Northern Ireland Chest Heart & Stroke

What you need to know about

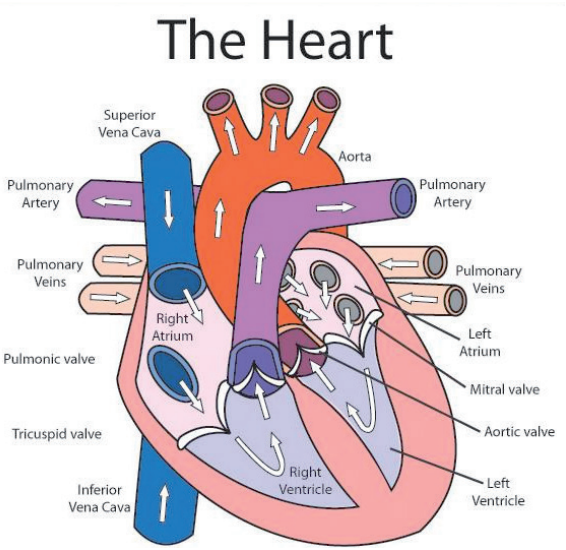
Heart Disease

WE'RE ON YOUR SIDE

www.nichs.org.uk

Contents

How the heart works



Your heart is a muscular pump, which is about the size of your clenched fist, and it is always pumping blood throughout the body.

The heart is divided into four chambers. The upper two chambers are called atria and the two lower chambers called ventricles.

One-way valves between the chambers keep blood flowing through your heart in the right direction. As blood flows through a valve from one chamber into another the valve closes, preventing blood flowing backwards.

There are two parts to each heartbeat. The first part, when the heart contracts and pumps blood, is called systole. The second part, when the heart relaxes so the chambers can refill with blood, is called diastole.The chambers of the heart also have to pump in sequence to ensure an adequate blood supply to the whole body. The two top chambers contract at the same time and the two lower chambers contract at the same time. In this way the heart fills and pumps most effectively.

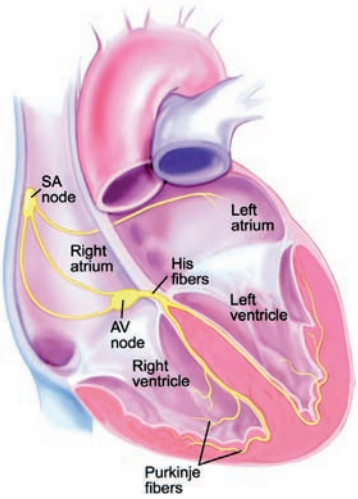
The average heart beats 100,000 times a day.

The heart has a left and right side, and the two sides of the heart have separate functions. The right side of the heart collects blood low in oxygen from the body and pumps it to the lungs, through the pulmonary arteries, where it picks up oxygen and releases carbon dioxide.

The left side of the heart then collects blood rich in oxygen coming from the lungs, through the pulmonary veins, and pumps it to the body via the aorta and a series of arteries. Once the oxygen is delivered to the cells in your body, the blood flows back to the right side of the heart through a series of veins.

The electrical system of the heart

The muscular pumping action of the heart is achieved by electrical signals being sent through the heart telling the muscles to contract and relax.



Your heart has a natural pacemaker, called the sinus node (or SA node), which sends electrical impulses through special fibres in the heart muscle to stimulate it to beat. These electrical

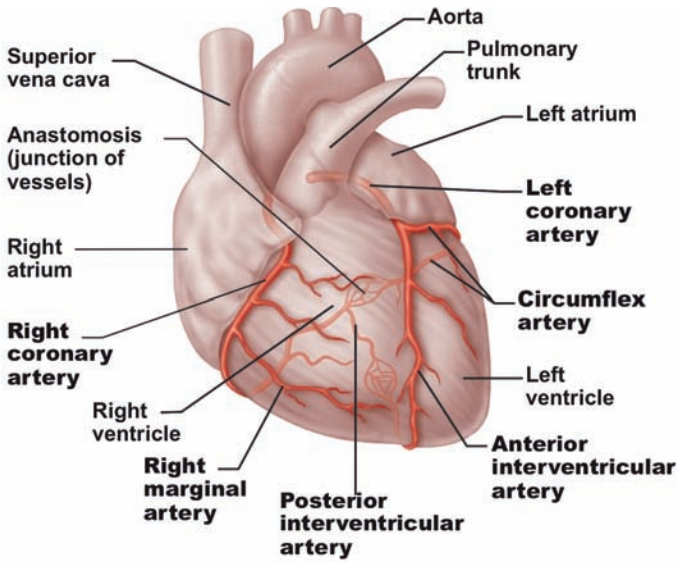
impulses usually keep the heart beating in a regular ‘sinus’ rhythm.

Your heart will normally beat between 60 and 100 times a minute when you are resting.

The blood supply to the heart

Since the heart is a muscle, it also needs a good blood supply in order for it to work properly.

The coronary arteries take blood to the heart muscle. These



branch off from the aorta and into the heart muscle itself. They ensure that the heart gets enough oxygen and other nutrients.

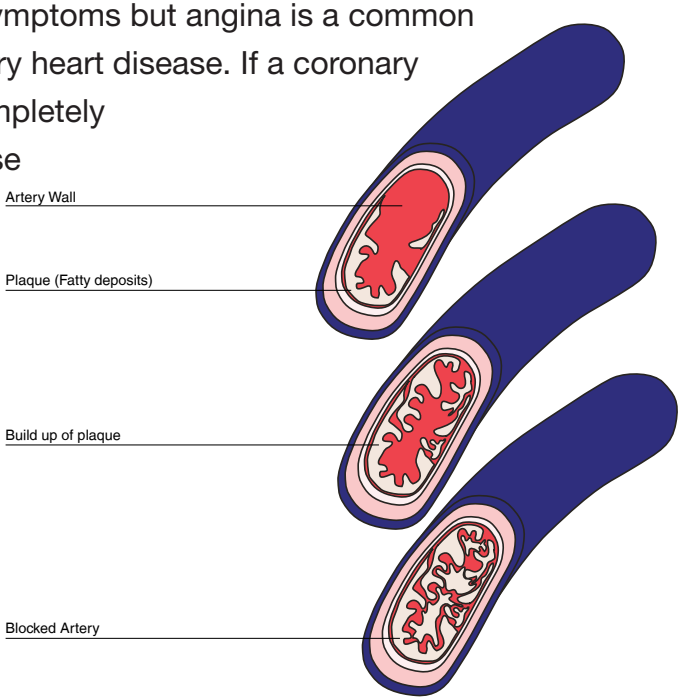
The right coronary artery mainly supplies the muscle of the right ventricle. The left coronary artery quickly splits into two and supplies the rest of the heart muscle. The main coronary arteries divide into many smaller branches to supply all the heart muscle.

Disruption to the supply of oxygen to the heart muscle can reduce the ability of the heart to pump blood efficiently and can also lead to damage of the heart muscle.

What is Coronary Heart Disease?

Your heart is a muscle that requires blood and oxygen to work properly. The right and left coronary arteries carry blood to the heart muscle to ensure that it gets enough oxygen and other nutrients.

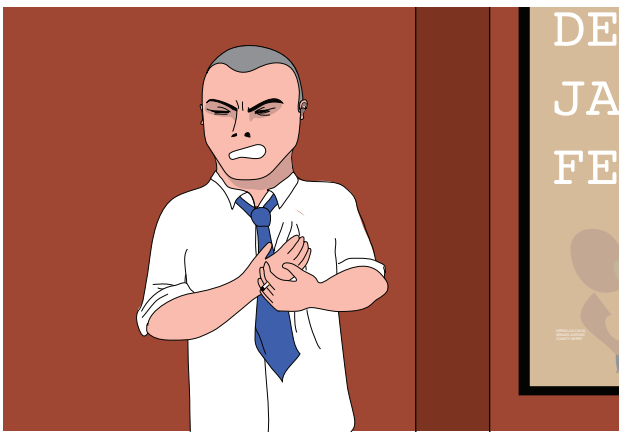
Coronary heart disease is the term that describes what happens when your heart's blood supply is blocked or interrupted by a build up of fatty substances in the coronary arteries. This build up of material inside the blood vessels can exist and grow without any symptoms but angina is a common symptom of coronary heart disease. If a coronary artery becomes completely blocked, it can cause a heart attack.



Risk of coronary heart disease

Some people are more at risk of coronary heart disease than others. Some factors cannot be altered, like your family history or increasing age, but other lifestyle factors can be changed.

If you already have coronary heart disease or have had a heart attack simple lifestyle changes, in combination with medical treatment, can help to prevent you from having a recurrent problem.



Always speak to your GP, consultant or nurse if you have any questions or concerns.

Managing Coronary Heart Disease

Get your blood pressure checked

High blood pressure puts too much pressure and stress on the walls of blood vessels. Over time high blood pressure can cause your heart to become abnormally large and beat less effectively. High blood pressure rarely gives any warning signs. The only way to know if your blood pressure is high is to have it checked.

If you have been told that your blood pressure is higher than 140 over 90 you should discuss this with your GP. If your blood pressure is high it can be treated. Lifestyle changes will help to reduce your blood pressure, such as;

- Losing weight
- Changing unhealthy eating habits
- Reducing your salt intake
- Reducing your alcohol intake
- Exercising more
- Stopping smoking
- See page 58 for details

In general these changes also reduce your risk of coronary heart disease. You may also be prescribed drugs to bring your blood

pressure down. There are many kinds of medications available and it may take a while to find the right drug at the right dose to suit you. If you experience any problems with the drug you are given, tell your GP and (s)he may be able to prescribe a different one.

Check your cholesterol

Cholesterol is a fatty substance, which is essential to healthy life. It is provided partly from the food we eat, but most of it is manufactured in the liver.

However, some people have more cholesterol than the body needs. When the cholesterol level in blood is high it contributes to the fatty build-up on the walls of the blood vessels which leads to coronary heart disease.

When your cholesterol is measured you may be told a total figure or individual ones. You should be aiming for a total cholesterol level below 5mmol/l. Total cholesterol is only an indication. You need to understand the breakdown into good and bad types. Good cholesterol (HDL) should be above 1.0mmol/l. Bad cholesterol (LDL) should be below 3.0mmol/l. Triglycerides should be below 1.5mmol/l. If your cholesterol is high then you may be prescribed medication to lower it. The most commonly prescribed drugs are called statins.

You can also lower your cholesterol by changing your diet, increasing activity levels and stopping smoking. See page 58 for more details.

What is Angina?

Your heart is a muscle that requires blood and oxygen to work properly. The right and left coronary arteries carry blood to the heart muscle to ensure that it gets enough oxygen and other nutrients.

Angina is the pain or discomfort experienced when the heart muscle doesn't get as much oxygen as it needs and it is a common warning sign of coronary heart disease.

Coronary heart disease is usually caused by narrowing of the coronary arteries due to the build-up of fatty deposits (plaque) on the walls of these arteries. This build-up of material inside the blood vessels can exist and grow without any symptoms but angina is a common symptom of coronary heart disease.

What does angina feel like?

- Pressure or a feeling of tightness in the chest
- This pain can also be felt at the same time in the neck, jaw and left arm, or both arms
- Sometimes there is pain in the upper back and shoulders
- Pain may be accompanied by breathlessness and sweating

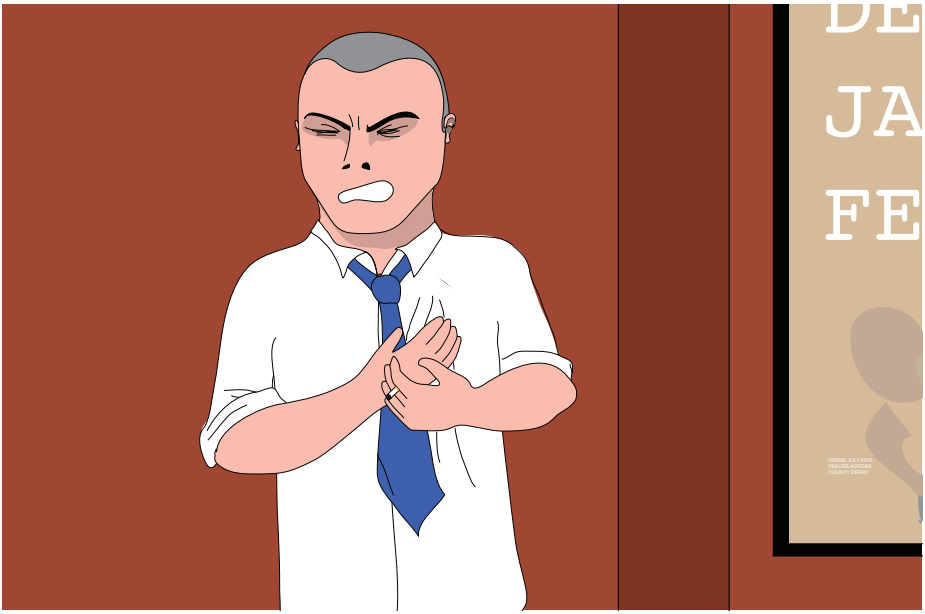
Always speak to your GP, consultant or nurse if you have any questions or concerns.

Types of angina

Often angina is experienced during exertion or exercise because the heart's demand for oxygen increases. The angina pain usually lasts for a few minutes and goes away after rest. This is known as stable angina and is usually well controlled with medication when symptoms are predictable (for example walking up a hill).

As the narrowing in the coronary arteries increases, the amount of exertion needed to cause anginal pain decreases and pain can even be felt at rest. This is known as unstable angina. The risk of having a heart attack is much greater if a person experiences unstable angina.

Angina pain can also occur during times of stress or strong emotions like anger or excitement, as these emotions can cause your heart rate to increase. Some people also report anginal pain develops more easily in cold temperatures and windy weather or after large meals.



What are the risk factors of angina?

The risk of coronary heart disease, which is the main cause of angina, increases as you get older. You are also more prone to angina if you:

- smoke
- have high blood cholesterol
- do not get enough exercise
- have diabetes
- have high blood pressure
- are overweight

Angina can sometimes run in the family, so if a close relative has had angina, your risk of having it may be higher.

If you have noticed a pain or pressure in your chest when you have been exerting yourself, you should visit your GP as soon as possible. The GP will ask you a number of questions about the pain such as:

- What brings on the pain or discomfort and what relieves it?
- What does the pain or discomfort feel like (for example, heaviness or tightness)?
- How often does the pain occur?

Your GP will also listen to your heart and chest and check your blood pressure. If your GP suspects that you have angina, you may be referred to the hospital for more tests such as:

- An ECG (Electrocardiogram) is a very quick, simple, painless test that measures the electrical activity and rhythm of your heart.

- For many people who have significant narrowing of the arteries supplying the heart muscle, the ECG recording made at rest can be normal. Therefore an ECG recording is often made when the patient is exercising. This is known

as an Exercise Stress Test and is more likely to reveal any coronary heart disease.

- An Echocardiogram is a test in which ultrasound is used to examine the structure of the heart and see how well it is pumping.

- An Angiogram is a test where a contrast agent (dye) visible on X-rays is injected into your coronary arteries to show up any narrowing or blockages.

How is angina treated?

Treatment for angina can include lifestyle changes, medication, medical procedures, and cardiac rehabilitation.

Lifestyle changes and medicines may be the only treatments needed if your symptoms are mild and aren't getting worse. When lifestyle changes and medicines don't control angina, you may need medical procedures and/or cardiac rehabilitation.

Lifestyle -

After several episodes, you will know the level of activity, stress, and other things that can bring on your angina. By knowing this, you can take steps to prevent or lessen the severity of episodes.

It is never too late to adopt a healthier lifestyle! You can reduce or eliminate those risk factors that are within your control:

- be smoke-free
- enjoy healthy eating
- be physically active (If you have symptoms on exertion, do not overdo exercise)
- control your blood pressure
- achieve and maintain a healthy body weight

Medications -

Medication depends on the severity of the condition, but may include:

- Nitrates - Nitrates are the most commonly used medicines to treat angina. They relax and widen blood vessels. This allows more blood to flow to the heart. Nitrates, for example GTN (Glyceryl Trinitrate), can be taken in many forms, including an aerosol pump spray or a tablet dissolved under the tongue.

- Aspirin - taken on a daily basis to help reduce the risk of blood clots.

- Drugs to slow the heart rate e.g. Beta blockers reduce the heart's demand for oxygen.

- Drugs to lower cholesterol and blood pressure.

You should know what medicines you are taking, their purpose, how and when to take them, and possible side effects. It is very important that you know exactly when and how to take your medication to relieve chest pain.

Medical procedures -

Percutaneous Coronary Intervention (PCI) is a procedure that improves blood flow to the heart by using a special balloon to open a blocked artery from the inside at the point of narrowing. Often a special expandable metal tube (stent) is inserted, expanded and left in place to keep the artery open.

Coronary artery bypass (CABG) is a surgical procedure where healthy arteries or veins taken from other areas in the body are used to bypass narrowed coronary arteries.

Cardiac rehabilitation -

- Exercise training - Teaches you how to exercise safely, strengthen muscles, and improve stamina.

- Education - This part of the rehabilitation programme develops understanding about heart conditions and ways to reduce the risk of future heart problems.

Other Information

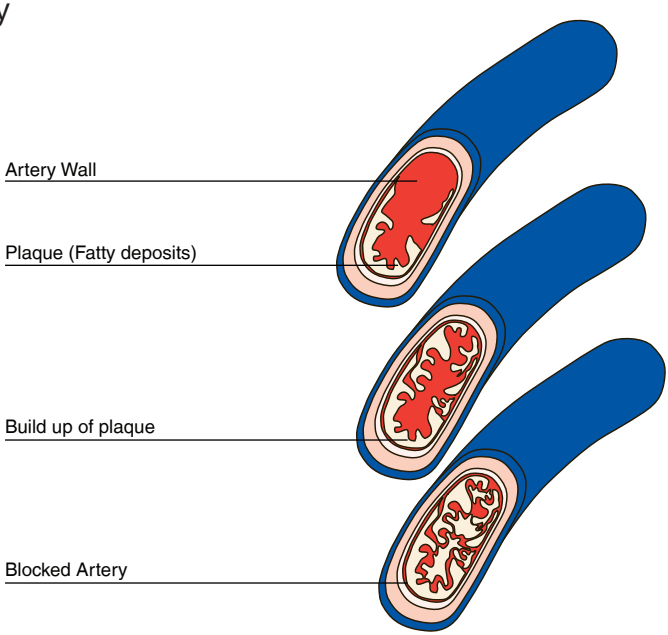
You do not have to tell the Driver & Vehicle Agency if you have angina, unless you are a bus, lorry or taxi driver. For more information see www.gov.uk/angina-and-driving

What is a heart attack?

Your heart is a muscle that requires blood and oxygen to work properly. The right and left coronary arteries carry blood to the heart muscle to ensure that it gets enough oxygen and other nutrients.

A heart attack, also known as myocardial infarction, is when part of the heart muscle dies because it has been starved of oxygen due to a blockage in a coronary artery.

Most blockages occur when the surface of the fatty deposits in the coronary artery ruptures or cracks, and this triggers the formation of a blood clot which blocks the artery.



Occasionally a blockage can be caused by a spasm or sudden narrowing of a coronary artery.

What are the symptoms of a heart attack?

The symptoms of a heart attack vary from person to person but can include:

- A pain, heaviness or discomfort in the chest which can spread or radiate to the arms, neck, jaw, back or stomach.
- The pain is usually severe and lasts longer than 15 minutes.
- The pain can be accompanied by shortness of breath, nausea or vomiting, sweating, dizziness or a general feeling of illness.

Unlike angina, pain associated with a heart attack will not usually be relieved by rest or nitrate sprays, such as GTN (Glyceryl Trinitrate).

It is important to note that some people can suffer other symptoms, for example, they

describe only pain in their arm, neck, jaw, back or stomach.

In some cases the chest pain may not be severe and can be mistaken for indigestion and so occasionally people do not know they have had heart attacks.

If you think that you or anyone else is having a heart attack, you should call 999 immediately. Early diagnosis and treatment saves lives.

How is a heart attack treated?

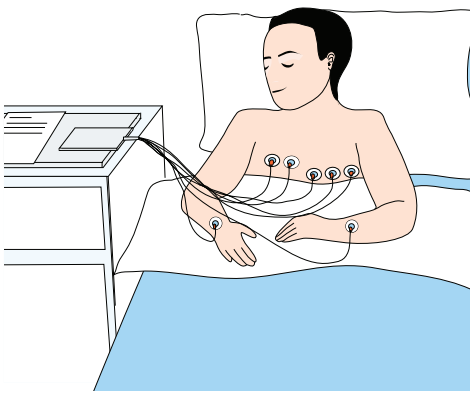
Medical Emergency

Ambulance paramedics will assess the person having the suspected heart attack, stabilise their condition and start treatment before transfer to hospital. Initial treatment in the hospital will include pain relief, oxygen and a combination of medications to thin the blood, widen the blood vessels or slow down the heart beat. A heart attack is usually confirmed with an electrocardiogram (ECG) and blood tests. Once the diagnosis is confirmed or strongly suspected, treatments to try to restore blood flow to the heart are started as soon as possible.

Treatment can include:

Thrombolysis - A drug is injected into the bloodstream to dissolve blood clots that are blocking the coronary arteries (these drugs are often called clot busters). To be most effective, these medicines must be given within 6 hours (ideally within 1 hour) after the start of heart attack symptoms but they are not suitable for everyone.

Percutaneous Coronary Intervention (PCI) - is a procedure that improves blood flow to the heart by using a special balloon to open a blocked artery from the inside at the point of narrowing. Often a special expandable metal tube (stent) is inserted, expanded and left in place to keep the artery open. PCI may be carried out after recovery from a heart attack. However, in some specialist hospitals, PCI may be performed as an emergency treatment for people having a heart attack.



Hospital Stay

Ideally, after treatment in the A&E department, heart attack patients are admitted to a Coronary Care Unit. The length of the hospital stay will depend on the severity of the heart attack and whether there are any associated Complications.

During a hospital stay, ECGs and blood tests are carried out. Other tests may also be carried out to assess how well the heart is pumping, whether blood flow has been restored and to help decide on the best form of treatment.

These tests can include:

- An echocardiogram examines the structure of the heart and shows how well it is pumping.
- A chest X-ray determines whether the heart is enlarged.
- An exercise stress test gives an indication of how much exercise the heart can tolerate after the heart attack and whether blood flow is still reduced to parts of the heart.

- An angiogram shows up any narrowing or blockages when a contrast agent (dye) visible on X-rays is injected into your coronary arteries.

Treatment

Medication - Following a heart attack, you may need to take a variety of medicines. The aim of administering medication during a heart attack, and just after, is to restore blood flow, save heart tissue and prevent complications. The purpose of subsequent medication is to promote healing of your heart and prevent another heart attack.

PCI - Following an angiogram which has shown narrowing or blockages in the coronary arteries, PCI may be performed to open up the artery or arteries.

Coronary artery bypass graft (CABG) - Increasingly blockages are being opened up with PCI but there are still cases where PCI is not suitable or has been unsuccessful and surgery is required. CABG is a procedure where healthy arteries or veins taken from other areas in the body are used to bypass narrowed coronary arteries.

Recovery

Recovery after a heart attack will start slowly. For the first few days you will need bed rest but gradually you will become more active, based on advice from your doctor.

Structured cardiac rehabilitation programmes start in hospital. Cardiac rehabilitation is a programme to help people manage their heart condition and improve their health.

Cardiac rehabilitation has two parts:

- **Exercise training** - Teaches you how to exercise safely, strengthen muscles, and improve stamina.

- **Education** - This part of the rehabilitation programme develops understanding about heart conditions and ways to reduce the risk of future heart problems.

Northern Ireland Chest Heart & Stroke offers a structured group workshop called the “Taking Control” Self Management Programme. It aims to help people with long term health conditions develop the skills and confidence they need to manage their condition more effectively. For more details contact 028 9032 0184.

Life after a heart attack

Working

Generally people take between 8 to 12 weeks off work after a heart attack. It may be advisable to initially go back to work on a part-time basis to help you adjust. After this many people can continue in their employment as normal.

However, if the job involves heavy manual work or high levels of stress then the remit of your employment should be adjusted or commitments re-arranged to avoid unnecessary strain.

Driving

You do not need to inform the Driver & Vehicle Agency (DVA, formerly the DVLNI) of your heart attack unless you have had pain whilst driving or you have sudden and disabling attacks of dizziness, falling, loss of awareness, confusion or fainting.

It may be advisable to avoid driving for a few weeks after your heart attack. Bus, lorry and taxi drivers who have had a heart attack must stop driving and contact the DVA immediately. More information can be found at www.gov.uk/heart-attacks-and-driving

Holidays

Patients who have had a heart attack are usually advised not to fly or take long car or train journeys for 6 to 8 weeks after leaving hospital. After this, it is a good idea to consult your doctor, but if you can walk over 100 yards without pain or breathlessness then flying shouldn't be a problem. If the flight is over 2 hours, it is best to take a walk along the aisle at regular intervals so that you reduce the risk of a DVT (blood clot) in the legs.

Remember to take enough medication for the holiday and if you are flying carry it in your hand luggage so that it is accessible and unlikely to get lost. It is also a good idea to take a list of your medications with you.

Please note it is important to have medical insurance for travelling outside the UK and to declare all your medical conditions to your travel insurance company.

The NICHS website has a list of insurance companies for people with pre-existing medical conditions: www.nichs.org.uk/travelinsurance

Sex

You should refrain from sexual intercourse for 2 weeks after discharge but after this time your heart attack shouldn't affect your sex life, particularly if you are able to briskly climb stairs without pain. If sex does bring on an angina pain, it may be helpful to take some GTN beforehand or discuss with your doctor. Viagra should not be taken if you are prescribed nitrates.

What is heart failure?

Heart failure means that your heart is not able to pump blood the way that it should. The most common cause of heart failure is a heart attack which causes damage to the muscle of the heart. Common causes of chronic heart failure include:

- Coronary heart disease
- High blood pressure
- Cardiomyopathy (disease of the heart muscle)
- An irregular heartbeat
- Disease of the heart valves
- Thyroid gland disease
- Alcohol or substance abuse can also contribute to heart failure

All these other conditions put extra work on the heart over a long period of time. The heart initially tries to cope with this extra workload by getting bigger, by developing more muscle or by beating faster in an attempt to keep up with demand. But eventually it just isn't able to cope and when it starts to fail symptoms will become evident.

Always speak to your GP, consultant or nurse if you have any questions or concerns.

What are the symptoms of heart failure?

Heart failure can affect the left side, the right side, or both sides of the heart and since the heart is part of our circulatory system its failure has knock-on effects throughout the body.

Most cases of heart failure involve the left side where the heart can't pump enough oxygen-rich blood to the rest of the body. This results in **general tiredness** and fatigue. The reduced pumping ability of the left side of the heart also leads to back pressure in the circulation causing fluid to build up in the lungs which leads to **breathlessness.**

Right-sided failure usually occurs as a result of left-sided failure. When the left side fails, increased fluid pressure is transferred back through the lungs, ultimately damaging the heart's right side. When the right side loses pumping power, blood backs up in the body's veins and this causes fluid build up and swelling in the feet and ankles which can extend to the legs and abdomen.

How is heart failure diagnosed?

If you have had a serious heart attack the symptoms may develop suddenly but they can also develop over weeks, months or longer if you had a more minor heart attack or have one of the other underlying causes of heart failure.

Your doctor will discuss your symptoms and medical history with you. He or she will also examine you. If they suspect that you have heart failure they are likely to suggest that you have a number of tests to confirm it.

These tests may include:

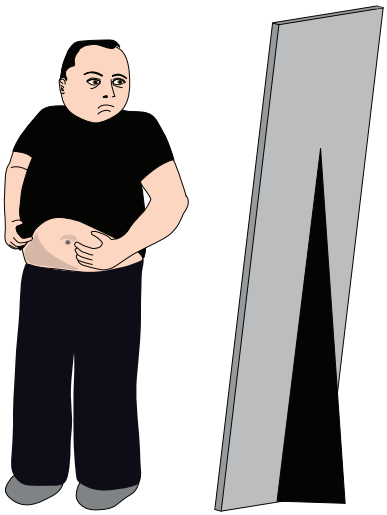
- An ECG (Electrocardiogram) which is a very quick, simple, painless test that measures the electrical activity and rhythm of your heart.
- An Echocardiogram which is a test in which ultrasound is used to examine the structure of the heart and see how well it is pumping.
- A chest X-ray to see whether your heart is enlarged and check your lungs for fluid.
- Blood tests including a BNP test. If you have heart failure levels of the hormone BNP are increased.

How is heart failure treated?

Often heart failure is the result of damage to the heart's pumping action. In most cases the heart cannot be completely normalised again. However, there are many treatments available that can help to keep the condition under control and help to relieve the symptoms.

The underlying condition that contributed to heart failure should be treated effectively. This reduces the pressure on your heart. For example, medication can be prescribed to treat the thyroid gland or to reduce blood pressure.

Treatment for heart failure can include lifestyle changes, medication or medical procedures:



Lifestyle - It is never too late to adopt a healthier lifestyle! A healthy lifestyle can help alleviate some of the symptoms and reduce the risk of your heart failure getting worse.

Monitor your symptoms - Know your symptoms and learn to recognise changes in their pattern. Changes in symptoms may be a sign that the heart failure is getting worse and so you should see your GP.

For example, fluid retention leads to weight gain and can be a sign of worsening heart failure or a sign that your medications need to be adjusted. Try to weigh yourself at the same time each morning. In this way it will become part of your daily routine. Your doctor may also suggest that you limit the intake of liquids so that your body can get rid of the extra water and sodium.

Medications - Several types of drugs have proved useful in the treatment of heart failure. They include:

- **Angiotensin-converting enzyme (ACE) inhibitors or ARB** lower blood pressure and decrease the heart's workload. They also blunt some of the effects of hormones that increase salt and water retention. Examples include ramipril, perindopril, enalapril and lisinopril.

- **Beta blockers** slow the heart rate and lower blood pressure. They also reduce the risk of some abnormal heart rhythms.

- **Diuretics**, often called water pills, cause frequent urination and keep fluid from collecting in the body. Bumetanide and

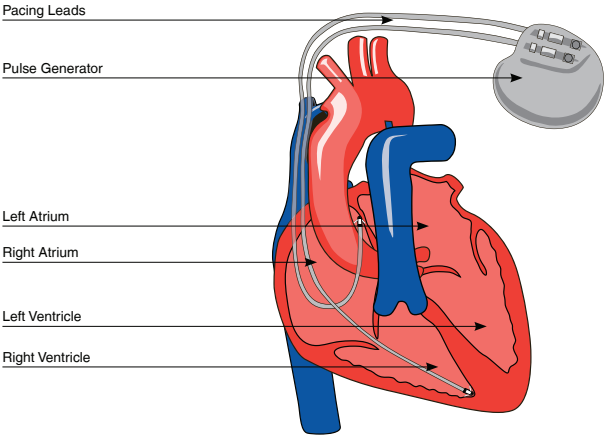
furosemide are commonly prescribed diuretic drugs. The drugs also decrease fluid in the lungs, making breathing easier. Because diuretics make the body lose potassium and magnesium, doctors may prescribe supplements of these minerals.

- **Digoxin**, also referred to as digitalis, increases the strength of the heart muscle contractions. It also tends to slow the heartbeat and is often used in patients who have a rapid irregular heart rhythm called **atrial fibrillation.**

Doctors may also prescribe other heart medications, such as nitrates (for chest pain), along with heart failure medications. Avoid over-the-counter medications.

Medical interventions - Heart failure cannot always be controlled by medication alone. There are some forms of surgery, and some devices which can be implanted in the body, that can help some people with heart failure. However, medical interventions are not suitable for everyone and will only be recommended after tests have been completed.

If the heart failure is caused by disease of the heart valves, you may be able to have an operation to give you a **replacement heart valve**. Or if the heart failure is caused by coronary heart disease which is poorly controlled by medication **Percutaneous**



Coronary Intervention (PCI) or **coronary artery bypass surgery** may be an option. Some people may benefit from having a specialised pacemaker implanted, to help coordinate the contractions of the heart muscle and help the pumping action. This is known as **resynchronisation therapy**.

Heart transplants may be an option for a small group of people with severe heart failure, but again it is not suitable for everyone, and it is dependent upon whether or not a donor heart is available.

Other information:

You do not need to inform the Driver & Vehicle Agency if you have heart failure, unless you are a bus, lorry or taxi driver. For more information see www.gov.uk/heart-failure-and-driving

Arrhythmia - What is the heart's normal rhythm?

Your heart has a natural pacemaker, called the sinus node, which sends electrical impulses through special fibres in the heart muscle to stimulate it to beat. These electrical impulses usually keep the heart beating in a regular 'sinus' rhythm. Your heart will normally beat between 60 and 100 times a minute when you are resting. Each heartbeat can be shown on a heart tracing, called an electrocardiogram or ECG.

Everyone experiences some variation in their heartbeat at certain times. Examples of normal changes in the heart rate include the following:

Sinus tachycardia - this is when the heartbeat is still regular, but faster than is usual, i.e. more than 100 beats per minute. This is a normal response during exercise or if you are stressed, feeling strong emotions or have a fever.

Sinus bradycardia - This is when the heartbeat is still regular, but slow, i.e. less than 60 beats per minute. Bradycardia is common in athletes.

Ectopic beats - These are extra heartbeats and are very

common. Often you are unaware of them and they are usually normal. If you do notice an ectopic beat, it may feel like a thud in the chest, a brief irregular heart rhythm, or a missed heartbeat. They may be made worse if you consume caffeine or alcohol and are most noticeable when resting. Ectopic beats are not usually dangerous and don't damage the heart.

At some time or another, most people have felt their heart race or skip a beat. These occasional changes can be brought on by strong emotions, exercise, caffeine or alcohol and they are usually not a cause for alarm.

Always speak to your GP, consultant or nurse if you have any questions or concerns.

What is an arrhythmia?

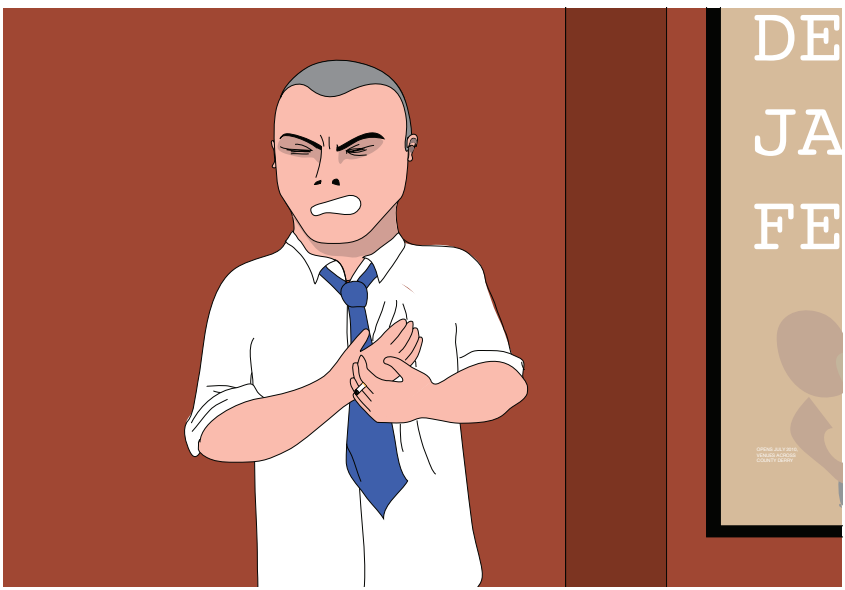
An arrhythmia is a change in the rhythm of your heartbeat. The heart rate can become abnormally rapid, slow and/or irregular.

Most arrhythmias are harmless, but some can be serious. When the heart rate is too slow, too fast, or irregular, the heart may not be able to pump enough blood to the body. When this occurs the arrhythmia needs to be investigated and treated.

What are the symptoms of an arrhythmia?

You may not notice any symptoms of an arrhythmia. If you do have symptoms, they will depend on the type of arrhythmia you have and how severe it is. Symptoms may include:

- Palpitations
- Dizziness
- Fainting or collapsing
- Breathlessness
- Chest pain



What causes an arrhythmia?

An arrhythmia can occur when the electrical impulses that control the heartbeat are delayed or blocked. This can happen when the sinus node which produces the electrical impulse doesn't work properly or when the impulse doesn't travel normally through the heart.

An arrhythmia can also occur when another part of the heart starts to produce electrical impulses, adding to the impulses from the sinus node and so disrupting the normal heartbeat.

Occasional ectopic beats can be caused by strong emotions, exercise or caffeine. But the most common cause of persistent arrhythmias is heart disease; particularly coronary artery disease, heart valve disease and heart failure. For some arrhythmias the underlying cause is present at birth (congenital).

Thyroid disease and severe anaemia can also cause arrhythmias but sometimes, the cause of an arrhythmia can't be found.

Types of arrhythmia

There are a number of different arrhythmias. In general, arrhythmias that start in the lower chambers of the heart (called the ventricles) are more serious than those that start in the upper chambers (called the atria).

Your doctor will talk with you about the type of arrhythmia you have and whether you need treatment.

How is an arrhythmia diagnosed?

If you have noticed palpitations or a fluttering in your chest on a regular basis you should visit your GP. The GP will ask you a number of questions about your symptoms such as, what they feel like, when they occur and how often they occur.

Your GP will also listen to your heart and feel your pulse. If your GP suspects that you have an arrhythmia he or she may refer you to the hospital for more tests such as:

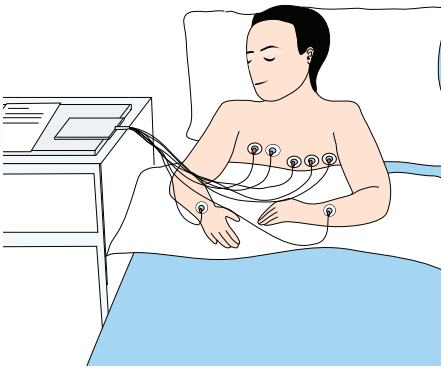
- An ECG (electrocardiogram) is a very quick, simple, painless test that measures the electrical activity and rhythm of your heart.

- For many people who have an arrhythmia, the ECG recording made at rest can be normal. Therefore an ECG recording is often made when the patient is exercising. This is known as an Exercise Stress Test and can reveal arrhythmias which occur during exercise or activity.

- A Holter monitor continually records the electrical activity of your heart over a 24-48 hour period. A continuous recording is more likely to detect any abnormal heartbeats or rhythms that occur during the day/night.

- If your palpitations or fluttering sensations are less frequent a Patient Activated Event Recorder may be more appropriate. This is a device which, although worn continuously, only records the ECG when you push the button if you feel symptoms.

- If the palpitations are very persistent and not responding well to medication, Electrophysiological Studies (EPS) may be needed to fully investigate their cause. Similar to an angiogram, fine tubes (electrode catheters) are fed into a vein and/or artery usually in the groin. They are then gently moved into the heart, where they stimulate the heart and your heart's electrical activity is recorded. This helps the doctors determine why you have the arrhythmia and decide the best form of treatment.



How are arrhythmias treated?

Treatment depends on the type of arrhythmia you have:

- Some mild arrhythmias require no treatment other than avoiding caffeine or stress.

- If another health problem is causing the arrhythmia, like a thyroid condition or anaemia, treatment is aimed at resolving that.

- Some arrhythmias can be treated with medication.

- In more serious cases, other treatments are available like cardioversion, a pacemaker (see diagram opposite), an implantable cardioverter defibrillator (ICD), or catheter ablation.

Medication

Medication can be used to speed up a heart that's beating too slowly, or slow down a heart that's beating too quickly. They also can be used to convert an abnormal heart rhythm to a normal steady rhythm. Medicines used to convert an abnormal rhythm are called anti-arrhythmics. They may be given intravenously in

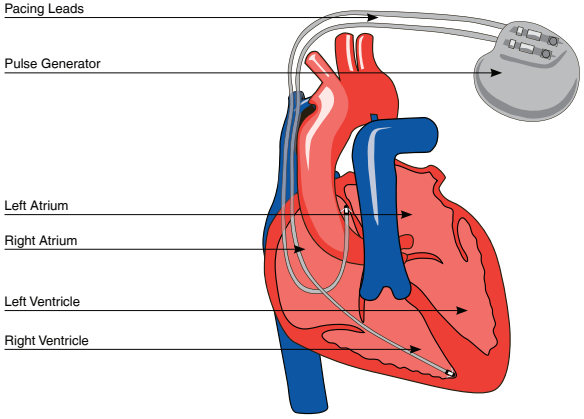
an emergency situation or orally for long-term treatment.

Cardioversion

For some, drugs alone will not convert an arrhythmia to a normal heart rhythm. For these people, a procedure called cardioversion may be appropriate. A short acting sedative is given to the patient and a controlled electrical shock is delivered to the chest wall through paddles or adhesive pads. The procedure restores the normal heart rate and rhythm.

Pacemaker

An artificial pacemaker is an electronic device placed under the skin on the chest and connected to the heart by one or two thin wires. The pacemaker helps the heart maintain a regular rhythm. Most pacemakers work only when they're needed or on demand. This means that the pacemaker only sends out an



impulse when it senses that the heart has missed a beat or is beating too slowly. If the pacemaker senses no natural beat then it will pace continuously.

Implantable cardioverter defibrillator

An implantable cardioverter defibrillator (ICD) is an implanted device that's fitted in the chest like a pacemaker. It's used for people who have had, or are prone to, episodes of life-threatening ventricular arrhythmias e.g. ventricular tachycardia. It continuously monitors the heartbeat. If it senses a dangerous ventricular arrhythmia, it sends an electric shock to the heart to restore a normal heartbeat.

Catheter ablation

A procedure called catheter ablation is sometimes used to treat certain types of arrhythmias when medication doesn't work. It is done using the same technique as the Electrophysiological Studies (EPS). During EPS, the abnormal areas in the heart which are creating the arrhythmia will be identified and treated.

What is a pacemaker?

An artificial pacemaker is an electronic device placed under the skin on the chest which helps the heart maintain a regular rhythm. The pacemaker system includes the pulse generator and leads that connect the pulse generator to the heart.

- Pulse generator - This small metal container contains a longlife battery and the electrical circuitry that monitors the patient's underlying heart rhythm and regulates the rate of electrical pulses sent to your heart.

- Leads - These flexible, insulated wires deliver the electrical impulses to your heart. There are a variety of pacemakers with different capabilities available. Your doctor will recommend which type of pacemaker is needed.

Most pacemakers work only when they're needed or on demand. This means that the pacemaker only sends out an impulse when it senses that the heart has missed a beat or is beating too slowly. If the pacemaker senses no natural beat then it will pace continuously.

Always speak to your GP, consultant or nurse if you have any questions or concerns.

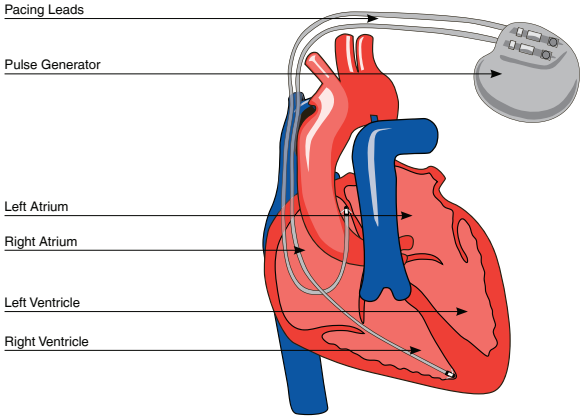
Implanting a pacemaker

The pacemaker is implanted during a minor surgical procedure performed under local anaesthetic and light sedation.

The leads are placed through a vein beneath the collar bone and positioned in the heart under X-ray. Tests are completed to ensure the leads are well connected to the heart muscle.

The leads are then connected to the pulse generator, which is placed beneath the skin just below the collar bone. Usually only a small bump in the skin is seen over the place where the pacemaker has been implanted.

The procedure usually takes less than an hour.



After the implantation

After the implantation a chest X-ray will confirm that the pacemaker's leads are placed correctly.

Recovery from the procedure is rapid, other than restrictions on heavy lifting and extreme motion of the arm on the side where the pacemaker is implanted for several weeks. You may experience some discomfort and bruising around your pacemaker site for a few days but this can be eased with pain-relieving medication. Before going home the nurse will discuss with you how to care for the pacemaker site, including keeping it dry for one week.

Most patients return to normal activities within a few days. You may need time to get used to the pacemaker in general. You may be aware of the presence of the pulse generator but you will soon get used to it.

After the pacemaker is implanted, regular follow-ups will be scheduled. At each visit the pacemaker will be tested and the life of the battery monitored. If necessary the pacemaker programme will be adjusted to your individual needs.

The average pacemaker battery lasts about 8 to 9 years and

the periodic checks on the battery usually give a several-month warning before the pacemaker requires replacement. This is usually a minor surgical procedure. Normally the leads are left in place and the pulse generator is changed but occasionally the leads may need to be replaced.

You'll be given a pacemaker registration card which contains details of the make and model of your pacemaker. You should always carry this with you in case of an emergency. You may also be given extra information produced by the pacemaker manufacturer.

Living with a pacemaker

For the vast majority of patients, the presence of a pacemaker does not change lifestyle or activities in any way. In fact it often allows people to get back to activities they were previously unable to do because of symptoms.

Driving

You must tell the Driver & Vehicle Agency if you have been fitted with a pacemaker. You should also inform your insurance company. You should not drive for one week after pacemaker implantation if you hold an ordinary (group 1) licence or six weeks if you hold a vocational (group 2) licence, providing there are no other disqualifying conditions.

Drivers with an implanted pacemaker and who can meet the standards of medical fitness to continue to drive may be issued with an ordinary (group 1) licence without regular medical review by the Driver & Vehicle Agency (DVA, formerly the DVANI), providing the following conditions are satisfied:

- Regular pacemaker checks under the care of a consultant cardiologist are undertaken.

- The advice of the doctor/cardiologist concerning your treatment and medical review is followed for the duration of your licence.

- You undertake to notify DVA if you suffer any sudden attacks of disabling giddiness/fainting or blackouts or any other medical condition, which may affect safe driving.

- Your licence does not require regular review for any other medical condition. Drivers with a vocational (group 2) licence will have to reapply for another licence.

More information can be obtained at:
www.gov.uk/pacemakers-and-driving

Sports and activities

Strenuous activity is not recommended for a few weeks after pacemaker implantation. After this sports and activities can be resumed. However when involved in a physical, recreational, or sporting activity, you should avoid receiving a blow to the skin over the device. A blow to the chest near the pacemaker can affect its functioning. If you do receive a blow to that area, see your doctor.

Travelling and holidays

When travelling abroad you should carry your pacemaker registration card that provides specific information on the type of leads and pulse generator implanted. Such a card can be shown to healthcare professionals if necessary.

In general it is recommended not to panic about airport security or shop anti-theft systems, simply move quickly through them and do not linger near them. Any interference ends as soon as you move away from the security system and the pacemaker will resume its normal function.

Your pacemaker card can also be shown to security personnel at airports in the event that the device activates the metal detector system. If security personnel are using a hand held device ask them to avoid the area around your pacemaker.

If you have any concerns ask your doctor or cardiac technician.

Home and work

Household appliances, which are kept in good condition, and mobile telephones do not interfere with your pacemaker's function, although you should not keep your mobile telephone in a pocket directly over the pacemaker and when using the phone hold it to the ear opposite the pacemaker.

Most well maintained appliances, such as office equipment in your workplace, will not interfere with your pacemaker. However, your pacemaker will be affected if you have a job in an industry which produces electromagnetic interference, for example arcwelding or if industrial generators are used.

If you are concerned about interference from a particular piece of equipment at home or at work, ask your doctor.

Health professionals

You should always tell your dentist and any other doctors or health professionals that you may see that you have a pacemaker.

Most dental and medical procedures are unlikely to interfere with your pacemaker. For example X-rays, ultrasounds and CT scans will not cause interference.

However, procedures like MRI scans are generally not recommended for people with pacemakers. The use of TENS equipment on the upper body for pain control is also not recommended.

What can I do to reduce my risk of Coronary Heart Disease?

Like everything in life, there are some things we have no control over. But some things **are** within our control.

WHAT CAN'T I CONTROL?

- Family history: if your siblings or parents had a heart attack or stroke at an early age (under 55 for men or under 65 for women), your own chances will be higher.
- Age: the risk of heart attack or stroke increases with age.
- Gender: men are more at risk of heart disease than women, though women's risk increases significantly after menopause.
- Ethnic origin: people with an Afro-Caribbean or South-east Asian background have an increased risk of heart attack and

stroke.

- If you have already had a stroke or mini-stroke (TIA), a heart attack or angina you have a greater chance of having another stroke or heart attack.
- Genetic condition which makes your blood more likely to clot, affects your blood pressure or cholesterol levels (eg. Familial Hypercholesterolaemia).

The good news is there are **some things we can control**. Stopping smoking, eating a healthy diet, exercising regularly, managing your diabetes (if you have it) and managing stress all have a positive impact on your blood pressure and cholesterol levels, which in turn reduce your risk of coronary heart disease.

Stop smoking

Cigarette smoking damages the lining of the blood vessels, increases your blood pressure, and makes your blood stickier, all of which increase the risk of coronary heart disease. It is also linked to many other serious health problems.

It is not easy to quit smoking

but there is help out there; ask your GP or local pharmacist for information on nicotine replacement products. Many local hospitals run smoking cessation clinics and there are some GPs and local pharmacists who also provide this service.

You can contact want2stop for tips and a quit kit on: 0808 812 8008 or www.want2stop.info

Eat a healthy diet

Cholesterol and fat contribute to the deposits which build up on the walls of the blood vessels. You can help lower the levels of cholesterol and fat in your blood by reducing the amount of saturated fats you eat. Saturated fats are found in fatty meats, full cream dairy products, take-away meals and cakes. You can make simple changes to your diet such as:

- Using semi-skimmed or skimmed milk
- Choosing low fat products
- Grilling instead of frying
- Cutting the visible fat off meat Keeping cakes and sweets to an occasional treat

Eating oily fish such as sardines, mackerel, salmon and trout, which contain omega-3, once or twice a week can help reduce the level of some of the fatty substances in your blood. Eating

more fibre also reduces cholesterol and helps your digestive system:

- Choose wholemeal instead of white bread
- Eat wholegrain cereal and wholemeal pasta
- Eat more beans and pulses

At least five portions of fruit and vegetables per day are also recommended. Fruit and vegetables contain antioxidant vitamins and potassium which are both good for the blood vessels.

Avoid adding sugar to tea/coffee. Reducing your salt intake is also important as it can contribute to high blood pressure. Use herbs and spices to flavour your food and avoid canned and packet foods as they have high levels of salt.

Exercise regularly

People who are physically inactive have greater risk of coronary heart disease than those who keep active. Being physically inactive over a long period is also linked to high blood pressure.

Any increase in physical activity is beneficial. If you are unsure about what to do, discuss with your doctor how much and what kind of exercise would be suitable for you.

- Take it slowly at first, especially if you're not used to physical activity.
- Build up gradually to 30 minutes a day.
- Choose things that you would enjoy, for example, walking, dancing, swimming, cycling, tennis or golf.

It doesn't matter what you do as long as it makes you feel warm and slightly out of breath.

As well as traditional forms of exercise we can also increase our activity levels in day-to-day life, for example:

- Take the stairs
- Walk to work
- Work in the garden

Hobbies such as golf and bowls also help to increase activity levels as well as being enjoyable.

Control your diabetes

Diabetes means that there is too much glucose (sugar) in the blood. High glucose levels can affect the artery walls, encouraging fatty deposits to develop. If you have diabetes, you are also more likely to have high cholesterol levels and high blood pressure. If you have diabetes, it is important to control your blood sugar, blood pressure and cholesterol. If you don't have diabetes, you can greatly reduce your risk of developing it by controlling your weight and doing exercise regularly.

Manage stress

A little bit of pressure in life can be motivating and helps you to be productive. However, too much pressure or prolonged pressure can lead to stress. As well as an emotional response, stress produces a physical response and chronic stress can lead to raised blood pressure. Some people also cope with stress with destructive behaviour such as smoking, drinking too much alcohol or overeating, all of which increase the risk of coronary heart disease.

If you often feel stressed, it is important to learn how to relax. Some people find that physical activity helps them cope with stress. Some learn relaxation techniques and others find it helps to talk to someone.

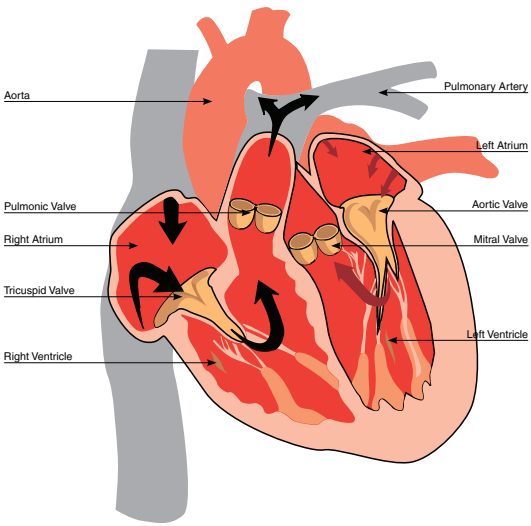
Cardiac tests

Cardiac tests give your doctors important information about your heart and this information can be used to determine the best treatment for your condition.

This section briefly describes some of the common heart tests.

How the heart works

Your heart is a muscular pump, which is about the size of your clenched fist, and it is always pumping blood throughout the body.



The heart is divided into four chambers. The upper two chambers are called atria and the two lower chambers are called ventricles. One-way valves between the

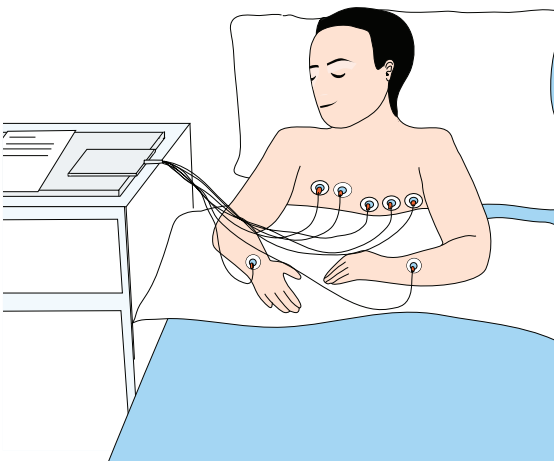
chambers keep blood flowing through your heart in a forward direction. Blood flows through a valve from one chamber into another, then the valve closes, preventing blood flowing backwards.

The average heart beats 100,000 times a day

Some common heart tests

ECG (Electrocardiogram)

An ECG is a very quick, simple, painless test that measures the electrical activity and rhythm of your heart. The ECG will show a variety of lines and waves which will be analysed to see if there is reduced blood flow to the heart muscle or if you have had any recent damage to the heart. The ECG will also show how fast your heart is beating and any irregularities in your heart's rhythm.



Sometimes your

doctor will compare your current ECG to old ECGs you have had done. This helps to determine if changes on your electrocardiogram are new or old.

However, since the ECG has limitations your doctor may refer you on for further tests.

Exercise ECG or Stress Test

For many people who have significant narrowing of the arteries supplying the heart muscle, the ECG recording made at rest is often normal. Therefore, if a significant narrowing is suspected, an ECG recording is often made when the patient is exercising as this is more likely to reveal the problem.

During an exercise stress test you will walk on a treadmill while your ECG and blood pressure are monitored and recorded. The doctor will be looking at the ECG to see if any changes occur in the ECG which would indicate coronary heart disease. The doctor will also be interested in how much exercise you are able to do and whether you experience chest pain or breathlessness.

Ambulatory Monitoring

Holter Monitor

A Holter monitor records the electrical activity of your heart while you do your usual activities. It is a small, portable ECG machine worn at home over a 24-48 hour period. Many symptoms like palpitations or fluttering in your chest only become noticeable during activity, such as exercise, eating, stress, or even sleeping. A continuous recording is more likely to detect any abnormal heartbeats or rhythms that occur during these activities.

Patient Activated or Cardiac Event Recorder

If your palpitations or fluttering sensations are less frequent a patient activated event recorder may be more appropriate. This is a device which, although worn continuously, only records the ECG if you push the button when you feel your symptoms.

Echocardiogram (Echo)

An echocardiogram is a test in which ultrasound is used to examine the heart. The echo produces an image of the heart on a screen. It shows the structures of your heart including the 4 chambers and the valves. How well your heart is pumping, the

presence of fluid around the heart, problems with your heart valves and information about the pressures within your heart can all be assessed during an echo.

Transoesphageal Echocardiogram (TOE)

A TOE is a special type of echocardiogram which is used when a closer and more defined image of the heart valves is needed. Pictures of your heart are taken by inserting a probe in to your gullet (oesophagus). These pictures are clearer because the oesophagus is close to your heart and the chest wall is not in the way.

The back of your throat will be sprayed with some numbing solution and although you will be awake during the procedure, you will be given some medication to make you feel relaxed and sleepy.

Cardiac Catheterisation (Angiogram)

Cardiac catheterisation is a procedure where a small plastic catheter is placed within a large artery in your groin and fed to the arteries in your heart. A special contrast agent (dye) will then be injected through the catheter and a series of X-rays will be taken. This technique is used to take pictures of the coronary arteries and the pumping action of the heart. The procedure

provides the most detailed and accurate information on the condition of your coronary arteries.

Local anaesthetic is given in your groin or wrist before insertion of the catheters. You may feel pressure as the catheter is inserted and you may feel a warm sensation throughout your body when the X-ray contrast agent (dye) is injected to obtain some of the pictures. The procedure generally lasts for less than 30 minutes. After the procedure you will be asked to lie still for 3-4 hours to allow the puncture site in the groin to heal (only if the groin is used).

Electrophysiological studies (EPS)

If you have abnormal heart rhythms (arrhythmias) or palpitations you may be referred for this test. Similar to an angiogram, fine tubes (electrode catheters) are fed into a vein and/ or artery usually in the groin. They are then gently moved into the heart, where they stimulate the heart and your heart's electrical activity is recorded. This helps the doctors determine why you have the abnormal rhythm and decide the best form of treatment.

Always speak to your GP, consultant or nurse if you have any questions or concerns.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