

Your heart

Although your heart is a small portion of your body weight, it is one of your most vital organs. This important pump – the size of a fist – beats continuously, on average, 60–100 times a minute, around 100,000 times per day. Each minute it pumps all of your blood – about 5 litres (9 pints) – around the body via a system of arteries, veins, and capillaries (see p246). This system, together with your lungs, serves to oxygenate your blood, and ensure that every cell in your body receives the oxygen it needs to function.

HOW YOUR HEART WORKS

Your heart weighs approximately 250–340g (9–12 oz). It is divided into four sections, or chambers, with two chambers on either side. The top two chambers are the right and left atrium (plural, atria), and the bottom two are the right and left ventricles.

For your heart to beat normally, electrical impulses make the atria contract. This electrical activity then travels to the ventricles, which then contract.

The right side of the heart receives deoxygenated blood (without oxygen) that has travelled, via the veins, from the rest of your body. With every heartbeat, the heart pumps this blood to the lungs, where carbon dioxide is removed and the blood is reoxygenated (see pp230–1). The oxygenated blood then travels from the lungs through your blood vessels to the left side of your heart. From here it travels to the rest of the body through the aorta (the main artery) and other arteries. Blood then returns to the heart via the veins, continuing the cycle.

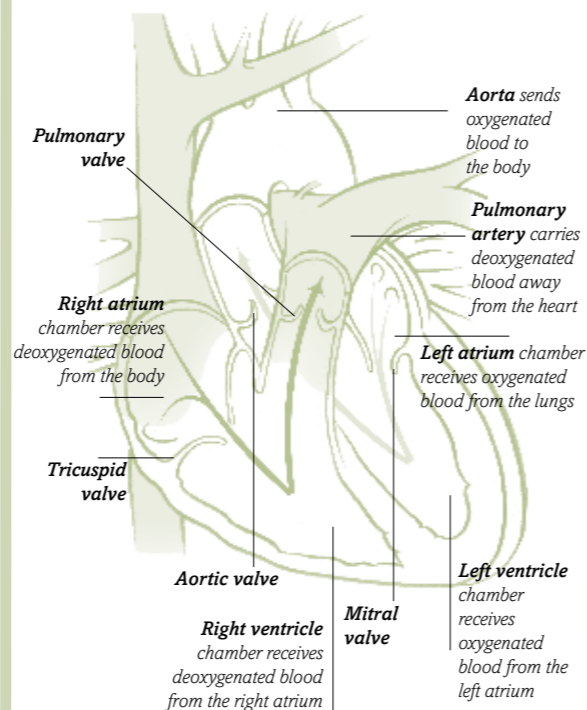
Valves in the heart – the tricuspid and pulmonary valves on the right and the mitral and aortic valves on the left – control the flow of blood (see opposite). The blood vessels also have valves to ensure that blood flows in the right direction through them.

HOW WOMEN ARE DIFFERENT

When it comes to heart disease, women differ in their risk factors (see p163), and in the diagnosis (see pp168–9) and treatment (see pp170–1).

INSIDE YOUR HEART

The heart has four chambers within a muscular structure; the myocardium. The flow of blood is controlled by valves (see opposite).

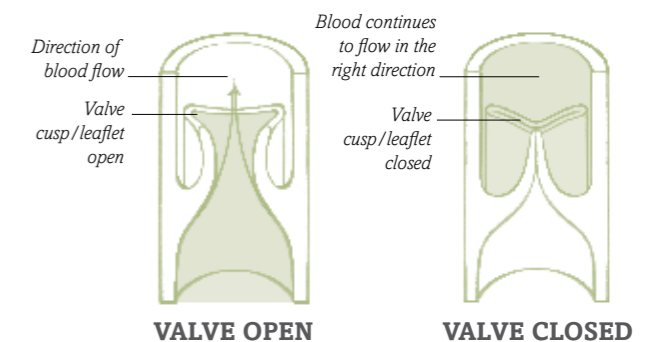


Cross-section through a healthy heart

This cross-section through the heart shows the four chambers, each with a valve.

VALVES IN THE HEART

Valves in the heart keep the blood flowing in the correct direction. Atrioventricular valves (mitral and tricuspid) lie between the atria and ventricles; semilunar valves are at the openings of the pulmonary artery and aorta. The valves have cusps or leaflets that open under pressure as the heart contracts to force the blood through. Then the cusps or leaflets shut, closing the valves and stopping the blood from flowing backwards.



BLOOD PRESSURE

Every time your heart beats, it pumps blood into your blood vessels. Blood pressure is the pressure of the blood as it flows through the blood vessels. Your blood pressure is at its highest – known as the systolic pressure – when the heart contracts and pumps blood to the rest of the body. When the heart is at rest, between beats, your blood pressure falls. This is the diastolic pressure.

Your blood pressure should not be higher than 140/90mmHg (140 is the systolic pressure and 90 is the diastolic pressure). In certain conditions, such as diabetes, you should be aiming to reduce your blood pressure below this.

Both your systolic and diastolic pressures are important, and if either one is raised this is known as high blood pressure, or hypertension. Low blood pressure is known as hypotension. There are several ways to measure blood pressure.

Sphygmomanometer The doctor or nurse will wrap a cuff around your upper arm and will inflate the cuff. He or she then listens to your pulse with a stethoscope. When the pulse is first heard, the systolic pressure is measured. The pressure in the cuff is then gradually released and the sound of the pulse becomes faint until it disappears, at which point the diastolic pressure is measured.

Electronic blood pressure machines These devices measure blood pressure electronically. They are often used by patients to monitor their blood pressure at home.

24-hour ambulatory blood pressure monitoring

This involves wearing a blood pressure cuff for 24 hours. It measures blood pressure periodically day and night and calculates the average blood pressure for certain periods. This method is useful if your blood pressure is borderline, or to monitor the effect of a medication. It's sometimes used if your blood pressure is thought to be high because you get anxious when a doctor or a nurse measures it. This is known as “white coat hypertension”.



Having your blood pressure taken

This method of checking blood pressure involves using a sphygmomanometer, or cuff that is inflated.

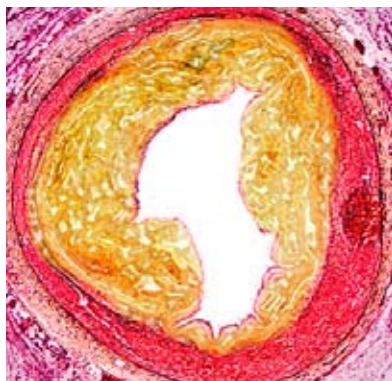
What is coronary heart disease?

Although in the UK coronary heart disease (CHD) leads to one in five deaths in men and one in six in women, there's still a common misconception that it's a disease of men. Women may fear breast cancer more than CHD, yet CHD kills almost four times more women than breast cancer does.

WHAT IS IT?

Coronary heart disease, or CHD, is a disease of the coronary arteries caused by a build up of fatty material that can lead to narrowing and blockages in the coronary vessels. The process is called atherosclerosis and the fatty deposits are known as atheroma.

Once the coronary arteries are narrowed by atheroma, the blood flow to the heart muscle is obstructed, which can cause angina (see p164). A sudden blockage of a coronary artery can lead to a heart attack, or myocardial infarction (see p166).



Narrowed coronary artery

Atheroma plaque (see opposite) has almost completely blocked this coronary artery, so blood flow will be obstructed.

DIFFERENCES IN WOMEN

Many women lack the basic awareness that heart disease is their biggest killer and that it can affect them as well as men. In addition, women's symptoms may be different from men's (see p164), so women do not always recognize that they may be having symptoms that could be related to heart disease. Women, therefore, tend to seek medical help later than men.

In addition, because basic cardiac investigations, such as electrocardiograms and exercise tests, tend to be less sensitive and less specific in women compared to men (see pp168–9), making a diagnosis in a woman is more challenging than it is in a man.

Also, since women tend to be protected by their hormones, especially by oestrogen, until the menopause, CHD is a disease of the older woman. So by the time a woman goes to the doctor or hospital with anginal symptoms, not only is she older, but she is also likely to have more risk factors for CHD, such as diabetes, high cholesterol (hypercholesterolaemia; see opposite), and high blood pressure (hypertension).

Women also tend to have smaller coronary arteries than men, so when it comes to treating women with either coronary angioplasty or coronary artery bypass surgery (see pp170–1) the treatment can be more challenging.

DENTAL TREATMENT AND HEART CONDITIONS

Until recently, antibiotics were recommended prior to dental treatment for people with certain heart conditions, as it was thought that bacteria in the mouth could enter the bloodstream during invasive dental treatment, causing

infection in the heart, known as subacute bacterial endocarditis. However, using preventive antibiotics is no longer recommended as it's felt there is insufficient evidence that dental treatment specifically can lead to infection in the heart.

AM I AT RISK?

There are a number of risk factors that increase your likelihood of developing coronary heart disease. These include:

Smoking This significantly increases your risk of coronary heart disease. Smoking reduces the amount of oxygen carried in the blood. It also increases the tendency of the blood to clot by raising the levels of fibrinogen and platelets, both of which are involved in the clotting process of the blood.

High cholesterol (hypercholesterolaemia) Cholesterol is a fatty material made in the liver, mainly from the fatty foods that we eat. It is present in the membrane of cells and is important for their healthy functioning. However, there are good and bad types

of cholesterol – “bad cholesterol” is known as LDL and “good cholesterol” is referred to as HDL. Having high levels of LDL and low levels of HDL increases your risk of developing cardiovascular disease.

High blood pressure (hypertension) Having high blood pressure increases your risk of CHD as well as your risk of having a stroke (see p196).

Diabetes increases your risk of getting CHD. If you have diabetes it is important that you monitor and keep your blood sugar levels under control.

Being overweight Being overweight can lead to high blood pressure, raised cholesterol, and diabetes, all of which increase your risk of CHD. In particular, it's thought that weight accumulated around your waist increases your risk (see pp58–9).

Lack of exercise Inactivity increases your risk of CHD as well as a myriad of other conditions (see pp56–7). Regular exercise reduces your risk.

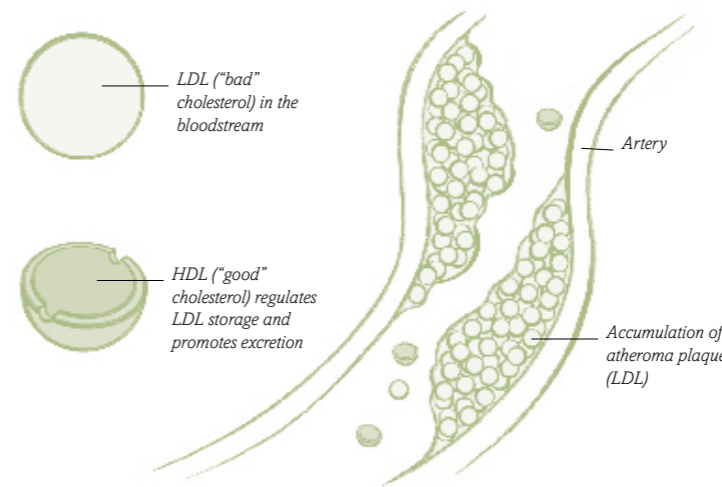
Stress Studies suggest that chronic stress can increase your risk of CHD. In particular, stress can result in high blood pressure, which is a risk factor for CHD.

Being postmenopausal Following the menopause (see opposite), women's risk for CHD increases, and by the time of the menopause, they may have also developed other risk factors for CHD.

A family history of cardiovascular disease Having a family history of heart disease in first-degree relatives can increase your risk of CHD, especially if you also have other risk factors. It's therefore important to try and modify all your other risk factors to reduce your risk of CHD.

Modify your risk factors

It is imperative that women start modifying their risk factors when they are younger in order to reduce the risk of developing heart disease once they are older. Better awareness and education, more aggressive control of risk factors as well as early diagnosis and treatment are all desperately needed.



HDL (“good”) and LDL (“bad”) cholesterol

CHD: Have I got the symptoms?

Chest pain is a common symptom in people with CHD. Women, however, may experience other, atypical, symptoms that they may not associate with CHD. That is why it is important for women to be aware of the whole range of possible symptoms so they can seek help at the earliest opportunity.

There is no doubt that CHD is the biggest killer in women: it kills more women than breast cancer. Women need to be aware of the risk of this potentially fatal disease and realize that it is not just a men's disease. They can help protect themselves by modifying any risk factors they may have, and by learning to recognize the symptoms and seek

medical help early. This is the key to successful treatment (see p170). The main symptom of CHD is chest pain. This is usually described as a heavy, crushing, or squeezing discomfort in the centre of the chest. At times, pain or discomfort can also be felt in the arms, neck, or jaw. Chest pain can occur on exertion (angina) or at rest. The chest pain

of a heart attack (myocardial infarction) is usually intense and prolonged, and can be associated with sweating, nausea, and vomiting. Women with heart disease can have various symptoms that are not always typical and can differ from those of men – there are many other symptoms apart from chest pain (see box, opposite).

Angina

It's easy to dismiss chest pain and other less typical symptoms. However, if you have any symptoms that you think may be related to heart disease and you have risk factors, it's best to consult your doctor who can help to determine whether the pain is a cause for concern.

WHAT IS IT?

When the heart's blood flow is obstructed due to fatty deposits in coronary arteries, the heart muscle receives insufficient oxygen, which can lead to chest pain, known as angina. When you rest, the heart may be able to cope with a reduced

oxygen supply. Angina arises once you increase the heart's oxygen demands, for example, after physical exertion or emotional stress.

WHAT NEXT?

Your doctor will take a medical history to assess your symptoms and any risk factors that you may have. After performing a medical examination, he or she will suggest tests, such as an electrocardiogram (ECG) or a stress test (see p168), to confirm a diagnosis of angina. If your exercise test is positive, your doctor will advise that you have a coronary angiogram to assess whether you have any narrowings or blockages in your coronary arteries.

HAVE I GOT THE SYMPTOMS?

The pain is often described as a dull, heavy feeling in the centre of the chest that can also extend to the throat, jaw, neck, back, or arms. It usually occurs on exertion – when you walk or take exercise, for example – although it can also occur at rest. The pain usually improves when you rest or take medication such as a nitrate spray, or nitrate tablet under the tongue (see p170). If the pain persists, you need to seek medical help.

See your doctor if you have these symptoms.

MY TREATMENT OPTIONS

The treatment your doctor will recommend will depend on the extent and severity of your CHD.

Medication Angina can be treated with medications such as nitrates.

Other treatments In some cases, coronary angioplasty and stenting or bypass surgery may be recommended (see pp170–1).

“A heart attack is a medical urgency – if you think you may be having a heart attack, don't delay, seek help immediately .”

HOW CAN I HELP MYSELF?

It is important that you start modifying your risk factors from a young age to reduce the risk of developing heart disease when you

are older. Modifiable risk factors include stopping smoking, eating healthily, exercising regularly, and having your cholesterol, blood sugar, and blood pressure checked.

ANGINA AND HEART ATTACK SYMPTOMS

Note these symptoms for angina and heart attack (see p168) and if you have risk factors for CHD, do not delay – you must get medical treatment fast.



Heart attack

A heart attack occurs when there is a sudden blockage in an already narrowed coronary artery.

Although heart attacks can be fatal, treatments have improved and the degree of damage caused by a heart attack often depends on how quickly a person receives the necessary treatment.

WHAT IS IT?

Narrowing of the arteries occurs over a period of years as fatty deposits gradually accumulate on the arterial walls. A heart attack occurs when a blood clot suddenly forms on the fatty deposits in a coronary artery, blocking the blood supply to the heart.

WHAT NEXT?

A heart attack is an emergency that requires urgent medical attention, so seek help immediately.

MY TREATMENT OPTIONS

Medications for a heart attack mainly include aspirin and clot-busting drugs. Some hospitals offer a primary coronary angioplasty service, in which the person having a heart attack is taken without delay to the cardiac catheter lab where a coronary angioplasty is performed to unblock the artery responsible for the heart attack (see p170).

HOW CAN I HELP MYSELF?

If you think you are having a heart attack, you should call an ambulance immediately.

HAVE I GOT THE SYMPTOMS?

Chest pain that is prolonged often indicates a heart attack.

The pain is described as a heavy or squeezing sensation and can spread to the arms, jaw, neck, back, or stomach. It can also be associated with sweating and a feeling of nausea. In women, however, the symptoms may be different (see p165). Women may therefore be unaware that they might be having a heart attack, take longer to seek help, and may be more ill by the time they do.

Get medical help immediately if you think you are having a heart attack.

“There are different treatment options available to treat heart failure, so talk to your doctor about which option is most suitable for you.”

treatments. For example, you may have a pacemaker inserted (see below) to improve the pumping action of your heart. People with pacemakers require regular follow-up in pacing clinics to ensure that

the pacemaker is functioning correctly. If you are a younger person with severe heart failure, a heart transplantation or a heart mechanical assist device may be an option.

HOW CAN I HELP MYSELF?

Always take the medication that has been prescribed by your doctor. Make an appointment to see your doctor if you feel that your weight is increasing, you are retaining fluid (when the lower legs or ankles swell), or you notice that you are becoming more breathless when you perform your normal everyday tasks.

Heart failure

Heart failure can be the result of coronary artery disease, valvular heart disease (see p174), high blood pressure (see p161), or cardiomyopathy (disease of the

heart muscle). It can also be caused by alcohol excess, certain drugs or toxins, and some infections.

WHAT IS IT?

Heart failure occurs when the heart weakens and its pumping action becomes less efficient. It may be acute, when symptoms come on suddenly, or chronic, when symptoms are milder and build up over time.

WHAT NEXT?

Your doctor, after taking your medical history and examining you, is then likely to organize certain investigations, such as an ECG (see p168), an echocardiogram (ultrasound of the heart, see p169),

and a conventional X-ray, to help make a diagnosis of heart failure.

MY TREATMENT OPTIONS

There are different treatment options available to treat heart failure. Talk to your doctor about which is the most suitable for you.

Medication Patients with heart failure will require a combination of tablets to help the heart pump more efficiently and to reduce fluid overload, which leads to leg swelling and breathlessness. You are likely to need diuretics (water tablets), which will help reduce fluid retention.

Other treatments Depending on the underlying cause of your heart failure, you may be offered other

Palpitations

A racing, or thumping, heart can cause the sensation known as palpitations. Although, often, these aren't a cause for concern and don't require treatment, they can be a sign of a problem with the heart or its blood vessels and should therefore be investigated.

WHAT IS IT?

The normal electrical activity of the heart is known as sinus rhythm. Arrhythmias occur if the electrical impulses in the heart that co-ordinate the pumping action don't function correctly so the heart beats too fast, too slow, or irregularly.

HAVE I GOT THE SYMPTOMS?

You are experiencing symptoms of palpitations if you feel that your heart is beating too fast, too slowly, or irregularly.

See your doctor if you have any of these symptoms.

WHAT NEXT?

If you have palpitations that your doctor thinks may be due to an arrhythmia, your doctor may recommend an electrocardiogram (ECG) and a 24-hour monitor (see p168). You will be asked to keep a diary of the times when you experience palpitations. When your doctor analyses the recording, he or she will check if there was an abnormal heart rhythm at the time you felt the palpitations.

MY TREATMENT OPTIONS

Palpitations may not always require treatment. Your doctor will advise on the most appropriate treatment: **Medication** Some people's symptoms settle by taking tablets that suppress the arrhythmia.

Pacemakers These are generally used to correct a slow heartbeat. There are a number of different types of pacemaker that can be used depending on the rhythm abnormality. Pacemaker implantation is normally carried

out under local anaesthetic and requires electrical leads to be passed through a vein in the chest to the heart. The electrical leads are then attached to a small pacemaker box, which sits underneath the skin.

Electrophysiological studies and ablation therapy People with troublesome palpitations may be offered an electrophysiological study and ablation therapy. Electrophysiological study involves passing tubes known as electrode catheters into the heart via a vein or artery in the groin. The electrode catheters are positioned in different areas of the heart to try to detect the abnormal heart rhythm. Once detected, ablation therapy can then be used to destroy or ablate the affected area that is producing the arrhythmia.

HOW CAN I HELP MYSELF?

If you are experiencing symptoms of palpitations (see box, left), it is important that you see your doctor.

CHD: How is it diagnosed?

A diagnosis of CHD will require a number of investigations. In women, the diagnosis can be more challenging because women can have more unusual symptoms than men (see pp164–5) and because certain investigations can be less sensitive and less specific in women compared to men.

HOW HEART DISEASE IS DIAGNOSED

Simpler tests, such as blood tests, can be done by a doctor or nurse.

The more complex tests are usually carried out by a cardiac physiologist in the cardiology department of a hospital, while scans of the heart (CT, MRI, and myocardial perfusion scans) are performed by a doctor or radiographer in the radiology department. The tests are then reviewed by a cardiologist. Scans of the heart are usually reviewed by a radiologist specializing in cardiac imaging. The cardiologist will discuss the results with you.

Blood tests These are done to measure your blood sugar and cholesterol levels. If the results are high, you are at increased risk of heart disease. If you have had a suspected heart attack (see p168), a blood sample will be taken to look for the presence of and to measure specific enzymes, such as Troponin T and Troponin I, that are released into the bloodstream at the time of a heart attack.

Electrocardiogram (ECG) This test is used to record the electrical activity of your heart, including the heart rate and rhythm. During the

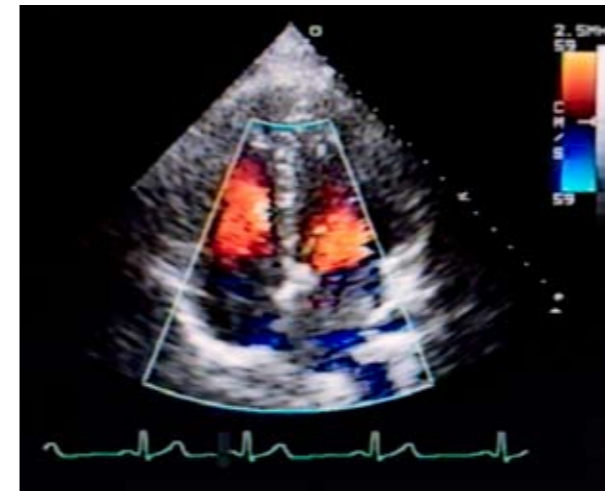
procedure, sticky pads known as electrodes are placed on your chest, wrists, and ankles. These are connected to a machine that records the readings. The test takes less than 10 minutes, but although the result is available immediately, a cardiologist will need to report on the test. If you have had palpitations, you may need a 24-hour recording to look for evidence of an abnormal heart rhythm, or arrhythmia (see p167).



Exercise test This test combines exercise with an ECG to see how your heart responds to exercise and exertion. During the test an ECG reading is taken while you exercise on a treadmill. Any symptoms of chest pain or undue breathlessness are noted, together with any changes in the ECG reading. Your blood pressure is also recorded. The length of the test depends on how long you are able to exercise for.

Exercise treadmill test

This woman is exercising on a treadmill with electrodes attached to her chest. The electrodes record the ECG and can detect any changes that occur with exercise. These can indicate that there may be disease of the coronary arteries.



Echocardiogram with Doppler ultrasound

The echocardiogram gives an image of the heart, while the Doppler ultrasound (the coloured area within the triangle) shows the blood flow through the valves.

Echocardiogram This is an ultrasound of the heart used to assess the size of the heart, and how well its four chambers and its valves are working. The test takes around 30 minutes.

Stress echocardiogram This is similar to an echocardiogram (see above), but your heart is made to beat faster and stronger using medication injected into your arm. This test assesses how the muscle of the heart responds to stress and exercise.

A stress echocardiogram helps to identify certain areas of the heart that may not be receiving a good blood supply from the coronary arteries. It indicates, therefore, whether there may be narrowings or blockages in the coronary arteries.

Myocardial perfusion scan This two-phase test is used to investigate the function of your heart muscle, both when it is at rest and during exercise. A small amount of radioactive substance

(radioisotope) is injected into the bloodstream then, during the first phase of the test, images of the heart at rest are taken using an ultrasound scanner.

During the second phase of the test you are given a further injection of radioisotope and the function of your heart is then reassessed, either after you have exercised on a treadmill (see opposite) or after you have been given an injection of a medication which increases your heart rate (as in a stress echocardiogram; see above). A second set of images are then taken and a direct comparison of the heart muscle at rest and after exercise can be made to help in the diagnosis.

CT (computerized tomography) scans (which include a coronary calcium scoring test and CT coronary angiogram; see below).

These tests involve taking images of the heart and coronary arteries using a CT scanner. The amount of calcium deposits (atheroma) in the coronary arteries can then be measured.

Cardiac MRI (magnetic resonance imaging) scan This test involves taking images of the heart to give a detailed picture of its structure, including its chambers, valves, the muscle of the heart and the coronary arteries as well as the great blood vessels.

Coronary angiogram This more invasive test is done by a cardiologist in the cardiac catheter lab. It is normally performed under local anaesthetic and takes approximately 30 minutes but can take longer.

It is used to image the coronary arteries to assess any narrowings or blockages within the coronary vessels. During the procedure, a needle is inserted in one of your blood vessels, either in the groin or in the arm, then hollow plastic tubes, or catheters, are passed along the blood vessel and into your heart. A dye is then injected into the coronary vessels and a series of X-ray images are taken. If you do have narrowings or blockages in the coronary arteries, these are seen as soon as the dye is injected. The cardiologist performing the procedure can then discuss the results with you.

“All investigations are reviewed by a cardiologist who will discuss the results with you.”

CHD: My treatment options

There are various treatments available for CHD. Your treatment will be decided by your cardiologist and will depend on the extent and severity of the narrowings and blockage in your coronary arteries. You may need coronary angioplasty or coronary artery bypass surgery.

Once you have been diagnosed and have had a coronary angiogram, your cardiologist will discuss the best treatment for you. It is likely that you will need a combination of medications or, if there are significant narrowings in your coronary arteries, you may be treated with angioplasty or bypass surgery.

MEDICATIONS

There are a number of medications that may be prescribed by your doctor or by your consultant cardiologist. These medications are divided into different groups, according to what they do. Some drugs relieve the symptoms of angina, others thin the blood, some reduce the level of cholesterol in your blood, and others lower blood pressure. You are likely to need a combination of medications depending on your specific heart condition. When discussing your treatment options, ask your doctor about any possible side effects of the medications.

“When it comes to treatment of coronary heart disease, often a combination of medications is recommended.”

Medication for angina Nitrate tablets or sprays are often prescribed for angina. They dilate the coronary arteries to increase the blood flow in the vessels.

Blood-thinning medications Aspirin thins the blood and reduces the risk of clotting in coronary arteries. Aspirin will also be prescribed after a heart attack.

Cholesterol-reducing medications If being careful about what you eat (see pp172–3) fails to lower your cholesterol levels enough, you may be prescribed cholesterol-reducing medications, known as statins. Cholesterol-lowering tablets are also prescribed routinely for people with coronary artery disease. There has been some debate about whether statins are as beneficial for women as they are for men, but currently women should be receiving the same treatment as men. Several statins are available, including simvastatin, atorvastatin, rosuvastatin, pravastatin, and fluvastatin. Other cholesterol-

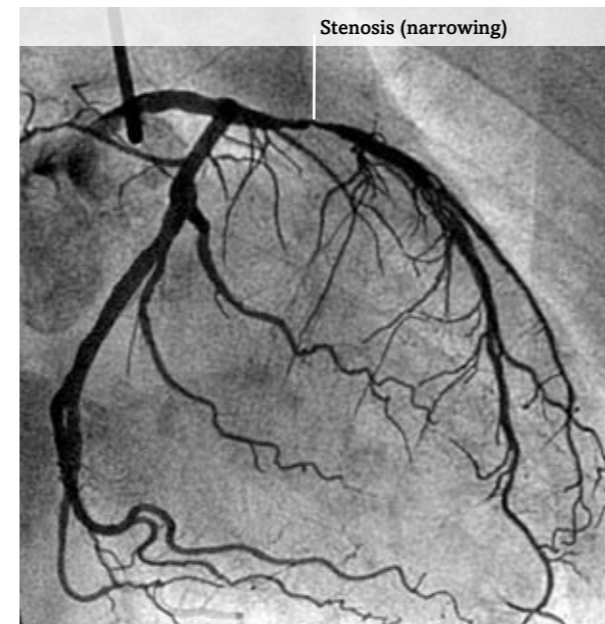
lowering drugs include ezetimibe, fibrates, and nicotinic acid drugs. Your doctor will decide which of these is the most suitable option for you.

Blood pressure medications There is a wide range of medications for lowering blood pressure, including angiotensin-converting enzyme (ACE) inhibitors, angiotensin II receptor antagonists, calcium channel blockers, diuretics, beta blockers, and alpha blockers. Often your doctor will prescribe a combination of tablets.

CORONARY ANGIOPLASTY AND BYPASS SURGERY

These are standard treatments for patients with CHD. After a coronary angiogram (see p169), your cardiologist will discuss with you the best treatment.

Coronary angioplasty When blockages have been located on a coronary angiogram, they can sometimes be treated with coronary angioplasty, which is carried out by a cardiologist in a cardiac catheter laboratory. During the angioplasty, you have a local anaesthetic and a catheter is inserted into the heart via an



Coronary angiogram

This X-ray of the left coronary system shows a severe stenosis (narrowing) of the left anterior descending artery. This can be treated with coronary angioplasty.

artery in the groin or arm. A very thin wire is then passed along the catheter into the coronary artery and an uninflated balloon is mounted onto the wire. Once the balloon is in place across the narrowed section of artery, it is inflated so that it flattens the fatty material that has caused the narrowing against the wall of the artery. In most cases it is also necessary to use a “stent” (a metal tube) to ensure the artery stays open. The stent is mounted on an uninflated balloon that is passed into the coronary artery, as before. Once in the correct position, the balloon is inflated and the stent expands against the artery wall. The balloon is then deflated and removed, leaving the stent in place.

After coronary angioplasty, you may be able to return home the same day, or you may need to stay in hospital overnight for

observation. You should be able to go back to work about a week later. After the procedure, as well as continuing to take aspirin, you will also be prescribed clopidogrel, another type of blood-thinning medication. The combination of the two blood-thinning medications helps reduce the risk of clotting in the stent.

Coronary artery bypass surgery

If you have multiple narrowings in your coronary arteries or if the cardiologist decides the narrowings are not suitable to be treated with coronary angioplasty, then you will be referred to a cardiothoracic surgeon for coronary artery bypass surgery. This is done under general anaesthetic in the operating theatre; the operation can take three hours or more.

The surgeon either makes a cut down your breastbone, or may

make a smaller incision. Grafts of arteries or veins are taken from the chest, arms, or legs and are sutured (stitched) between the aorta (the main artery in the body) and the coronary arteries, so that the narrowed or blocked areas of the arteries are “bypassed”. The number of grafts needed depends upon the number of narrowed or blocked arteries.

After the procedure, you will need to stay in hospital for seven to ten days. It may take up to three months before you have recovered fully from the operation and can return to work. After the operation it is common to feel pain in your chest as well as swelling, discomfort, and pins and needles where the grafts were taken. It is not unusual to feel depressed and emotional in the early weeks after the operation; you may also experience some temporary impairment of your memory. Fortunately, these problems usually improve over the following few months, but you should see your doctor if these symptoms are bothering you.

After both angioplasty and bypass surgery you will need to continue on medication and will need regular follow-up, first in a cardiology clinic, and then by your doctor. You must also make sure that all your risk factors (see p163) are kept under control to reduce the chance of developing further coronary artery disease. If your anginal symptoms recur, you must seek medical help.

CHD: How can I help myself?

Anyone at risk of CHD (see p163) should take preventive steps to avoid developing it. For women, who typically get CHD later in life when they may have other risk factors, prevention early on is key and they need to modify their risk factors when they are young. Fortunately, there is a lot you can do.

Preventive measures are geared towards preventing the build up of fatty deposits in your arteries.

WATCH YOUR LIFESTYLE

Follow these simple lifestyle rules for a healthy heart:

Stop smoking Smoking significantly increases your risk of developing CHD (see p163), so stopping is a major step to improving your heart health.

Eat healthily You should make sure you eat a healthy, low-fat diet (see opposite).

Reduce your salt intake Salt raises your blood pressure. You should not eat more than 6g a day (see p54).

Moderate your alcohol intake

A small amount of alcohol is unlikely to cause harm, although you should keep within the

recommended weekly allowance. Excessive drinking may increase your risk of CHD (see p163).

Keep fit Keeping active is important in preventing the development of heart disease. This is because exercise helps to control your blood pressure and cholesterol levels, helps you maintain a healthy body weight, and reduces stress. If you're diabetic (see pp320–5), a healthy weight helps towards managing your blood sugar levels.

Reduce your stress Learning relaxation techniques can help you to cope with and reduce the harmful effects of long-term stress.

GET CHECKED OUT

As well as taking steps to improve your lifestyle, it's also important to have your cholesterol levels and

blood pressure checked regularly. You can often have high levels of cholesterol and high blood pressure – two major risk factors for developing CHD – yet be symptom-free. Asking your doctor for regular checks can highlight a problem, which can then be treated early.

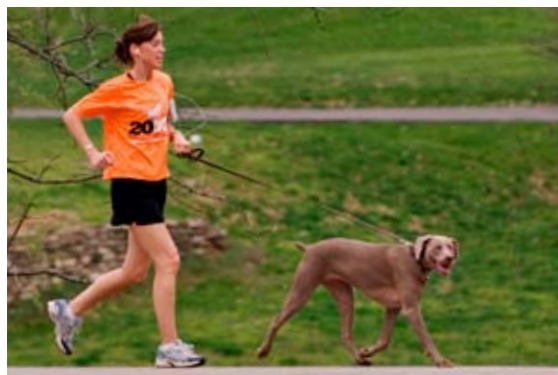
Cholesterol Your cholesterol levels can be checked with a simple blood test. If your “bad” cholesterol, or LDL, level (see p163) is high, your doctor will recommend lifestyle changes to lower it (see opposite), and in some cases may suggest medication (see p170).

Blood pressure It's sensible to have your blood pressure checked regularly, at least every year (see pp28–47), and more frequently if you suffer from a condition such as diabetes, have other risk factors for CHD (see p163), or already have heart disease.

Diabetes If you suffer from diabetes (see pp320–5), you are already at an increased risk of developing CHD and so it's even more important to make sure that your diabetes is kept under control and that you take preventive lifestyle measures.

Keeping fit

Being active and building exercise into your weekly routine helps to keep your heart healthy. Aim to do a 30-minute exercise programme at least three times a week.



Foods to eat for a healthy heart

Eating a healthy, low-fat diet, with a minimum of saturated fats (see pp52–5) can help to prevent the build up of plaque deposits in your coronary arteries. Eating healthily also helps you to maintain a healthy weight, which in turn lowers your risk of heart disease as well as of other dangerous conditions such as diabetes.

Soluble Fibre

Increases the feeling of fullness, which can help with weight control. RDA of dietary fibre = 30g



Oats 11g dietary fibre = 100g (4oz)



Ground linseeds 27g dietary fibre = 100g (4oz)

Oily Fish

Provides the heart-healthy omega-3 fatty acids, which may help reduce LDL cholesterol and triglycerides. RDA of essential fatty acids = currently, no amount set



Sardines (canned in oil) 1480mg (total omega-3 fatty acids) = 100g (4oz)



Mackerel (cooked) 1422mg (total omega-3 fatty acids) = 100g (4oz)



Herring (cooked) 1729mg (total omega-3 fatty acids) = 100g (4oz)

Antioxidants

Antioxidants (beta carotene, vitamin C, and vitamin E) may help protect the cardiovascular system from damage. RDA of beta carotene = none set, vitamin C = 60mg, vitamin E = 10mg



Tomatoes beta carotene 0.5mg, Vit C 17mg, Vit E 1.2mg = 100g (4oz)



Carrots beta carotene 9mg, Vit C 5.9mg, Vit E 1.6mg = 100g (4oz)



Red peppers beta carotene 1-2mg, Vit C 140mg, Vit E 0.8mg = 100g (4oz)

Magnesium

Important for the function of nerves and muscles. RDA of magnesium = 300mg



Green vegetables such as spinach (cooked) 34mg magnesium = 100g (4oz)



Almonds 270mg magnesium = 100g (4oz)



Chickpeas (cooked) 24mg magnesium = 100g (4oz)

Valvular heart disease

Your heart valves help to control the flow of blood between the four chambers of the heart as well as the blood entering and leaving the heart (see p160). Sometimes a valve can be narrowed or doesn't close fully. Your doctor will be able to hear a heart murmur and you will need to undergo investigations.

WHAT IS IT?

Valvular heart disease occurs when there is an abnormality or dysfunction of one or more of the four heart valves. If a valve is narrowed, blood flow will be obstructed. This is known as valve stenosis. If a valve does not close fully, there will be leakage of blood, known as valve regurgitation.

Either problem can be caused by an anatomical abnormality of the valve from birth, as a result of having had rheumatic fever, or simply as part of the aging process.

Valve stenosis or regurgitation can affect the pumping action of the heart. This means that the heart will work less efficiently or may become enlarged, which can result in heart failure.

HAVE I GOT THE SYMPTOMS?

Symptoms may be minimal, but can include the following:

- Breathlessness
- Chest pain
- Dizzy spells
- Swollen ankles.

See your doctor if you have any of these symptoms.

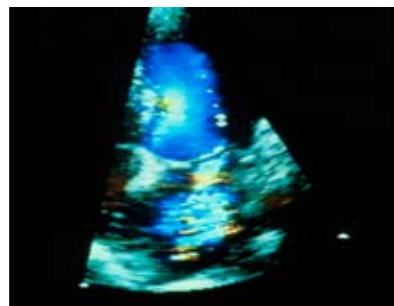
Endocarditis is a condition which results from infection of heart valves. If the valve is abnormal the risk of endocarditis is greater than in a normal valve.

WHAT NEXT?

If your doctor suspects valvular heart disease, he or she will examine you to check for a heart murmur. You will also need other tests, including an ECG, (see p168) an echocardiogram (see p169), and a chest X-ray.

MY TREATMENT OPTIONS

Patients with mild forms of valvular heart disease may not require any treatment but will need regular follow-up. Some patients only require treatment with



Valve regurgitation

This echocardiogram with Doppler ultrasound (coloured area within the triangle) shows a leaking valve (valve regurgitation).

VALVULAR HEART DISEASE AND PREGNANCY

Valvular heart disease can get worse during pregnancy, so if you have been diagnosed with this condition you should consult your doctor if you are planning a pregnancy.

medication, for example diuretics and ACE inhibitors.

Surgery Patients with severe disease and who have symptoms are likely to require surgery. Surgery involves repairing or replacing the existing heart valve using either a metal or a tissue valve. Your cardiologist and surgeon will advise on which is the most suitable for you.

Transcatheter valve procedures are newer techniques that are used for treating some valves without the need for open heart surgery. However, they are only available in certain hospitals.

HOW CAN I HELP MYSELF?

If you think you may have the symptoms of valvular heart disease, you should make sure you seek medical help.

Vascular disease

Varicose veins rarely cause serious complications, but they're at best unsightly, and at worst, uncomfortable. They don't significantly increase your risk of deep vein thrombosis (see pp252–3), but they can cause aching and swollen ankles and can make you more prone to eczema and possible leg ulcers.

Varicose veins

Achy legs are common after you have been standing for a long time, but varicose veins may be to blame.

WHAT ARE THEY?

Varicose veins are enlarged, twisted veins, usually in the leg. Blood runs through superficial veins, then through one-way valves into deeper veins. As the valves become less efficient, blood may flow backwards, then pool, enlarging and making the superficial veins visible.

WHAT NEXT?

Your doctor will examine the veins while you are standing. He or she

HAVE I GOT THE SYMPTOMS?

Visible bulging veins are a clear indication of varicose veins.

Other symptoms include:

- Aching or painful legs that continue to ache during rest
- In severe cases, itchy skin and ulceration.

See your doctor if you have symptoms that are painful or concern you.

ANEURYSMS

Aneurysms are rare, occurring where there is a weak area in a blood vessel that balloons out. Most aneurysms are small and symptomless, often going undetected, but the danger is that a larger one may burst, causing a life-threatening haemorrhage. Aneurysms can occur throughout the body but are most

common in the aorta, known as an aortic aneurysm. If an aortic aneurysm is found, it will be monitored and surgery may be planned. A burst aortic aneurysm is an emergency; its symptoms include pain or tenderness in the abdomen or chest, a pulse-like sensation in the abdomen, and backache.

may arrange for a scan to assess the blood flow in the vessels to confirm the diagnosis.

MY TREATMENT OPTIONS

If self-help measures (see below) fail to bring relief, talk to your doctor about the best treatment for you. However, you should be aware that varicose veins can recur after any of the treatments below.

Injections (sclerotherapy) Small veins may be treated with an injection of a chemical, which sticks the vein walls together to stop blood from entering.

Surgery This may be considered for larger varicose veins. Either the vein is tied and cut, or a long vein may be removed, a procedure known as "stripping".

Laser surgery This may be used to treat superficial "thread" veins, but works less well for varicose veins.

HOW CAN I HELP MYSELF?

Several self-help measures may relieve the symptoms.

Compression stockings These help the blood to flow through the veins more efficiently.

Regular exercise This improves your circulation so that blood flows more effectively.

Keeping your weight down This takes pressure off your veins.

Avoiding standing for long periods This can help swelling and aching, as can resting with your legs raised.

Red vine leaf extract This can relieve achy, swollen legs.