

## Angina

Angina is caused by narrowing of the coronary (heart) arteries. Usual treatments include a statin drug to lower your cholesterol level, low-dose aspirin to help prevent a heart attack, and a beta-blocker drug to help protect the heart. Beta-blockers and other drugs can also ease and prevent angina pains. In some cases, angioplasty or surgery are options to widen, or to bypass, narrowed arteries.

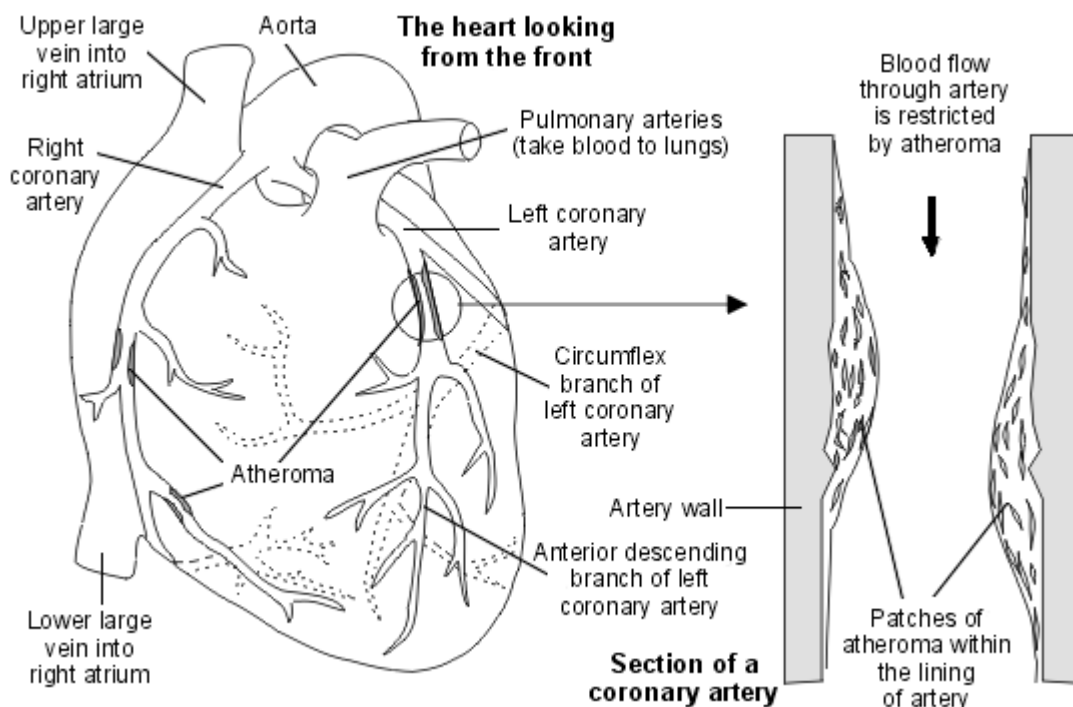
### What is angina?

Angina is a pain that comes from the heart. It is common in people over the age of 50. Sometimes it occurs in younger people. It is more common in men than women. This brochure is about the common type of angina which is caused by narrowing in the coronary arteries of the heart. (Angina is sometimes caused by uncommon disorders of the heart valves or heart muscle.)

### Understanding the arteries of the heart

The heart is mainly made of special muscle. The heart pumps blood into arteries (blood vessels) which take the blood to every part of the body. Like any other muscle, the heart muscle needs a good blood supply. The coronary arteries take blood to the heart muscle. The coronary arteries are the first arteries to branch off the aorta. The aorta is the large artery that takes blood from the left ventricle of the heart to the body.

### What causes angina?



If you have angina, one or more of your coronary arteries is usually narrowed. This causes a reduced blood supply to a part or parts of your heart muscle. The blood supply may be enough when you are resting. However, your heart muscle needs more blood and oxygen when it works harder. For example, when you walk fast or climb stairs, your heart rate increases to deliver the extra blood. If the extra blood that your heart needs during exertion cannot get past the narrowed coronary arteries, the heart 'complains' with pain.

The narrowing of the arteries is caused by atheroma. Atheroma is like fatty patches or 'plaques' that develop within the inside lining of arteries. (This is similar to water pipes that get 'furred up' with scale.) Plaques of atheroma may gradually form over a number of years in one or more places in the coronary arteries. In time, these can become bigger and cause enough narrowing of one or more of the arteries to cause symptoms. (The diagram shows three narrowed sections as an example. However, atheroma can develop in any section of the coronary arteries.)

### What are the symptoms of angina?

#### Typical and common symptoms

The common symptom is a pain, ache or discomfort that you feel across the front of the chest when you exert

yourself. For example, when you walk up a hill. You may also, or just, feel the pain in your arms, jaw, neck or stomach. An angina pain does not usually last long. It will usually ease within 10 minutes when you rest, and often within 1-2 minutes if you take some GTN (see below). The pain may also be triggered by other causes of a faster heart rate. For example, when you have a vivid dream or an argument. The pains also tend to develop more easily after meals, or in cold winds.

#### **Less typical symptoms that sometimes occur**

Some people have non-typical pains, for example, when bending or eating. If the symptoms are not typical then it is sometimes difficult to tell the difference between angina and other causes of chest pain such as a pulled muscle in the chest, or heartburn. Some people with angina also become breathless when they exert themselves. Occasionally this is the only symptom and there is no pain.

#### **What are the tests for angina?**

If you have suspected angina, tests are usually advised.

- **A blood test** may be advised to check for anaemia, thyroid problems, and a high cholesterol level as these may be linked with angina.
- **A heart tracing called an ECG (electrocardiograph)** may be advised. A routine ECG may be normal if you have angina. In fact, more than half of people with angina have a normal resting ECG. However, an ECG taken whilst you exercise on a treadmill or bike ('exercise-ECG') is often abnormal. The exercise-ECG helps to confirm the diagnosis, and also helps to assess the severity of the condition.
- **Further heart tests** are usually only necessary if the diagnosis is not clear, or if the symptoms are not controlled by medication, or if the exercise-ECG shows that the condition is severe. For example, angiography of the coronary arteries may be advised. In this test a dye is injected into the coronary arteries. The dye can be seen by special x-ray equipment. This shows up the structure of the arteries (like a road map) and can show the location and severity of any narrowing.

#### **What can I do to help with angina?**

Certain 'risk factors' increase the risk of more atheroma forming which can make angina worse. Briefly, risk factors that can be modified and may help to prevent angina from getting worse are:

- **Smoking.** If you smoke, you should make every effort to stop.
- **High blood pressure.** Make sure your blood pressure is checked at least once a year. If it is high it can be treated.
- **If you are overweight,** losing some weight is advised.
- **A high cholesterol.** This can 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. (Occasionally, angina is due to a heart valve problem where physical activity may not be so good. Ask your doctor to confirm that regular physical activity is OK for you.)
- **Diet.** You should aim to eat a healthy diet. Briefly, a healthy diet means:
  - AT LEAST five portions of *a variety of* fruit and vegetables per day.
  - THE BULK OF MOST MEALS should be starch-based foods (such as cereals, wholegrain bread, potatoes, rice), plus fruit and vegetables.
  - NOT MUCH fatty food such as fatty meats, cheeses, full-cream milk, fried food, butter, etc. Use low fat, mono-, or poly-unsaturated spreads.
  - If you eat meat it is best to eat lean meat, or poultry such as chicken.
  - If you do fry, choose a vegetable oil such as sunflower or olive oil.
  - Try not to add salt to food, and limit foods which are salty.
- **Alcohol.** A small amount of alcohol (1-2 units per day) may be beneficial to the heart. One unit is in about half a pint of normal strength beer, or two thirds of a small glass of wine, or one small pub measure of spirits. However, too much can be harmful. Men should drink no more than 21 units per week (and no more than four units in any one day).

#### **What are the aims of treatment if you have angina?**

The main aims of treatment are:

- To prevent angina pains as much as possible.
- To ease pain quickly if it occurs.
- To limit further deposits of atheroma as much as possible. This prevents or delays the condition from getting worse.
- To reduce the risk of having a heart attack.

### Treatments that are advised in most cases

#### Lifestyle measures to reduce 'risk factors'

Discussed above.

#### GTN (Glyceryl Trinitrate)

This comes as tablets or sprays. You take a dose under your tongue 'as required' when a pain develops. GTN is absorbed quickly into the bloodstream from under the tongue. A dose works to ease the pain within a minute or so. Many people always carry their GTN spray or tablets with them. Some people take a GTN tablet or a spray before any exercise. For example, before climbing stairs. If the first dose does not work, take a second dose after five minutes. (If the pain persists for 15 minutes despite taking GTN, then call an ambulance.)

GTN works by relaxing the blood vessels. This reduces the workload on the heart, and also helps to widen the coronary arteries and increase the flow of blood to the heart muscle.

GTN tablets 'go off' after a few weeks. Therefore, you need a fresh supply of tablets every eight weeks, and return any unused tablets to the pharmacist. You may prefer to use a GTN spray which has a longer shelf life than tablets. A dose of GTN may cause a headache and/or flushing for a short while. This side-effect often improves, or goes, with continued use.

#### A statin drug to lower your cholesterol level

Cholesterol is a chemical that is made in the liver from fatty foods that you eat. Cholesterol is involved in forming atheroma. As a rule, the higher the blood cholesterol level, the greater the risk of developing atheroma. However, whatever your cholesterol level, a reduction in the level is usually advised if you have angina. Statin drugs lower the blood cholesterol level by blocking an enzyme (chemical) which is needed to make cholesterol in the liver.

There are several brands of statin drugs to choose from. The aim is to reduce your cholesterol level to below 4 mmol/l or by 25% of the original level, whichever gives the greatest reduction.

#### Aspirin

Aspirin reduces the 'stickiness' of platelets. Platelets are tiny particles in the blood that help the blood to clot after cuts. If lots of platelets become stuck onto a patch of atheroma inside an artery they can form a clot (thrombosis). Therefore, taking aspirin reduces the risk of a heart attack which is caused by a blood clot forming in a coronary artery. The usual dose of aspirin is 75mg daily. This is a lot less than the dose used for pains and headaches. Side-effects are unusual with low dose aspirin. If you have a stomach or duodenal ulcer, or asthma, you may not be able to take aspirin. Options then include to take an additional drug to 'protect the gut', or to use another antiplatelet drug such as clopidogrel.

#### A beta-blocker drug

Beta-blockers 'block' the action of certain hormones such as adrenaline. These hormones increase the rate and force of the heartbeat, particularly when you exert yourself. Therefore, if you take a beta-blocker it blunts any increase in the rate and force of the heart beat, particularly when you exert yourself. Therefore less oxygen is needed by the heart, and angina pains are prevented, or occur less often. Beta-blockers are also thought to have some protective effect on the heart muscle which may reduce the risk of developing complications.

### Other treatments that may be advised

#### Other drugs to prevent angina pains

A beta-blocker (described above) may be sufficient to prevent angina pains. There are also other drugs that can be taken in addition, if required, to reduce the number and severity of angina pains. There are many drugs that can be used, but they fall into three main groups.

- **Calcium channel blockers** 'relax' the coronary arteries to increase blood flow. Some of these drugs also reduce the heart rate at rest, and the rate of rise in the heart rate when you exert yourself. So, less oxygen is needed by the heart.
- **Nitrate drugs** work in a similar way to GTN.
- **Potassium channel blockers** work in a similar way to nitrates.

There are several types in each group. They are all good at preventing angina pains. If the pains are not well controlled by taking one drug, then another drug can be added from another group. As the different groups of drugs work in different ways, combinations of these drugs complement each other. It is quite common to take a 'combination therapy' of two or three drugs to prevent angina pains. The possible side-effects vary between the

different drugs. Therefore, if a particular drug does not suit, you may find that a different one is fine. The aim is to find a drug, or combination of drugs, that prevent your pains, but with minimal side-effects.

Note: even when taking regular medication to prevent angina pains, you can still take GTN for 'breakthrough' angina pains that may still occur from time to time.

### **Surgery and angioplasty**

These treatments are an option if drugs fail to control the pains, or if the condition becomes severe with one or more coronary arteries becoming very narrow.

- **Angioplasty.** In this procedure a tiny wire with a balloon at the end is put into a large artery in the groin or arm. It is then passed up to the heart and into the narrowed section of a coronary artery using special x-ray guidance. The balloon is then blown up inside the narrowed part of the artery to open it wide again. This procedure is only suitable in some cases as only arteries with short narrowed sections can be treated this way.
- **Surgery.** This involves an operation to bypass the narrowed sections of arteries with healthy blood vessel segments (grafts) which are taken from other parts of the body. The operation is called coronary artery bypass graft surgery (CABG). More blood can then get past into the heart muscle. Not all people with angina are suitable for this operation as it depends on where the narrowed arteries are.

### **Some common worries about angina**

- **'Straining the heart' by exertion** is a common worry. On the contrary, more physical activity is usually advised. You will normally be encouraged to exercise regularly. Physical activity helps to get the heart 'fitter' and improves the blood supply to the heart muscle.
- **Sex.** Some people with angina worry that the physical effort of having sex will damage the heart. This is wrong, and you do not need to stop having sex. If sex does bring on an angina pain, it may be helpful to take some GTN beforehand.
- **Driving and flying.** If you are a car driver, there is usually no restriction for driving your own car unless pains occur at rest, or while driving. In general, if you can climb 12 stairs and walk 100 metres on the level without pain or getting very breathless, you are fit to fly as a passenger. People with frequent angina pains or unstable angina should avoid flying.

### **Some other points about angina**

#### **Stable angina and unstable angina**

In most cases, angina pains come on with a certain amount of exertion, and you can predict the level of exertion that triggers a pain. This situation is called 'stable angina'. It is common to have stable angina for many years. With treatment, most pains can be prevented. In time, over months or years, the pains may come on with a lesser amount of exertion.

If the pattern of your pain changes fairly suddenly, and the pains come on minimal exertion, or while you are resting, this is called 'unstable angina'. This is an emergency and needs immediate medical care.

#### **Heart attack**

If you have angina, you have a higher than average risk of having a heart attack (myocardial infarction). Briefly, a heart attack usually occurs when there is a sudden total blockage of a coronary artery. This is caused by a blood clot that forms over a patch of atheroma, and blocks the blood supply to a segment of heart muscle. However, your risk of having a heart attack is much reduced if you take aspirin and a statin - as discussed above.

#### **Prolonged pain**

If you have a pain that lasts longer than 15 minutes, or is different or more severe than usual, then call an ambulance immediately. It may be unstable angina or a heart attack and immediate medical care is needed.

#### **Immunisation**

People with angina should be immunised against the pneumococcus, and have an annual 'flu-jab'.