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Heart Attack (Myocardial Infarction)

A heart attack (myocardial infarction) is usually caused by a blood clot, which stops the blood flowing to a part of your heart muscle. You should call for an ambulance immediately if you develop severe chest pain.

Treatment with a clot-busting medicine or an emergency procedure to restore the blood flow through the blocked blood vessel is usually done as soon as possible. This is to prevent or minimise any damage to your heart muscle. Other treatments help to ease the pain and to prevent complications. Reducing various risk factors can help to prevent a heart attack.

What is a 'heart attack'?

If you have a heart attack, a coronary artery or one of its smaller branches is suddenly blocked. The part of the heart muscle supplied by this artery loses its blood (and oxygen) supply if the vessel is blocked. This part of the heart muscle is at risk of dying unless the blockage is quickly removed. When a part of the heart muscle is damaged it is said to be infarcted. The term myocardial infarction (MI) means damaged heart muscle.

If a main coronary artery is blocked, a large part of the heart muscle is affected. If a smaller branch artery is blocked, a smaller amount of heart muscle is affected. After a heart attack, if part of the heart muscle has died, it is replaced by scar tissue over the following few weeks. Read [Anatomy of the heart](#) for more information about the heart.

There is actually a range of conditions that can be caused by a sudden reduction in blood flow in a coronary artery. This range of conditions has an overall term called [acute coronary syndrome \(ACS\)](#).

Symptoms

If you think someone is having a heart attack, look for the four Ps:

- Pain - a continuous pain in the chest, which could spread to the jaw, neck or arms.
- Pale skin.
- Rapid and weak pulse.
- Perspiration/sweating.

The most common symptom is severe chest pain, which often feels like a heavy pressure feeling on your chest. The pain may also travel up into your jaw and down your left arm or down both arms. The pain may be similar to angina but it is usually more severe and lasts longer. [Angina usually goes off after a few minutes](#). Heart attack pain usually lasts more than 15 minutes - sometimes several hours. Heart attack pain also doesn't usually improve if you rest or take your usual angina medication.

However, some people have only a mild discomfort in their chest. The pain can sometimes feel like indigestion or heartburn.

You may also sweat, feel sick and feel faint. You may also feel short of breath.

Occasionally, a heart attack happens without causing any pain. This is usually diagnosed when you have a heart tracing (electrocardiogram, or ECG) at a later stage.

Some people collapse and die suddenly if they have a large portion of heart muscle damaged. This is not very common.

What should I do if I think I am having a heart attack?

Dial 999/112/911 for an ambulance immediately. Then, if you have some, take one aspirin tablet (see below for the reason for this). You will normally be admitted straight to hospital.

Editor's Note

[Danny Buckland](#), December 2018.

Women tend to wait longer than men when reporting heart attack symptoms, according to new research in the European Heart Journal. It discovered that women wait an average 37 minutes longer than men before calling for medical help. It concluded that the delays contributed to a higher mortality rate among women. "Every minute counts when you have a heart attack. Look out for moderate to severe discomfort including pain in the chest, throat, neck, back, stomach or shoulders that lasts for more than 15 minutes. It is often accompanied by nausea, cold sweat, weakness, shortness of breath, or fear," said Matthias Meyer, co author of the research.

Causes

Blood clot (thrombosis) - the cause in most cases. Blood clots do not usually form in normal arteries. However, a clot may form if there is **some atheroma within the lining of the artery**.

Certain risk factors increase the risk of more atheroma forming. This can lead to ACS. **See the separate leaflet called Cardiovascular Disease (Atheroma)**.

Briefly, risk factors that can be modified and may help to prevent a heart attack include:

- **Smoking.** **If you smoke, you should make every effort to stop.**
- **High blood pressure.** **If your blood pressure is high it can be treated.**
- **Being overweight.** **Losing some weight is advised.** Losing weight will reduce the amount of workload on your heart and also help to lower your blood pressure.
- **Cholesterol.** **This should usually be treated if it is high.**
- **Inactivity.** **You should aim to do some moderate physical activity** on most days of the week for at least 30 minutes - for example, brisk walking, swimming, cycling, dancing, gardening, etc.
- **Diet.** **You should aim to eat a healthy diet.**
- **Diabetes.** People with diabetes have a higher risk of having ACS. This risk can be reduced by ensuring your blood pressure, cholesterol levels and blood sugar (glucose) levels are well controlled.
- **Family history.** Your risk is increased if there is a family history of heart disease or a stroke that occurred in your father or brother aged below 55, or in your mother or sister aged below 65.
- **Ethnic group.** Certain ethnic groups - for example, British Asians - have a higher risk of developing cardiovascular disease.

How is a heart attack diagnosed and assessed?

Tests are usually done to confirm a heart attack. These are:

- **A heart tracing (electrocardiogram, or ECG).** There are typical changes to the normal pattern of the ECG in a heart attack.
- **Blood tests.** A blood test that measures a chemical called troponin is the usual test that confirms a heart attack.

Other tests may be done in some cases. This may be to clarify the diagnosis (if the diagnosis is not certain) or to diagnose complications such as heart failure if this is suspected. For example, **an ultrasound scan of the heart (echocardiogram, or 'echo')** or a test called a **myocardial perfusion scan** may be done.

You may also be advised to have tests to assess the severity of the fatty patches or plaques (atheroma) in the coronary arteries - for example:

- **An ECG taken whilst you exercise on a treadmill or bike (exercise tolerance test).**
- **An angiography of the coronary arteries** may also be performed.

Heart attack treatment

The following is a typical situation and mentions the common treatments that are usually offered. However, each case is different and treatments may vary depending on your situation.

What you need to do

- Call 999/112/911 for medical help and say you think someone is having a heart attack.
- Help move them into the most comfortable position. The best position is on the floor leaning against a wall with knees bent and head and shoulders supported.
- Give them a 300 mg aspirin (if available and they're not allergic) and tell them to chew it slowly.
- Keep checking their breathing, pulse and level of response.
- If they stop responding at any point, you may need to do cardiopulmonary resuscitation (CPR). **See the separate leaflet called Dealing with an Adult who is Unresponsive.**

Aspirin and other antiplatelet medicines

As soon as possible after a heart attack is suspected you will be given a dose of aspirin. Other antiplatelet medicines may be given. **See the separate leaflet called Aspirin and other Antiplatelet Medicines.**

Injections of heparin or a similar medicine

These are usually given for a few days to help prevent further blood clots from forming.

Pain relief

A **strong painkiller** such as **morphine** is given by injection into a vein to ease the pain.

Treatment to restore blood flow in the blocked coronary artery

There are two treatments that can restore blood flow back through the blocked artery:

- **Coronary angioplasty.** Ideally this is the best treatment if it is available and can be done within a few hours of symptoms starting.
- **An injection of a clot-busting medicine** is an alternative to emergency angioplasty. It can be given easily and quickly in most situations. Some ambulance crews are trained to give this.

Both the above treatments usually work well to restore blood flow and greatly improve the outlook. The most crucial factor is the speed at which one or other treatment is given after symptoms have started.

A beta-blocker medicine

Beta-blocker medicines have some protective effect on the heart muscle and they also help to prevent abnormal heart rhythms from developing. Beta-blocker medicines will also help to prevent another heart attack.

Insulin

Some people have a raised blood sugar level when they have a heart attack, even if they do not have diabetes. If this occurs then your blood sugar (glucose) levels may need to be controlled with insulin. If you have diabetes then it is also likely that you will need to be treated with **insulin** to control your blood glucose levels when you are in hospital.

Oxygen

You may be given oxygen which works to reduce the risk of damage to your heart muscle.

Treatment after you have had a heart attack

Treatment and advice after a heart attack aims:

- To reduce the chance of a further heart attack.
- To help to prevent heart disease from getting worse.

If you are a smoker, it's essential to **stop smoking**. Regular exercise and getting back to normal work and life are usually advised. Much can be done to reduce the risk of a further heart attack. Read more about **after a heart attack (myocardial infarction)**.

Normally you will be advised to take regular medication for the rest of your life. The medicines are usually taken each day for life. The exact medicines prescribed for you can depend on factors such as the type of heart attack you had, as well as any other illnesses you may also have. The medicines used include:

- **Antiplatelet medicines** to help prevent blood clots.
- **Beta-blockers** to help protect the heart.
- **Angiotensin-converting enzyme (ACE) inhibitors** to help protect the heart.
- **Statins** to lower the cholesterol level.

How serious is a heart attack?

This often depends on the amount of heart muscle that is damaged. In many cases, only a small part of the heart muscle is damaged and then heals as a small patch of scar tissue. The heart can usually function normally with a small patch of scar tissue. A larger heart attack is more likely to be life-threatening or cause complications.

Even before treatments became available to restore blood flow, many people made a full recovery. With the help of modern treatment, particularly if you are given treatment within a few hours to restore blood flow, a higher percentage of people now make a full recovery.

Some possible complications include the following:

- **Heart failure.**
- **Abnormal heart rhythms.**
- **A further heart attack** may occur sometime in the future.

The most crucial time is during the first day or so. If no complications arise and you are well after a couple of weeks then you have a good chance of making a full recovery. A main objective then is to get back into normal life and to **minimise the risk of a further heart attack**.

Further reading & references

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