapamil (Cordilox, Univer)

How can they help?

These drugs don't seem to improve your chances of living through a heart attack. They don't help prevent another heart attack. Nor do they help with chest pains or [angina](#).^[74]
^[75] ^[76]

How do they work?

When calcium gets into heart cells, it makes them want to pump. By stopping this process, calcium channel blockers can make the heart pump less hard.

Doctors thought calcium channel blockers might work for people having heart attacks because they have the same kinds of actions in the body as other, more effective drugs. For example, they slow the heart down and make it less excitable. And they lower blood pressure, just like [beta-blockers](#). All of these actions stop the heart from working too hard, so they should protect it. Unfortunately, when you're having a heart attack, calcium channel blockers don't help.

Can they be harmful?

Yes. Studies show that calcium channel blockers actually harm people who have had a heart attack and whose hearts now can't pump properly (a condition known as [heart failure](#)). The calcium channel blocker known as diltiazem increases their chances of having another heart attack by 40 percent.^[77]

Calcium channel blockers can also cause less serious side effects, such as headaches, dizziness and nausea.

How good is the research on calcium channel blockers?

There is good research to show that calcium channel blockers don't work. Some types of calcium channel blockers work on your arteries and some work on your heart. Your arteries are the blood vessels that supply your heart and other parts of your body with blood.

Calcium channel blockers that work mainly on your arteries

Two large studies have looked at the calcium channel blocker nifedipine. ^[74] ^[75]

People who were given nifedipine didn't do any better than people given a dummy treatment for comparison (a placebo) for up to six months. Nifedipine did not help people to live longer, stop them having another heart attack or improve the symptoms of angina.

One of the studies was stopped because the researchers were concerned that calcium channel blockers may be doing more harm than good. ^[74]

Calcium channel blockers that work mainly on your heart

We found one summary of the research (called a systematic review) of the drug verapamil. ^[76]

Seven studies, which included more than 6,500 people, were included in this summary. These found that giving verapamil to people who'd had a heart attack did not help them live any longer.

Antiplatelet agents after a heart attack

In this section

[Do they work?](#)

[What are they?](#)

[How can they help?](#)

[How do they work?](#)

[Can they be harmful?](#)

This information is for people who have had a heart attack. It tells you about antiplatelet agents, a treatment taken with aspirin to prevent blood clots after a heart attack.

Do they work?

Yes, taking antiplatelet agents alongside aspirin after you've had a heart attack is likely to prevent blood clots forming in your blood vessels. This may prevent you from having another heart attack.

What are they?

Antiplatelet agents are drugs that can prevent blood clots from forming in your veins after a heart attack.

Heart attack

Some common antiplatelet agents and their brand names are listed below.

- clopidogrel (Plavix)
- prasugrel (Effient)
- ticagrelor (Brilique)

These drugs are taken along with aspirin.

If you are treated with clopidogrel along with aspirin in the first 24 hours after your heart attack, then the treatment will normally continue for at least four weeks, but not for longer than 12 months.^[78]

You will probably be given prasugrel along with aspirin if you need to have an operation (called an [angioplasty](#)) to unblock your arteries immediately after your heart attack, or if you have diabetes.^[79]

You will probably be given ticagrelor along with aspirin for up to 12 months after your heart attack if your doctor thinks that you should have an operation to unblock or widen your arteries (called an [angioplasty](#)).^[80]

How can they help?

Taking an antiplatelet agent with aspirin after your heart attack reduces the risk of forming clots in the blood vessels that supply your heart with blood (your [coronary arteries](#)).^[78]

^[79] ^[80] If you have a clot in one of these blood vessels, then blood can't reach your heart and you may have another heart attack or a stroke

How do they work?

Antiplatelet agents stop your blood clotting by making [platelets](#) less sticky. Platelets are tiny blood cells in your bloodstream. They help your blood to clot when you are injured. The less sticky your platelets are, the less likely they are to form clots in the blood vessels that supply your heart with blood (your [coronary arteries](#)). If you have a clot in one of these blood vessels, then blood can't reach your heart and you will have a heart attack.

Can they be harmful?

Yes, antiplatelet agents can cause side effects. The most important side effect is bleeding. Because these drugs stop your blood from clotting too easily, you may bleed more easily.

^[81] ^[82] ^[83] Two summaries of the research showed people who took these antiplatelet agents after a heart attack were between two and three times more likely to get serious bleeding.^[84] ^[85]

Clopidogrel

Common side effects

- Indigestion
- Abdominal pain
- Diarrhoea
- Bleeding

Less common side effects

- Nausea
- Vomiting
- Gastritis (when the lining of your stomach becomes inflamed or swollen)
- Flatulence (passing wind)
- Constipation
- Dizziness
- A low white blood cell count

Clopidogrel may not work as well with heartburn drugs called proton pump inhibitors (PPIs). These drugs reduce the amount of acid produced in the stomach and are used to protect against acid reflux ([GORD](#)) and stomach ulcers. Brand names include Nexium, Losec, and Protium. But research shows these drugs may stop the body from breaking down clopidogrel properly, so it may not work as well. Doctors have been advised to avoid using PPIs along with clopidogrel. ^[86]

Prasugrel

Common side effects

- Haemorrhage (heavy bleeding)
- Haematoma (collection of blood under the skin)
- Haematuria (blood in the urine)
- Anaemia (not enough iron in your blood)

Heart attack

Less common side effects

- Angioedema (swelling of the deep layers of the skin)

Ticagrelor

Common side effects

- Shortness of breath
- Haemorrhage (heavy bleeding)
- Bruising

Less common side effects

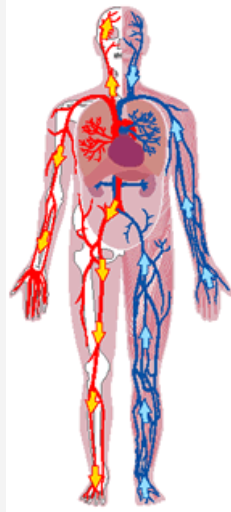
- Nausea
- Vomiting
- Diarrhoea
- Abdominal pain
- Indigestion
- Gastritis
- Dizziness
- Headache
- Rash
- Itching

Further informations:

How your heart moves blood around your body

Two main types of blood vessels work together to carry blood through your body: arteries and veins .

Heart attack



Arteries (in red) carry blood away from your heart. Veins (in blue) carry blood to your heart.

Arteries are thick vessels that carry blood from your heart to other parts of your body.

Veins are thinner. They carry blood from your body back to your heart.

Your heart pumps blood to your lungs to pick up oxygen. This blood goes back to your heart and is pumped out to the rest of your body. Veins carry the blood back to the heart and the cycle repeats.

How blood moves through your heart

Once your blood has delivered oxygen and food to your cells, it returns to the upper chamber on the right side of your heart.

From there it travels into the lower chamber on the right side. This chamber pumps blood to your lungs through the pulmonary artery (a short, wide blood vessel that stretches between your heart and your lungs). In your lungs, blood picks up oxygen.

Once blood has picked up oxygen in the lungs, it returns to the left side of your heart through your pulmonary veins. These veins are two large blood vessels that return blood from the lungs to your heart.

Blood then enters the upper chamber on the left side of the heart, before moving into the lower chamber. It's then pumped through the body's main artery (the aorta) to all parts of your body.

Complications after a heart attack

You can get problems after a heart attack because your heart is no longer working properly. These complications may mean you need more tests, get more intensive treatment and stay in hospital longer.

Abnormal heart rhythm

It's common for a heart attack to disrupt the way your heart beats. Your heart may beat too quickly, too slowly or in an uneven way. Having an irregular heartbeat means that instead of beating evenly (thump thump thump) like the ticking of a watch, it might beat like this: thump thump thumpthump thump. Abnormal heart rhythms are also called **arrhythmias**.

The most dangerous kinds of abnormal rhythms stop your heart pumping properly or make your heart work so hard it can't get enough oxygen. Very fast heart rhythms are more common and more dangerous than very slow ones. They can cause your heart to stop, a condition doctors call **cardiac arrest**.

Sometimes the rhythm goes back to normal without treatment. If it doesn't, you'll need medicine. If your heart's rhythm is dangerously abnormal, particularly if it's very fast, doctors can reset it quickly by passing an electric current through it. This is called cardioversion. If you need it, you will have an anaesthetic first. A machine called a defibrillator will then be used to give an electric shock to your heart.

Heart failure

If your heart attack is bad, your heart may be left too weak to pump correctly. When the heart muscle is no longer able to move blood around your body, pressure builds up behind the damaged part. If the damage is mainly on the left side of your heart, pressure builds up in your lungs. Fluid is forced out of your blood vessels and into your lungs, and you may become short of breath. But there are many treatments available. To learn more, see our article on [Heart failure](#) .

Low levels of oxygen in your blood

Doctors call this condition **hypoxaemia**. Usually it means that blood isn't flowing through your lungs very well. If this happens, you'll be given extra oxygen to breathe through a face mask. Many people are given oxygen after a heart attack whether or not the level of oxygen in their blood is low. However, there is not much good research on this. We don't know if it really helps. ^[1]

Low blood pressure

Several things can give you **low blood pressure** after a heart attack. Low blood pressure is a side effect of some of the drugs that are taken for heart failure. It can also be a sign that your heart attack was serious and that your heart can no longer pump blood properly. The treatment you get depends on what is causing the problem. If you have very low

Heart attack

blood pressure, you'll be admitted to an intensive care unit and given drugs by injection to increase your blood pressure.

Cardiogenic shock

Cardiogenic shock is a dangerous form of low blood pressure that happens when the heart's main pumping chamber is badly damaged. About 7 in every 100 people admitted to hospital with heart attacks have cardiogenic shock. ^[2] Between 50 in 100 and 80 in 100 of those people die before they leave hospital. People with cardiogenic shock are treated in an intensive care unit. Treatments include drugs that make your heart beat more strongly and operations to repair your coronary arteries .

Chest pain

Angina is chest pain that occurs when your heart doesn't get enough oxygen. It is often set off by exercise or emotional stress. If your angina gets worse (or you get it for the first time) after you've had a heart attack, it can be a warning that you may be heading for another heart attack. Your doctor will suggest drugs or surgery to keep your angina under control.

Abnormal bulging of the heart wall

Scar tissue in the wall of your heart can balloon out, creating a bulge. Doctors call this an **aneurysm**. An aneurysm can cause abnormal heart rhythms, low blood pressure or blood clots in your heart. If you get an aneurysm, you'll need to have drugs to stop your blood clotting. If you still have the problem after drug treatment, your doctor may suggest surgery.

Different types of heart attack

Doctors sometimes use names for heart attacks that describe the part of the heart that's been damaged. You don't need to remember them. But you may hear your doctor use them.

The names your doctor might use include:

- **Anterior infarct:** Infarct is the name that doctors give to a part of an organ that has been damaged because its blood supply has been cut off. Doctors use the term anterior infarct when the front part of the heart has been damaged. This type of heart attack usually affects the lower chamber on the left side of your heart (the left ventricle). The left ventricle pumps blood to all parts of your body. Anterior infarcts are often big heart attacks that happen when a branch of the left coronary artery is blocked. This is the most dangerous type of heart attack

Heart attack

- **Posterior or inferior infarct:** These heart attacks affect the back or base of the heart. A posterior or inferior infarct is often smaller than an anterior infarct. They're usually caused when the right coronary artery or one of its branches is blocked.

Your doctor may also describe your heart attack by referring to the type of changes he or she sees on your electrocardiogram (ECG). To learn more, see [Tests for a heart attack](#) .

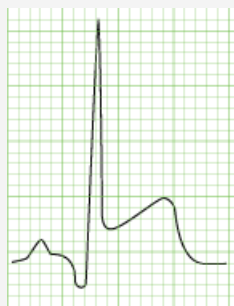
Your doctor may talk about an **ST segment elevation**, an **ST segment depression**, or **Q waves**. These are all changes your doctor will look for on your electrocardiogram. They will help your doctor work out which is the best treatment for you.

Tests for a heart attack

Once you get medical help, you'll have tests to see if you've really had a heart attack. If you have, doctors will run more tests to find out what kind of heart attack you've had and how much damage it has done. The early tests may be carried out in the ambulance by paramedics. ^[3] Others will be done in hospital by doctors.

The most common tests are listed below.

Electrocardiogram (ECG)



An ECG reading showing a heartbeat during a heart attack.



An ECG reading showing a normal heartbeat.

Heart attack

An ECG is one of the most important tests doctors use to find out whether you've had a heart attack.

You'll probably have several ECGs during your first few days in hospital.

When you have an ECG, doctors put electrodes on your chest. This lets them measure the electrical activity in your heart.

The electrodes are connected to a machine that shows the electrical activity as a tracing on a moving screen. ECGs don't hurt and don't have any effect on your heart.

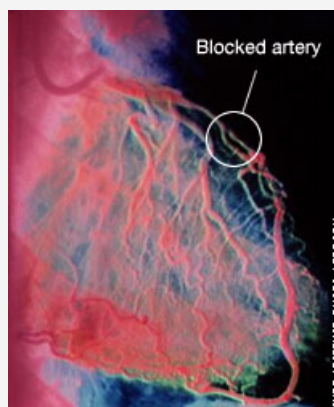
From your ECG, your doctors will be able to tell:

- Whether you've had a heart attack
- What kind of heart attack you've had
- Which part of your heart has been damaged
- How fast your heart is beating
- Your heart's rhythm, that is, whether your heart is beating in a regular pattern.

Blood tests

When your heart is damaged, the levels of certain chemicals in your blood go up. Measuring the level of these chemicals helps doctors find out whether you've had a heart attack.

Coronary angiography (or cardiac catheterisation)



A special type of x-ray can show blocked arteries.

Coronary angiography is a way for doctors to see whether your coronary arteries have any blockages or narrowed areas. Your coronary arteries supply your heart with blood.

Heart attack

This test is done in an x-ray laboratory. You may hear doctors and nurses refer to the laboratory as the **cather lab** or **cath lab** for short.

If you have angiography, doctors thread a thin tube (called a catheter) through an artery in your arm or thigh and into your heart. Then they inject dye through the tube into your coronary arteries. When they take the x-ray, the dye shows up on the film. If doctors find that your arteries are very narrow, they may suggest you have an operation to widen them.

You may be given sedatives before this test, to make you sleepy.

Echocardiogram

An echocardiogram uses sound waves to give doctors an idea of how well your heart is working. This test can help them find out which part of your heart is damaged. They can also see how blood flows through your heart and see if your heart valves are working properly. A special instrument that sends and receives sound signals is placed on your chest. And the echoes it records are displayed on a screen. An echocardiogram is especially useful for seeing how your heart wall moves as it beats. This test is safe, and it doesn't hurt. ^[3]

Nuclear scan

This test can show doctors which areas of your heart have been damaged. Doctors inject a tiny amount of a radioactive substance into your bloodstream, usually through a vein in your arm. A special camera records whether the substance is taken up by your heart.

Stress test (electrocardiogram during exercise)

While you walk on a treadmill, doctors do an electrocardiogram (ECG) to see how well your heart is recovering. You may have this test before you leave hospital. If the test shows that the blood supply to your heart is poor, your doctor may suggest that you have coronary arteriography (which is described above). ^[3]

Risk factors for a heart attack

These are the most important risk factors for heart attacks. The more risk factors you have, the more likely you are to have a heart attack. Some risk factors you can't control but others you can do something about. Talk to your doctor about lowering your chances of having a heart attack.

Being male

Men have more heart attacks at younger ages than women. ^[4]

Heart attack

Being middle-aged or older

Whether you're a man or a woman, your chances of having a heart attack go up as you get older. The risk for men begins to rise at about age 45. Women's risk goes up at 55. Researchers think younger women are less likely to have heart attacks because they have higher levels of oestrogen, the female sex hormone. Levels of this hormone drop when women go through the menopause.

Having people in your family who've had a heart attack

Heart disease and heart attacks tend to run in families. So you may be at a higher risk if your father or brother was diagnosed with heart disease before age 55, or if your mother or sister was diagnosed before age 65. ^[5]

Having a low income

Things that may be difficult to control can make it more likely that you'll get heart disease. For example, people who have a low income are more likely to have a heart attack. ^[6]

Smoking

About a third of all heart attacks in western Europe are thought to be due to smoking. ^[4] Nicotine and other chemicals in cigarette smoke damage the lining of your arteries. And these chemicals also make blood stickier and more likely to clot. If you get blood clots in the arteries that supply your heart with blood (your coronary arteries) they can stop blood from reaching your heart and cause heart muscle to die.

If you have other risk factors for a heart attack or have already been diagnosed with heart disease, smoking is particularly dangerous. Smokers who have heart attacks are more likely to die than non-smokers who have heart attacks. The more you smoke, the higher your risk. And inhaling other people's tobacco smoke at home or at work increases your risk of getting heart disease by about 25 percent. ^[4]

If you stop smoking you can reduce your risk of getting heart disease or having a heart attack. You can get help with giving up. Treatments that work include nicotine replacement gum or a skin patch, drugs such as bupropion (Zyban) and varenicline (Champix), and counselling.

To learn more, see our articles on [Smoking](#) .

Having high cholesterol

Cholesterol is a fat-like substance that is found in your blood. The two main types are low-density lipoprotein cholesterol (or LDL for short) and high-density lipoprotein cholesterol (or HDL). LDL cholesterol is sometimes called 'bad' cholesterol. If you have high levels of it in your blood, you have a higher risk of getting heart disease and having a heart attack. HDL cholesterol is often called 'good' cholesterol. It removes LDL cholesterol from your blood. This lowers your risk of heart disease.

Heart attack

Your cholesterol level is affected by what you eat and how much you exercise. It's also affected by whether heart disease and heart attacks run in your family and whether you smoke. If you have a high level of LDL cholesterol, talk to your doctor about how you can lower it. To find out more, see our article on [High cholesterol](#) .

Having high blood pressure

When doctors take your blood pressure, they're measuring how hard your blood pushes against the walls of your blood vessels as it moves around your body. If you have high blood pressure , it can damage the inside of your arteries . This makes it easier for fatty deposits to build up. So as your blood pressure rises, so does your risk of getting heart disease and having a heart attack.

If you smoke or have high cholesterol, high blood pressure is particularly dangerous. If your blood pressure is high, talk to your doctor about how you can lower it. To learn more, see our article on [High blood pressure](#) .

Being overweight

There are a couple of reasons why being overweight is bad for your heart. If you have too much body fat, you probably also have too much low-density lipoprotein cholesterol (LDL cholesterol) in your blood. This type of cholesterol can clog the vessels that supply your heart with blood. You may also have high blood pressure . And carrying too much weight makes your heart work harder.

If you want to find out whether you are overweight, you can work out your [body mass index](#) (BMI). The body mass index compares your height with your weight. People with a BMI of 25 or higher are overweight.^[7] Those with a BMI of 30 or more are obese.^[7] If you fall into either of these categories, you might want to talk to your doctor to find out how you can lose weight safely. To learn more, see our articles on [Obesity](#) .

Not getting enough exercise

There's a link between not getting enough exercise and getting heart disease. Even gentle exercise, such as going for a walk or gardening, can help lower the risk of having a heart attack.

Having diabetes

If you have diabetes , your risk of having a heart attack is increased. Keeping your blood sugar under control is important. So is managing any other risk factors that may make it more likely that you will have a heart attack, such as being overweight or smoking.

Being under stress

Lots of stress in your life might increase your chances of a heart attack, but the research isn't good enough to be certain. Sometimes, people who are under emotional stress may start smoking or may smoke more than they usually do, or they may overeat. Both smoking and being overweight are risk factors for having a heart attack.

Getting erection problems

Getting erection problems can be a sign that you have an increased risk of a heart attack.

^[8] Erection problems can be a sign that your blood vessels are less healthy than they used to be. The reduced blood flow makes it more difficult to get an erection. Problems with your blood vessels can also mean you're more likely to have a heart attack. Lots of men find it embarrassing to talk about their sexual health, but if you get erection problems, it's a good idea to talk to your doctor and get your heart health checked.

What you can do after a heart attack

The National Institute for Health and Care Excellence (NICE) is the organisation that advises the government about NHS treatments. It says that there are lots of things that you and your doctor can do to cut your risk of another heart attack. ^[9] We've described the advice on this page.

Talk to your doctors

Before you leave hospital, make sure you understand what has happened to you. Talk about your heart attack, test results and drugs with your doctors. Ask whether you need to change your diet or do more exercise.

Your doctor should answer all of your questions. You may also be given some written information that tells you what you can do to reduce your chances of having another heart attack.

Take your drug treatments

You'll probably get several drug treatments to take after a heart attack to reduce your risk of having another one. You may need to take these drugs for the rest of your life. Your treatment could include:

- **Aspirin** and another **antiplatelet agent** such as clopidogrel (Plavix), prasugrel (Effient), or ticagrelor (Brilique). These drugs prevent blood clots from forming. To learn more, see [Aspirin](#) and [Antiplatelet agents](#) .
- An **ACE inhibitor**. These drugs reduce blood pressure and have other effects on the heart. To learn more, see [ACE inhibitors](#)
- A **beta-blocker**. These drugs also reduce blood pressure and help to control the way your heart beats. To learn more, see [Beta-blockers](#) .
- A **statin**. Statins are drugs that are used to treat high cholesterol. But they seem to help if you have had a heart attack, even if your cholesterol is normal. There's evidence that statins can lower your chances of having another heart attack. ^[10]

Heart attack

Some common statins are atorvastatin (Lipitor), fluvastatin (Lescol), pravastatin (Pravachol), rosuvastatin (Crestor), and simvastatin (Zocor). To learn more, see our article on [Statins to treat high cholesterol](#) .

Find out if you need surgery

The tests you have in hospital will show your doctors whether you could benefit from surgery. Surgery can help open up the blocked arteries in your heart. But it isn't suitable for everyone. If you're very ill, for example, surgery could be too dangerous.

Stop smoking

If you smoke, try to stop. Smoking narrows the arteries that carry blood to your heart (your coronary arteries). Start helping yourself now by deciding to stop. Then get help from a health professional. The doctors at the hospital, your GP or your cardiac rehabilitation team will be able to help you. There are lots of treatments that can help you stop. These include nicotine patches or gum, and the drug treatments bupropion (brand name Zyban) and varenicline (brand name Champix). Getting counselling with other people who are trying to stop can also help. To learn more, see our section on [Smoking](#) .

Tell your friends and family that you are going to give up smoking. Their support will be important. And be realistic. You may not stop on your first try. But it's important to keep trying until you're successful. It could save your life.

The food you eat

If you've had a heart attack, you'll be advised to eat a healthy diet. You may hear the ideal diet described as a **Mediterranean diet**. It means:

- You eat more fruit, vegetables and wholemeal bread
- You eat less meat
- You either cut down on butter and cheese or try low-fat dairy products instead. And you should try to use vegetable oil, olive oil, or sunflower oil instead of butter or lard.

Your doctor may also suggest that you eat between two and four portions of oily fish a week. Oily fish include salmon, trout, mackerel, and sardines. Fresh tuna counts as oily fish, but not tinned. If your heart attack was less than three months ago and you're not eating enough oily fish, your doctor may suggest you take an omega 3 supplement. Omega 3 is the type of fat you get in oily fish.

If you're taking vitamin supplements, make sure they don't contain beta-carotene. It can actually increase your risk of another heart attack.

Drinking alcohol in moderation is unlikely to do most people any harm.

Join a cardiac rehabilitation programme

Rehabilitation programmes help you recover from your heart attack, keep your heart healthy and live life to the fullest. Before you leave hospital, you and your doctors should discuss how you can join a programme. If your doctors don't mention it, ask.

Cardiac rehabilitation is an important part of your recovery. It will help you: ^[10] ^[11]

- Get better faster
- Get fit
- Change your lifestyle to reduce your risk of having another heart attack
- Manage stress or depression (if you feel bad)
- Live longer.

Most cardiac rehabilitation programmes include:

- Information about exercising
- Education about making healthy lifestyle choices, including eating better and giving up smoking
- Counselling, or talking treatment, to help you manage stress and depression.

Everyone is different, so the rehabilitation team at your hospital will plan a programme that suits you. It may last six weeks, six months, or even longer. But it can't work without your commitment. Don't give up.

Take regular exercise

With help from your health care team or your GP, you can develop an exercise plan that suits your needs, abilities and interests. You'll probably be advised to make sure you do 20 to 30 minutes of exercise each day. Or you may do supervised exercise as part of a cardiac rehabilitation programme.

Whatever type of exercise you do, it should be enough to make you slightly breathless. If you're not used to exercise, build up the amount you do gradually. Exercise improves stamina and strength, and makes you feel good. Over time, exercise makes your heart work better. It can also help you lose weight.

For most people, a supervised exercise programme after a heart attack is safe. And many people can continue to exercise safely on their own after a few weeks.

Heart attack

Education

Learning about your heart attack and the treatment you need is an important part of getting better and lowering your risk of future trouble. Health professionals, including your specialist, your GP, practice nurses and dietitians, can help you learn:

- What makes it more likely that you'll get heart disease, including having high blood pressure and high cholesterol. To learn more, see [Risk factors for having a heart attack](#) . You can also read more about [High blood pressure](#) and [High cholesterol](#) .
- How the drugs you're taking to control your blood pressure or lower your cholesterol work. Keeping your blood pressure and cholesterol under control gives you the best chance of staying healthy
- What a healthy diet is. Eating more fruits and vegetables and less fat can help you lower your cholesterol, lose weight and feel better. These are all important after a heart attack. Getting good advice about what to eat may make it easier for you to change your diet for good.

Counselling

You may feel anxious or depressed after a heart attack. Lots of people do. But anxiety and depression can slow down your recovery. A good cardiac rehabilitation programme will spot these problems and offer you treatment. If you need help, make sure you ask for it. It is an important part of your recovery.

How to tell the difference between a heart attack and other pain

Sometimes it's hard to tell whether the pain you're having is from a heart attack or something else. Here's a guide to some of the differences.

If you have any sort of chest pain and you think you could be having a heart attack, call 999 immediately.

Chest pain (angina)

Angina is the name doctors use for a pain in your chest that you get when your heart muscle isn't getting enough oxygen. You usually get angina because not enough blood is reaching your heart. The pain you have with angina is similar to the pain of a heart attack. If your angina seems to be getting worse, it may be a warning sign that you're going to have a heart attack.

Like a heart attack, angina usually happens when the vessels that supply blood to your heart (your coronary arteries) get narrower because of a condition known as

Heart attack

atherosclerosis (which is also called hardening of the arteries). The main differences between angina and a heart attack are: ^[16]

- Angina often comes on during exercise and goes away when you rest
- Angina usually goes away if you take medicine, such as nitroglycerin
- The pain of angina is usually not as bad as the pain of a heart attack, and it doesn't last as long. Angina goes away in about 10 minutes.

A severe attack of angina can feel a lot like a heart attack. If you have any doubts about what is causing your pain, get medical help immediately.

Indigestion and acid reflux

Indigestion is any discomfort you feel after eating. Acid reflux happens when acid from your stomach flows back into your throat or into the tube (oesophagus) leading from your throat to your stomach. Indigestion causes pain in the middle of your chest. But the burning pain of indigestion is usually not as bad as the crushing or restricting pain of a heart attack. The pain of indigestion does not usually spread down your arms or into your jaw.

Chest infections

Chest infections can cause pain. But it's usually much sharper than the pain of a heart attack. You're more likely to have pain on one side of your chest, not in the middle. If you have an infection, breathing in or coughing makes the pain worse. And the pain usually doesn't spread to your arms or jaw. If you're having a heart attack, breathing in and coughing usually won't make the pain worse.

It can be hard to tell the difference between the pain of a heart attack and something less serious. Studies have found that you're probably not having a heart attack if the pain: ^[12]

- Feels sharp like a knife
- Gets worse when you breathe in
- Is brought on by a doctor pressing on your chest
- Changes when you move.

You probably are having a heart attack if the pain:

- Spreads out from your chest to your arms or jaw
- Goes down both arms.

What can affect your recovery from a heart attack?

Doctors look at four things to predict how well you'll do after a heart attack.

They ask:

- Is your heart pumping blood properly? If you have a serious heart attack, your heart may not be able to pump properly afterwards. Doctors call this **heart failure**
- Where has your heart been damaged? Attacks that damage the front of your heart (called **anterior infarcts**) are more dangerous than those that affect the back or base of your heart (called a **posterior infarct** or an **inferior infarct**). Heart attacks at the front are more severe and more likely to cause heart failure. To learn more, see [Different types of heart attacks](#)
- What was your **blood pressure** and how fast was your heart beating when you were admitted to hospital? If you had low blood pressure and your heart was beating quickly, you probably had a serious heart attack
- How old are you? The older you are, the more likely it is that your heart attack was dangerous. More than half of those who die of coronary heart disease (which includes heart attacks) are 75 or older.^[24]

Having a coronary artery bypass

This is an operation to improve the blood flow to your heart. It's sometimes called CABG for short (pronounced cabbage).

In a bypass operation, a surgeon takes parts of healthy blood vessels from another part of your body (such as your leg) and uses them to take over from the narrowed arteries in your heart.

Bypass surgery usually takes between three and six hours. You'll be given a **general anaesthetic**, so you'll be asleep during the operation. Afterwards, you'll recover in intensive care. You should recover quickly. You'll usually be walking after two days and home within 10 days.

If you've had a heart attack, having a coronary artery bypass can help you live longer.^[25] You're about 40 percent more likely to be alive in five years and 20 percent more likely to be alive in 10 years than you would be with just drug treatment.

But a coronary artery bypass is a serious operation and it may take you months to recover fully.

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We've prepared some extra information for people considering having a coronary artery bypass. To find out more, read [Coronary artery bypass](#).

Aspirin and bleeding

Blood clots stop you bleeding too much if you're cut. So, all drugs that affect clotting can make you bleed more than you would normally. Fortunately, the dose of aspirin you need to protect your heart is low. So your risk of bleeding too much is also low.

In one large study, people taking aspirin were compared with people who were taking a dummy treatment (a placebo). The number of times that people had serious bleeding was similar between the group that took aspirin and the group that took the placebo. ^[26]

Still, if you're taking aspirin after a heart attack, you may notice that cuts take longer to stop bleeding or that you bruise more easily.

Aspirin and upset stomach

Aspirin irritates the lining of your stomach. Most people feel this as indigestion soon after taking an aspirin. Others feel a little sick. More rarely, the irritation causes ulcers or bleeding from the stomach lining. To avoid these problems, take aspirin with your main meal or with a large glass of milk.

But if you think you're having a heart attack, don't worry about your stomach. Chew at least 160 milligrams of aspirin as soon as possible.

If you have an upset stomach or pain after you take aspirin, ask your doctor to recommend a brand that protects your stomach lining.

Clot-busting drugs and strokes

Clot-busting (thrombolytic) drugs stop blood clotting. So they increase the chances of bleeding into the brain. Bleeding into the brain can cause a stroke. Out of 250 people treated with clot-busting drugs, one more person will have a stroke than would otherwise be expected. ^[27]

This may not seem like much of a risk, but a stroke can radically change your life. It might even kill you. It's worth discussing the risk with your doctor, if it's possible. But clot-busting drugs must be given quickly and there may be little, if any, time for talk.

Heart attack

All clot-busting drugs carry this risk. One drug in this group is called alteplase. It may be slightly more likely to cause a stroke. But the difference in risk between alteplase and the other drugs in this group is small.

Strokes linked to clot-busting drugs usually happen soon after treatment. To learn more, see our articles on [stroke](#).

People who have heart attacks are more likely to have strokes, whether or not they take clot-busting drugs. You are also more likely to have a stroke after taking clot-busting drugs if: ^[28] ^[29] ^[30]

- You are older than 65
- You are very thin
- You have high blood pressure
- You've already had a stroke
- You're treated with alteplase rather than another clot-busting drug.

A stroke is serious, but a heart attack is serious too. Weighing the pros and cons of treatment can be difficult. But for most people the benefits of treatment with clot-busting drugs far outweigh the risks of having a stroke.

Clot-busting drugs and bleeding

Clot-busting (thrombolytic) drugs stop your blood clotting normally, so you may bleed a lot from an injury or cut, including surgery.

Most people who take these drugs don't have serious problems with bleeding. Many have no problem at all. But about 1 in 100 people treated with clot-busting drugs bleed badly enough to need a blood transfusion.

People who have an operation to clear a blocked artery and are given clot-busting drugs are most likely to need a transfusion. Bleeding after this kind of operation is not usually dangerous. But if you need a blood transfusion you will need to stay in hospital for longer.

Clot-busting drugs do not make women bleed more during their periods.

Getting beta-blockers as added treatment

Most of the studies on beta-blockers were done before newer treatments were available. Most people now get clot-busting (thrombolytic) drugs as soon as they get to hospital. It's not clear exactly how much benefit there is in taking beta-blockers as well as clot-busting drugs.

One study tested the effect of beta-blockers on people who also had clot-busting drugs or an operation to help clear their blocked artery. This study found that people who took the beta-blocker carvedilol (Eucardic) for six weeks after a heart attack were less likely to die from their heart attack than people who took a dummy treatment (placebo).^[31] The beta-blocker reduced the risk of death during the study by about one-fifth and cut the risk of having another heart attack by more than one-third. All the people in this study had heart failure .

For more information, see [Clot-busting \(thrombolytic\) drugs](#) and [An operation to widen blocked arteries](#) .

ACE inhibitors and low blood pressure

Angiotensin is a powerful chemical that is made by your body. It stops your blood pressure dropping too low. That's important when you are healthy, but it can be dangerous after a heart attack. ACE inhibitors block the effects of angiotensin, so your blood pressure tends to go down. But, this makes some people feel dizzy and light-headed.

Between 17 and 18 people in every 100 who are treated with ACE inhibitors get blood pressure that is seriously low. But, about 10 of them would have had this problem after their heart attack even without ACE inhibitors.^[32] You're more likely to get low blood pressure if you're over 75.^[32]

ACE inhibitors and kidney problems

About 1 in 100 people treated with ACE inhibitors develop kidney problems at some point while they are in hospital. About half of these people would have had kidney problems after their heart attack anyway, even if they didn't take ACE inhibitors.

ACE inhibitors affect your kidneys in several ways. They can stop your kidneys getting rid of waste products as well as they should. This problem is more common in patients who are over 75. If you take ACE inhibitors, you should have regular blood tests to check that your kidneys are working properly.

ACE inhibitors and dry cough

Getting an irritating, never-ending dry cough is the most common reason people stop taking ACE inhibitors. You get a dry cough because ACE inhibitors cause your body to make more of a chemical called **bradykinin**. Bradykinin can build up in your lungs and make you cough.

People who have heart failure and take ACE inhibitors are 6 percent more likely to develop a cough than people who don't take them.^[33] Some studies have found that more than one-third of the people who have heart failure and take this drug develop a cough.^[33]

ACE inhibitors and nausea and diarrhoea

ACE inhibitors can make you feel sick. Or you may get diarrhoea or constipation.

ACE inhibitors and swelling of the lips, eyes and face

ACE inhibitors can make your eyes, lips and face swell up. This swelling is similar to an allergic reaction that happens when your body's natural defences overreact to a foreign substance. ACE inhibitors can also cause your throat to swell. This is a dangerous side effect, but it is rare. It's not clear what causes the swelling. But if you have swelling, you should see your doctor.

Studies show that about 1 in 100 people who have heart failure get this type of swelling, whether they take ACE inhibitors or not.^[33]

When is angioplasty (surgery to widen blocked arteries) better than clot-busting drugs?

When it comes to saving your life and reducing the risk of another heart attack, an operation to widen blocked arteries (coronary angioplasty) can be better than clot-busting (thrombolytic) drugs if:^[34]

- You are treated soon enough. To get the full benefit from surgery, you must get to hospital less than four hours after your chest pain starts
- You have clear signs of a heart attack on your first electrocardiogram (ECG) tracing
- You are in a well-equipped hospital

Heart attack

- You are in a hospital that carries out at least 200 coronary angioplasties per year
- You are treated by an experienced doctor who does at least 60 coronary angioplasties each year.

Unfortunately, not all hospitals in the UK meet these standards.

The Department of Health says that 97 in 100 people should be able to get treated quickly enough (within 2 hours of calling an ambulance). Hospitals have been told to plan to treat most people with an operation in future.

We can't say for certain which patients should have an operation and which should choose clot-busting drugs. Although it hasn't been proven, it's likely that an operation is better for you than clot-busting drugs if: ^[35]

- You are more likely than other people to have a **stroke**. Strokes are a possible side effect of being given clot-busting drugs. People who are at a higher risk of having a stroke include those who have already had a stroke or a mini-stroke, and people over 75
- You cannot have clot-busting drugs because of a medical condition. For example, you may have a bleeding disorder or an allergy that could be made worse by the drugs
- You have severe heart failure after your heart attack. Heart failure occurs when your heart isn't pumping properly. For more information about this condition, see [Heart failure](#) .

Glossary:

coronary arteries

Coronary arteries are the vessels that supply blood to the heart muscle. If yours are blocked, you may have a pain in your chest (known as angina) or a heart attack because parts of the heart are not getting enough blood and oxygen.

acute myocardial infarction

Acute myocardial infarction is what doctors call a heart attack. A heart attack is when your heart muscle gets damaged because it isn't getting enough blood and oxygen. This can happen if a branch of your coronary arteries becomes blocked. During a heart attack, you may have pain or heaviness over your chest, and pain, numbness or tingling in your jaw and left arm.

atherosclerosis

Atherosclerosis is also called 'hardening of the arteries'. It happens when fatty material sticks to the inner wall of your arteries. Over time, cholesterol, fats and other things in your blood stick to the same area and the artery wall becomes thick and narrow, making it progressively more difficult for blood to flow through the affected vessels.

angina

Angina is the name that doctors use for a pain in your chest that you get when your heart muscle isn't getting enough oxygen.

arteries

Arteries are the blood vessels that take blood that is rich in oxygen and food away from your heart. The arteries carry this blood to all the tissues in your body.

veins

Veins are blood vessels that carry blood back to your heart after your blood has delivered oxygen and food to the tissues.

Heart attack

defibrillator

A defibrillator is an electronic device that is used to restore normal heart rhythm. It works by giving electric shocks to your chest.

low blood pressure

If your blood pressure is about 100/60 or less, your doctor may say that you have low blood pressure. Low blood pressure is usually not a problem unless it becomes too low to push blood to your brain and the rest of the body. If you have low blood pressure, you may sometimes feel dizzy when you stand up.

LDL cholesterol

Cholesterol is a fatty substance in your blood. You can get it from food and it is also made by your liver. Having a lot of cholesterol in your blood can cause health problems. LDL cholesterol is often called 'bad' cholesterol. It can build up in your arteries and increase your risk of heart disease. LDL stands for low-density lipoprotein.

HDL cholesterol

Cholesterol is a fatty substance in your blood. You can get it from food and it is also made by the liver. Having a lot of cholesterol in your blood can cause health problems. But HDL cholesterol is sometimes called 'good' cholesterol, because it may lower the risk of heart disease. HDL stands for high-density lipoprotein.

high blood pressure

Your blood pressure is considered to be high when it is above the accepted normal range. The usual limit for normal blood pressure is 140/90. If either the first (systolic) number is above 140 or the lower (diastolic) number is above 90, a person is considered to have high blood pressure. Doctors sometimes call high blood pressure 'hypertension'.

diabetes

Diabetes is a condition that causes too much sugar (glucose) to circulate in the blood. It happens when the body stops making a hormone called insulin (type 1 diabetes) or when insulin stops working (type 2 diabetes).

blood pressure

Blood pressure is the amount of force that's exerted by your blood on to your blood vessels. You can think of it like the water pressure in your home: the more pressure you have, the faster and more forcefully the water flows out of the shower. Blood pressure is measured in millimetres of mercury (written as mm Hg). When your blood pressure is taken, the measurement is given as two numbers, for example 120/80 mm Hg. The first, higher, number is called the systolic pressure, and the second, lower, number is the diastolic pressure. The systolic number is the highest pressure that occurs while your heart is pushing blood into your arteries. The diastolic number is the lowest pressure that happens when your heart is relaxing and is not pushing your blood.

body temperature

Your body temperature is a measure of how warm you are. If you have a higher temperature than normal, it can mean that your body has an infection or you have a fever. Women also have a higher temperature at the time of month when their ovaries release an egg (ovulation).

acid reflux

Acid reflux happens when acid from your stomach flows into the tube leading from your throat to your stomach (your oesophagus) or up into your throat. Acid reflux can cause heartburn.

cholesterol

Cholesterol is a fat-like substance made by your liver or absorbed from food. It is used by your body to make bile acids (which help your intestines absorb nutrients) and steroid hormones (like testosterone or oestrogen). Cholesterol is also an important part of cell membranes, which are the structures that surround cells. 'Good cholesterol' is called HDL; 'bad cholesterol' is LDL.

heart failure

When the heart loses its ability to push enough blood through the blood vessels, it is called heart failure.

general anaesthetic

You may have a type of medicine called a general anaesthetic when you have surgery. It is given to make you unconscious so you don't feel pain when you have surgery.

placebo

A placebo is a 'pretend' or dummy treatment that contains no active substances. A placebo is often given to half the people taking part in medical research trials, for comparison with the 'real' treatment. It is made to look and taste identical to the drug treatment being tested, so that people in the studies do not know if they are getting the placebo or the 'real' treatment. Researchers often talk about the 'placebo effect'. This is where patients feel better after having a placebo treatment because they expect to feel better. Tests may indicate that they actually are better. In the same way, people can also get side effects after having a placebo treatment. Drug treatments can also have a 'placebo effect'. This is why, to get a true picture of how well a drug works, it is important to compare it against a placebo treatment.

ulcer

An ulcer is an open sore. Ulcers can happen in many parts of your body, such as in your stomach, and the skin of your legs, mouth, or genitals.

Heart attack

stroke

You have a stroke when the blood supply to a part of your brain is cut off. This damages your brain and can cause symptoms like weakness or numbness on one side of your body. You may also find it hard to speak if you've had a stroke.

allergic reaction

You have an allergic reaction when your immune system overreacts to a substance that is normally harmless. You can be allergic to particles in the air you are breathing, like pollen (which causes hay fever) or to chemicals on your skin, like detergents (which can cause a rash). People can also have an allergic reaction to drugs, like penicillin.

platelets

Platelets are small disc-shaped particles found in your blood (along with red blood cells and white blood cells). Platelets form the clots that stop the bleeding when you've been cut. People who don't have enough platelets have problems with bleeding too much.

allergy

If you have an allergy to something (such as pollen or a medicine), your body always overreacts to it. The reaction happens because your immune system (your body's system for fighting infection) is too sensitive to it.

intravenous infusion

When a medicine or a fluid, such as blood, is fed directly into a vein, it's called an intravenous infusion (or IV). To give you an intravenous infusion, a nurse, technician or a doctor places a narrow plastic tube into a vein (usually in your arm) using a needle. The needle is then removed and the fluid is infused (or dripped) through the tube into the vein.

systematic reviews

A systematic review is a thorough look through published research on a particular topic. Only studies that have been carried out to a high standard are included. A systematic review may or may not include a meta-analysis, which is when the results from individual studies are put together.

randomised controlled trials

Randomised controlled trials are medical studies designed to test whether a treatment works. Patients are split into groups. One group is given the treatment being tested (for example, an antidepressant drug) while another group (called the comparison or control group) is given an alternative treatment. This could be a different type of drug or a dummy treatment (a placebo). Researchers then compare the effects of the different treatments.

asthma

Asthma is a disease of the lungs. It makes you wheeze, cough and feel short of breath. Asthma attacks are caused by inflammation and narrowing of your airways, which makes it hard for air to pass in and out of your lungs.

chronic bronchitis

Your doctor may say that you have chronic bronchitis if you have a cough that brings up phlegm, if it lasts for three months or more, and you have had it twice in two years. Smoking is a common cause of chronic bronchitis.

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