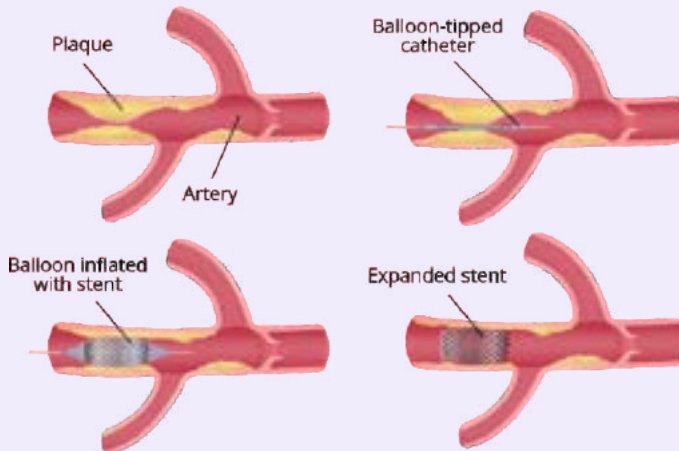




# What is **Angioplasty**

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# ANGIOPLASTY



## Introduction

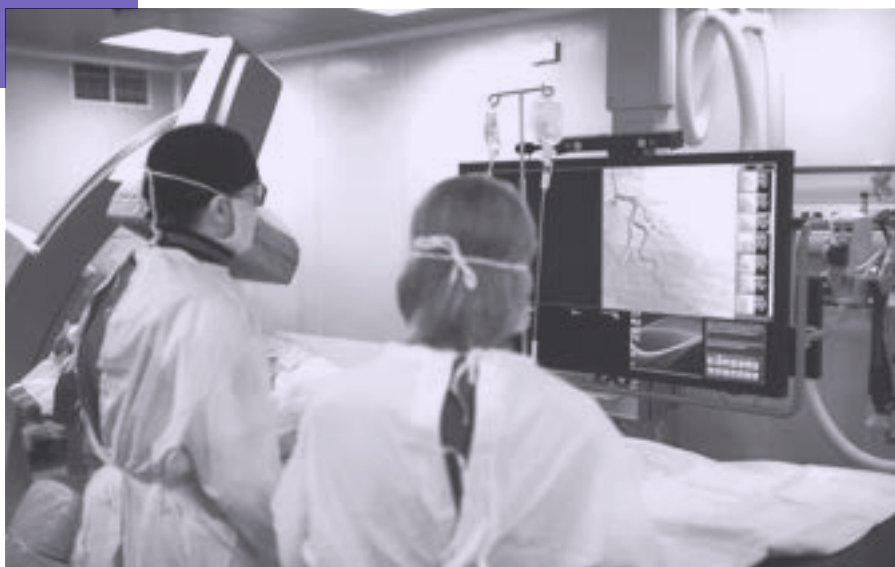
Coronary angioplasty is a treatment to widen narrowed sections of the heart (coronary) arteries. It is also known as percutaneous coronary intervention (PCI). It does not involve major heart surgery but involves the use of a thin, flexible tube (a catheter) which is inserted into coronary arteries via large blood vessels.

The catheter is inserted into a coronary artery. The balloon at the tip of the catheter is blown up at the narrowed section of artery to force it wider. A small tube (a stent) is left in place to keep the artery widened.

## What is coronary angioplasty used for?

Coronary angioplasty is commonly used to treat people who have angina. In these people, angioplasty is usually carried out 'electively'. This means a time and date are chosen to do the procedure.

However, angioplasty can also be used to help in emergency situations, such as when a person has a heart attack (myocardial infarction). A heart attack occurs because part of the heart is not receiving enough blood. This is usually caused by a blockage in an artery supplying blood to the heart itself. Coronary angioplasty is used to widen the artery surrounding the blockage. This helps blood flow back to the affected area and reduces the damage to the heart.



## How is coronary angioplasty done?

You lie on a couch in a catheterisation room. An X-ray machine is mounted above the couch. A thin, flexible 'guide' tube (catheter) is inserted through a wide needle or small cut in the skin into a blood vessel in the groin or arm. Local anaesthetic is injected into the skin above the blood vessel. So, it should not hurt when the catheter is passed into the blood vessel. The doctor gently pushes the catheter up the blood vessel towards the heart. Low-dose X-rays are used to monitor the progress of the catheter tip which is gently manipulated into the correct position. You may be able to see the progress of the catheter on the X-ray monitor.

The tip of the catheter is pushed inside a heart (coronary) artery down to where there is a narrowed section caused by the fatty patches, or 'plaques', (atheroma). A second thinner 'balloon catheter' is then passed down the 'guide' catheter. There is a balloon and a small tube (a stent) at the tip of the balloon catheter. The balloon is blown up for 30–60 seconds. This squashes the atheroma and widens the narrowed artery. When the balloon is blown up it stops the blood flow. Therefore, you may have an angina-like pain for a short time. However, this soon goes after the balloon is let down.

Usually, a stent is left in the widened section. The stent is like a wire mesh tube which gives support to the artery and helps to keep the artery widened. The 'collapsed' stent covers the balloon and is opened as the balloon is blown up. Some stents are coated with a chemical that helps to prevent the artery from becoming blocked again. People who are known to have an allergy to nickel may need a nickel-free stent.



The procedure may be repeated for one or more narrowed sections within the coronary arteries.

You cannot feel the catheter inside the blood vessels. You may feel an occasional missed or extra heartbeat during the procedure. This is normal and of little concern. During the procedure your heartbeat is monitored by electrodes placed on your chest which provide a tracing on an electrocardiograph (ECG) machine. Sometimes a sedative is given before the test if you are anxious.

## How do I prepare for a coronary angioplasty?

You should receive instructions from your local hospital about what you need to do, which may include:

- If you take any 'blood-thinning' medicine such as warfarin or another anticoagulant, you will need to stop this for 2-3 days before the test (to prevent excessive bleeding from the site of the thin, flexible tube-catheter insertion).
- If you take insulin or medicines for diabetes, you may need to alter the timing of the dose. Some medicines may need to be stopped for 48 hours. Your doctor should clarify this with you.
- You may be asked to stop eating and drinking for a few hours before the procedure.
- You may be asked to shave both groins before the procedure.



### How long does coronary angioplasty take?

If just one section of artery is widened, the procedure usually takes about 30 minutes. If several sections are to be widened then the procedure takes longer. You may need to stay in hospital overnight for observation following the procedure.

### How successful is coronary angioplasty?

More than 9 in 10 procedures are successful at relieving angina. However, coronary angioplasty cannot be used for all people with angina. This is because in many cases there are too many narrowed sections in the heart (coronary) arteries. Or, the sections that are narrowed are too long, or too narrow, or too far down a coronary artery or branch artery for this procedure.

### After an angioplasty

You should avoid any heavy activities such as lifting for about a week until the small wound, where the thin, flexible tube (catheter) was inserted, has healed. You should not drive a car for a week after having an angioplasty.

## Drug-eluting Stents



### Complications and side-effects

One common problem is that a bruise may form under the skin where the thin, flexible tube (catheter) was inserted (usually the groin). This is not serious but it may be sore for a few days.

### Long-term complications

In some cases, the fatty patches, or 'plaques', (atheroma) re-form within the small tube (stent) over the following few months and years. This may narrow the artery again and angina pains may return. It is difficult to explain as to how often this occurs. If it does, the procedure can be repeated, or other treatments for angina can be considered, such as coronary artery bypass grafting.

Newer techniques are being developed to try to prevent this possible problem. For example, stents that are coated with chemicals which prevent the local formation of atheroma are being developed. It may be possible that these coated stents (called drug-eluting stents) will be commonly used in the near future.

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# What is **Heart Failure?**

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## Introduction

Heart failure does not mean that your heart has stopped or is going to stop at any minute. It means that your heart is not functioning as well as it should. Heart failure can be caused by many different conditions. Symptoms include fluid retention, breathlessness and tiredness. Medication can usually ease symptoms and can often improve the outlook.

## What is Heart Failure?

In a normal healthy heart, during each heartbeat a set amount of blood enters the heart and is pumped out again. If you have heart failure, your heart cannot cope with pumping the full amount of blood in each heartbeat.

Heart failure is divided into different types depending on its onset and associated symptoms. It is called acute heart failure if it has made you unwell quite suddenly. If the symptoms have been going on for some time, it is called chronic heart failure. As a general rule, you will often be admitted to hospital if you have acute heart failure, whereas if you have chronic heart failure you will probably have tests done as an outpatient. If you have chronic heart failure, it is possible to develop acute heart failure if matters suddenly become worse.

Heart failure is also divided into types depending on how much blood the heart manages to pump out in each heartbeat. The term ejection fraction means the amount (percentage or fraction) of blood in the biggest chamber of the heart (the



left ventricle) that is pumped out (ejected) with each heartbeat before it fills up again for the next beat. It is normal for some of the blood to be left behind with each beat but usually at least half the blood is pumped out with every beat.

#### **Heart failure can be classified into three groups:**

- If less than 40% of the blood is pumped out, this is called heart failure with reduced ejection fraction
- If 41-49% of the blood is pumped out, this is called heart failure with minimally reduced ejection fraction
- If more than 50% is pumped out, it is called heart failure with preserved ejection fraction

Distinguishing between the three groups is important as it will affect the recommended treatment plan.

### **What are the symptoms of Heart Failure?**

Symptoms of heart failure can vary. The most common symptoms are:

- Feeling breathless - this may occur when you exert yourself, when you lie flat, or even when you are awake or asleep.
- Retaining fluid - most common symptom is swollen ankles. It can also cause swelling of your legs, bottom or tummy.
- Feeling tired.



#### Other symptoms include:

- Having a cough.
- Feeling light-headed or dizzy or having fainting spells.
- Losing your appetite.
- Constipation.

Depending on the underlying cause for heart failure, you may also have other symptoms. For example, chest pains if you have angina or the sensation of having a 'thumping heart' (palpitations) if you have a heart rhythm problem.

#### The severity of heart failure is often graded into four classes or stages:

- **Class 1 (very mild)** - ordinary physical activity does not cause breathlessness, extreme tiredness (fatigue), or palpitations. You may not have any symptoms at all. However, tests (perhaps done for other reasons) may have detected mild heart failure.
- **Class 2 (mild)** - you are comfortable at rest. However, ordinary physical activity such as walking causes some breathlessness, fatigue, or palpitations.
- **Class 3 (moderate)** - although comfortable at rest, slight physical activity such as dressing yourself causes breathlessness, fatigue, or palpitations.
- **Class 4 (severe)** - you are unable to carry out any physical activity without developing breathlessness, fatigue, or palpitations. Symptoms are often present even at rest. With any physical activity you have increased symptoms and discomfort.



## What causes Heart Failure?

Heart failure is not an exact term. Heart failure is a general umbrella term and may develop as a complication of various conditions. Conditions that cause heart failure affect the heart's ability to function well as a pump.

Coronary heart disease (CHD) is the most common, or main, cause of heart failure. In particular, heart failure may develop after a heart attack (myocardial infarction).

### Other conditions that may cause heart failure

These include:

- Diseases of the heart muscle (cardiomyopathy).
- High blood pressure (hypertension).
- Diseases of the heart valves.
- Some types of abnormal heart rhythms (arrhythmias).
- Medicines and other chemicals that may damage the heart muscle - for example, excess alcohol, cocaine and some types of chemotherapy.
- Various non-heart conditions that can affect the function of the heart - for example, severe anaemia, thyroid disease (hypothyroidism or hyperthyroidism) and Paget's disease of bone.
- Sometimes it can be caused by a lack of certain nutrients - for example, vitamins such as thiamine.



Sometimes the cause of heart failure is not known.

The cause will often have an effect on the type of heart failure - for example, reduced or preserved ejection fraction - the treatment, and whether or not it can be cured.

## How is Heart Failure diagnosed?

When a doctor examines you, they may find signs that occur with heart failure - for example:

- An enlarged heart
- A faster than normal pulse
- Signs of fluid retention - such as swollen ankles, an enlarged liver or crackles in the lungs when the chest is examined

However, these signs and the symptoms mentioned above can be due to various conditions other than heart failure. If heart failure is suspected, tests are usually done to confirm the diagnosis. A blood test is usually done to measure a chemical called B-type natriuretic peptide (BNP) or N-terminal pro-B-type natriuretic peptide (NT-proBNP).

BNP is a hormone that helps to keep blood volume at a steady level. These substances are increased in heart failure, and the higher they are, the more severe the heart failure is likely to be. However, they can be high in other conditions also. You will also have to undergo a 'heart tracing' (electrocardiogram, or ECG).



## Heart Failure treatment

### Diet

Weight should be within a healthy range (BMI 18.5 to 25). If you are overweight, try to lose weight to reduce the extra burden on your heart. If you are underweight, your specialist or GP may refer you to a dietician for advice about nutritional supplements.

### Do not smoke

The chemicals in tobacco cause blood vessels to narrow, which can make heart failure worse. Smoking can also make chronic heart disease worse.

### Exercise

For most people with heart failure, regular low-intensity exercise is advised. Exercise cannot reverse heart failure, but the fitter the heart, the better it will pump. The level of exercise to aim for will vary from person to person. Before you start to increase your exercise, get advice from your specialist, as some people with heart valve problems or more severe heart failure condition may not be able to do some forms of exercise. You may also be referred for a specialised heart failure rehabilitation programme which may include exercise.



### Immunisation

You should have an annual influenza jab and be immunised against the pneumococcal germ (bacterium).

### Weigh yourself regularly

If you have moderate-to-severe heart failure. Your specialist will advise if you need to do this and if so, how often you should weigh yourself. If you retain fluid rapidly, your weight goes up rapidly too. So, if your weight goes up by more than 2 kg (about 4 lb) over 1-3 days, you should contact a doctor. You may need to increase your medication.

### Limit your alcohol intake

You should not exceed the recommended amount of alcohol, as more than the recommended upper limits can be harmful.

### Medicine

The following medications are commonly used to treat heart failure. They will be tailored to the individual person, depending on the type, cause and severity of the heart failure.

- Angiotensin-converting enzyme (ACE) inhibitors
- Angiotensin receptor blockers (ARBs) - such as valsartan or losartan
- Beta-blockers





- 'Water tablets' (diuretics)
- Mineralocorticoid/aldosterone receptor antagonists (MRAs), eg spironolactone and eplerenone, like diuretics, also prevent the build-up of fluid
- Other medicines used by specialists for treating heart failure include Ivabradine, and sacubitril with valsartan.

## Devices for Heart Failure

Various devices are implanted in a small number of people with heart failure. Examples include implantable cardioverter defibrillators (ICDs) and pacemakers.

ICDs work by detecting any abnormal heart rhythms that may occur. If your heart rhythm is too slow, the device can give your heart extra support by working as a normal pacemaker. If your heart beats too fast, the ICD can give you a burst of extra beats at a slightly faster rate which should return your heart back to a normal rhythm, or it can give you a shock (defibrillation) to restore a regular heartbeat.

Pacemakers work differently. In some cases, there is some damage to the specialised heart cells that carry the signals needed for your heart to squeeze (contract) properly. This can then cause the signals to travel out of sync which leads to your heart pumping less forcefully and less efficiently. The pacemakers work to control these signals so the heart can then beat more effectively. This is also known as cardiac resynchronisation therapy.



These different devices have dramatically altered the treatment of heart failure in selected cases and have improved both the outlook and quality of life. However, these devices are only suitable for certain people with heart failure. Your doctor will be able to discuss with you in more detail if you are suitable for one of these devices.

## Other treatments

As mentioned above, heart failure usually develops as a complication of various conditions. Other treatments for the underlying condition may be advised in certain cases. For example:

- Treatment to lower blood pressure if you have high blood pressure (hypertension).
- Treatments to slow down the progression of chronic heart disease if this is the cause of the heart failure. For example, lowering high cholesterol level.
- Surgery to replace or fix a heart valve may be done if a damaged heart valve is the cause of heart failure.
- A heart transplant is an option in some cases.

Over recent years, various new treatments have been introduced which have led to a much improved prognosis for people with heart failure.

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