Heart rhythms

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The British Heart Foundation (BHF) is the nation’s heart charity, saving lives through pioneering research, patient care and vital information.

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About this booklet

This is a booklet about heart rhythms. It includes information on both normal and abnormal heart rhythms.

An abnormal heart rhythm is called an arrhythmia (pronounced ‘ah-rith-me-ah’). Arrhythmias affect more than 700,000 people in England alone.

Some people who have an arrhythmia may feel unwell or anxious, even if their condition is not harmful. Getting appropriate information and support can be very helpful, and can help improve your quality of life.

This booklet explains:

- what a normal heart rhythm is
- what palpitations are
- what ectopic beats are (when you feel like your heart ‘misses’ a beat or you feel extra beats)
- the different types of arrhythmias – what they are and what causes them
- the tests used to diagnose arrhythmias, and
- the treatments you might need to have if you have an arrhythmia.
This booklet does not replace the advice that the health professionals involved in your care may give you, but it should help you to understand what they tell you.

If you have atrial fibrillation

Atrial fibrillation is the most common type of arrhythmia. We mention it in a few places in this booklet but, if you have atrial fibrillation, you will find it more helpful to read our booklet *Atrial fibrillation*. 
What is an arrhythmia?

An arrhythmia is an abnormal heart rhythm. Your heart has an electrical conduction system which makes your heart pump blood around your body. Arrhythmias are caused by an abnormality in that electrical conduction system, and can make your heart beat too slowly, too quickly, or in an irregular way. Some arrhythmias are more serious than others.

There are many reasons why a person may develop an arrhythmia. For example, they are more common in older people, and in people with a heart condition such as coronary heart disease or heart valve disease.

The symptoms of an arrhythmia will depend on what type of arrhythmia you have, and how it affects the functioning of your heart. The most common symptoms of an arrhythmia include palpitations (being aware of your heartbeat), dizziness, breathlessness, and in some rare cases collapsing or losing consciousness.

There are many different types of arrhythmias. This booklet describes the most common types.
How a normal heart works

The heart is a pump that is driven by a series of electrical impulses produced by a bunch of special cells in the right atrium, called the **sinus node**. (The right atrium is one of the four chambers of the heart. See the illustration on the next page.) The sinus node is sometimes called the heart’s ‘natural pacemaker’.

The sinus node produces pulses of electrical activity that spread through the heart’s cells, causing the heart muscle to contract. When the electrical signals travel through your heart, it’s like electricity going down a circuit of wires.

The electrical impulses from the sinus node travel down through the atria to special cells in the **AV node**. These impulses make the **atria** contract. This squeezes blood into the **ventricles** (the two lower chambers of the heart).

The impulses then travel from the AV node through the ventricles via an **electrical pathway**. These electrical impulses cause the ventricles to contract and squeeze the blood out of your heart to your body and your lungs.
Normal electrical signals in the heart

**What is the difference between heart rate and heart rhythm?**

The **heart rate** is the number of times the heart beats in a minute. This is the number of times it pumps to push blood round the body.

The **heart rhythm** is the pattern in which the heart beats. It may be described as regular or irregular, or fast or slow.
How to measure your heart rate by taking your pulse

Every heartbeat creates a wave of pressure, as blood flows along the arteries. Where these arteries lie closest to the surface of your skin, you can feel this pressure wave as a pulse.

To measure your pulse, you’ll need a clock or watch that measures seconds.

1. Hold one of your hands out so you’re looking at your palm.

2. Place the pads of the first and middle fingers of your other hand on the inside of your wrist. You should place them at the base of your thumb, near where a watch strap would sit.
3 Press lightly and feel the pulse. If you can’t feel anything, press slightly harder or move your fingers around until you feel your pulse.

4 Once you’ve found your pulse, count how many beats you can feel during 60 seconds.

You can also feel the rhythm of your pulse and check if it’s regular or irregular.

**What to do if your pulse is irregular**

An irregular pulse could be a sign that you have an arrhythmia such as atrial fibrillation (AF). AF is a major cause of stroke, so it is important to find out if you have it. If you think you have an irregular pulse, or if you’re concerned about your pulse, make an appointment to see your doctor.
Normal heart rhythms

The heart’s normal rhythm is called **sinus rhythm**. Its rate is between 60 and 100 beats per minute (bpm) while you are resting.

If the sinus rhythm is slower than 60 bpm, it is called **sinus bradycardia**. If the sinus rhythm is faster than 100 bpm, it is called **sinus tachycardia**. (‘Brady’ means slow and ‘tachy’ means fast.)

The normal heart rate varies from minute to minute, depending on the demands on the heart. **Sinus arrhythmia** is a normal variation of sinus rhythm, where the heart rate increases very slightly as you take a breath in.

Sinus rhythm, sinus bradycardia, sinus tachycardia and sinus arrhythmia are all normal heart rhythms where the electrical impulses travel in a normal way through the heart.

**Sinus bradycardia**

Many people get sinus bradycardia (a slow heart rate), especially when they are resting or asleep. People who are very physically active are more likely to have slower heart rates.
Other causes of sinus bradycardia include:

- medicines such as beta-blockers, including eye drops which contain beta-blockers
- an underactive thyroid gland
- hypothermia, and
- tachybrady syndrome (see page 45).

**Treatment**

Sinus bradycardia does not usually need treatment. However, if your sinus bradycardia is due to an underlying medical condition – such as an underactive thyroid gland – you may need to have treatment for that condition.

**Sinus tachycardia**

The heart may be beating fast because it needs to – for example, if you are doing exercise, or if you are excited. It can also beat faster if you are stressed or anxious, or in pain, or if you’re heavily pregnant.

Sometimes a sinus tachycardia is a sign of an underlying health condition such as an overactive thyroid gland (thyrotoxicosis) or severe anaemia. Or it may be because you have an infection or have had severe blood loss.

Other causes of sinus tachycardia include:

- stimulants such as caffeine, nicotine and alcohol
• prescribed medicines such as salbutamol (Ventolin) – a medicine for asthma, or
• illegal drugs such as amphetamines (speed), cocaine, ecstasy and cannabis.

Treatment

Treatment for sinus tachycardia is rarely needed. However, if an underlying condition is causing the sinus tachycardia, you may need to have treatment for that condition.
The term ‘palpitations’ is often used to describe the sensation of feeling your own heart beating. Some people say that having palpitations feels like a fluttering in their chest, or their heart pounding. Others describe it as feeling like a thud or movement in their chest. Some say they feel their palpitations in their neck or through their ear when they are lying down.

Most people who get palpitations don’t have a serious heart condition, but palpitations can feel unpleasant and may cause distress. They are common, and many people will have them at some time in their lives. For example, they can happen simply with anxiety or during exercise.

If you’re concerned about palpitations, go and see your GP. He or she may arrange for you to have an ECG. We describe this test on page 20. If the symptoms continue, or if you have underlying heart disease, or if the palpitations are making you feel very unwell, and your doctor thinks that your palpitations may be due to an arrhythmia, you may need to have further tests, such as a 24-hour ECG recording (see page 21).
Ectopic beats

Ectopic beats are early (premature) or extra heartbeats that can cause palpitations, and can make you feel like your heart skips or misses a beat. ‘Ectopic’ means out of place.

An ectopic beat happens when cells away from the sinus node release an electrical discharge, causing an ‘extra’ or early heartbeat. There is often a tiny pause after the extra beat, giving the sensation of a ‘missed’ beat.

Ectopic beats can come from cells in both the atria and the ventricles. They can happen in patterns – for example, one before every other normal heartbeat. And they can happen in sequence – for example, four ectopic beats in a row.

Most people have ectopic beats at some time in their lives. Many people are unaware of having them, or may have them while asleep. Some people have frequent ectopic beats and are unaware of all of them, while others may have only a few ectopics but are aware of every one.

Most people who get ectopic beats have nothing to worry about. People of all ages can get ectopic beats, and in most cases the ectopic beats are not caused by an
underlying heart condition, are not dangerous and don’t need treatment.

Ectopic beats can be confirmed by an ECG or by a 24-hour ECG recording. If ectopic beats are seen on your ECG and you have an underlying heart condition, you may need to have further tests, such as an echocardiogram. We describe all these tests on pages 20 and 23.

If you have no underlying heart disease, and your doctor tells you that the ectopic beats are harmless, you probably won’t need to have any more tests or treatment.
Arrhythmias (abnormal heart rhythms)

What are the symptoms of an arrhythmia?
Symptoms can include palpitations (see page 15), dizziness, breathlessness, and in some rare cases, collapsing or becoming unconscious.

What types of arrhythmia are there?
There are many different types of arrhythmia. What type you have will depend on where in your heart the rhythm starts, and whether it causes your heart to beat too fast, or too slow.

We describe the most common types of arrhythmias on pages 24 to 46. These include:
- fast heart rhythms – called tachycardias, and
- heart blocks and slow heart rhythms – called bradycardias.

On the next page we tell you where in this booklet you can find out more about the following types of arrhythmias.
Types of arrhythmias

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On page 20 we describe the different tests that are used to diagnose arrhythmias.

On pages 33 and 47 we explain the treatments you might have if you are diagnosed with an arrhythmia.
Tests to diagnose arrhythmias

Below we describe some of the tests used to diagnose different types of arrhythmias. For more detailed information about these tests, see our booklet *Tests for heart conditions*.

**ECG**

*Also called an electrocardiogram.*

An ECG records the electrical activity of your heart. It can show an arrhythmia, but usually only if it is happening at the time of the ECG. Sometimes an ECG can show features that could suggest you might be at risk of an arrhythmia.

An ECG is painless and usually takes about five minutes to do. Small sticky patches called ‘electrodes’ are put on your chest, arms and legs and are connected, by wires, to a recording machine. The recording machine picks up the electrical activity in your heart and interprets it into wavy lines which are printed onto paper.

If your ECG shows an abnormal heart rhythm, it’s a good idea for your doctor to give you a copy of the ECG, as well as keeping a copy in your medical records.
24-hour ECG recording
Also called Holter monitoring or ambulatory ECG monitoring.

This can be useful if a standard ECG doesn’t pick up an arrhythmia but you are getting symptoms of an arrhythmia quite often. You have to wear a small recording machine, usually around your waist. Four or six ECG leads from the device are taped to your chest. The device records an ECG over a 24-hour period – through one day and overnight. Sometimes the recorder can record for longer than 24 hours.

Exercise ECG
Also called an exercise tolerance test or ETT.

Sometimes arrhythmias are triggered by physical activity. An exercise ECG can be used to record your heart rhythm while you are exercising, when your heart is working under increased pressure.

In an exercise ECG, an ECG recording is taken while you are walking on a treadmill or while cycling on an exercise bike.

Cardiac event recorders

If you don’t get the symptoms of an arrhythmia very often, your doctor may suggest using a small electrical recording device called a cardiac event recorder. This
device records your heart’s rate and rhythm over a longer period of time. You keep the recorder with you and use it when you experience your typical symptoms. There are several different types of recorder. If you need to use one, someone will show you how to use it.

There is also a device called an **implantable loop recorder (ILR)** which can be implanted under the skin on your chest and left in place for up to three years. The ILR is a small, slim device, about the size of a packet of chewing gum or a computer memory stick. It can record electrical activity in the heart that doesn’t happen very often.

**Electrophysiological studies**

*Also called an EP study, EPS or electrophysiological testing.*

An EP study can discover if there are extra electrical pathways in the heart that could be causing an abnormal heart rhythm – especially a particular type of fast heart rhythm called an SVT (see page 24).

If you need an EP study, your doctor will refer you to a cardiac electrophysiologist. This is a cardiologist who specialises in arrhythmias.

Most people need only a local anaesthetic and sedation before having this test. The test can take about two to three hours.
The electrophysiologist will insert some special catheters (long, thin tubes) into a large vein, usually in the groin. The catheters are then gently moved up through the veins and into your heart. A small electrode at the tip of each catheter tries to detect where any unwanted electrical impulses are coming from.

If the electrophysiologist can pinpoint the exact area of your heart where the unwanted electrical impulses are coming from, he or she may do a catheter ablation treatment at the same time as they do the test. We describe this treatment on page 36.

There are some risks involved in an EP study. For more on this, see Possible complications on page 38.

**Echocardiogram**
*Also called an echo.*

This is an ultrasound scan of the heart. Most people find it’s not uncomfortable at all. The test can take up to an hour. An echocardiogram can detect if you have a problem with your heart muscle or heart valves, which could be the cause of your arrhythmia.

For more detailed information about all the tests described on pages 20 to 23, see our booklet *Tests for heart conditions.*
Fast heart rhythms

If you have a fast heart rhythm, it’s important to try to find out exactly what type it is, so that your doctors can provide the best possible treatment.

Some fast heart rhythms arise from above the ventricles and are called supraventricular tachycardias – or SVTs for short. We describe these on pages 24 to 29.

Other fast heart rhythms come from within the ventricles, and are called ventricular arrhythmias. We describe these on pages 29 to 32.

Supraventricular tachycardias (SVTs)

Supraventricular tachycardia – or SVT for short – is an overall term for any fast heart rhythm that starts from above the ventricles. (‘Supra’ means above.) SVTs are often ‘paroxysmal’, which means that they come and go. SVTs are quite common, but are rarely life-threatening.

What causes an SVT?

Most SVTs are due to one or more extra electrical pathways between the atria and the ventricles. In people with SVTs, an extra electrical pathway can make the heart beat very fast. In most cases, there are no other heart problems.
In those people who may be prone to SVTs, the SVT can be triggered by caffeine, alcohol, drugs, hormone changes in adolescence, or pregnancy.

Sometimes an SVT happens for the first time in early adulthood. Some people find that SVTs improve with age, while others find that they get worse as they get older.

One example of an extra pathway is found in people with Wolff-Parkinson-White syndrome – or WPW for short. People who have WPW have an extra electrical pathway that can conduct very fast rhythms because it allows a very fast route from the top of the heart directly to the bottom (to the ventricles) with very little delay. WPW causes a particular pattern on a routine ECG.

**Treatment**

Different types of SVT need different treatments. People with an SVT may need one or more of the following treatments:

- intravenous medicine (through a vein)
- oral medicine (such as tablets)
- cardioversion
- catheter ablation.

We explain more about these treatments on pages 33 to 39.
Inappropriate sinus tachycardia

This is a sinus tachycardia (a fast heart rhythm) which can happen suddenly, with no obvious cause. While resting, the heart rate can quickly rise to over 100 beats per minute. And with a very small amount of activity it can quickly rise to 150 beats per minute. It is more common in young women.

It is not clear what causes inappropriate sinus tachycardia, but it is thought that it happens because of an abnormality with the sinus node. It is sometimes called a type of sick sinus syndrome (see page 45).

Treatment

For some people, the symptoms of inappropriate sinus tachycardia can be debilitating, and can lead to high levels of anxiety. A number of medicines, and a treatment called catheter ablation, have been used to treat the symptoms of inappropriate sinus tachycardia, but with varying results (see page 36). If an underlying condition is causing the arrhythmia, you may need to have treatment for that condition.

Atrial flutter

Atrial flutter is a type of heart rhythm that arises in the atria. It is usually fast, with the atria often beating in a
regular rhythm at a rate of 300 beats a minute. It happens when electrical impulses circulate very fast around the atria. The ventricles can’t pump this fast successfully, so the AV node ‘blocks’ some of the electrical impulses, stopping some of them from reaching the ventricles. The ventricles often beat at a rate of about 75, or 100 or 150 beats per minute, depending on how many electrical impulses have been blocked by the AV node. However, it does this in an ordered way so that the heartbeat stays regular (unlike the chaotic way that the heart beats in atrial fibrillation, which we describe on the next page).

Some people get periods of atrial flutter followed by atrial fibrillation.

**What causes atrial flutter?**

People who have atrial flutter usually have an underlying heart problem. Possible causes include coronary heart disease, cardiomyopathy, heart valve disease, a hole in the heart, inflammation of the heart (such as myocarditis), high blood pressure, lung disease or thyroid problems.

**Treatment**

Treatment for atrial flutter may include one or more of the following:

- cardioversion
• medicines such as beta-blockers, calcium channel blockers and other anti-arrhythmic medicines
• catheter ablation.

Atrial flutter also increases your risk of developing a blood clot inside the chambers of the heart. If the clot breaks off, it could cause a stroke. To reduce this risk, you may need to take a medicine such as warfarin.

For more information about these treatments, see pages 33 to 39.

**Atrial fibrillation (AF)**

Atrial fibrillation is an irregular and sometimes fast abnormal heart rhythm that starts in the atria. It is the most common type of arrhythmia, and is thought to affect roughly 1 in every 100 people in the UK.

**What causes atrial fibrillation?**

Atrial fibrillation happens when different places in and around the atria fire off electrical impulses in an uncoordinated way.

**Treatment**

People usually need treatment to try and control their atrial fibrillation. What type of treatment you need will depend on several factors, including what type of atrial
fibrillation you have.

Atrial fibrillation also increases your risk of developing a blood clot inside the chambers of the heart. If the clot breaks off, it could cause a stroke. To reduce this risk, you may need to take a medicine such as warfarin.

For more information on atrial fibrillation and on all the different types of treatments for it, see our booklet *Atrial fibrillation*.

**Ventricular arrhythmias**

Ventricular arrhythmias are fast, abnormal heart rhythms that start from the ventricles.

Most ventricular arrhythmias are caused by underlying heart disease, and can often be life-threatening.

The two main types of ventricular arrhythmias are ventricular tachycardia (VT) and ventricular fibrillation (VF). If you have, or if your doctor thinks you may have had, an episode of VT or VF, he or she should refer you urgently to a cardiologist.

**Ventricular tachycardia (VT)**

People with VT usually feel very unwell. Symptoms include having palpitations, dizziness, breathlessness and sometimes chest pain. It can also cause sweating, nausea or collapsing.
An episode of VT can start and stop suddenly and may last for just a few seconds or minutes, or it may continue for longer. Some episodes do stop on their own.

For VT which doesn’t stop on its own, the person needs to be treated very quickly. VT can cause the blood pressure to fall dangerously low, and the person can go into cardiac arrest (see page 31).

**What causes it?**

VT usually happens when someone has some underlying heart disease, such as a cardiomyopathy, or damage to the heart muscle caused by a heart attack.

Less commonly, VT can happen in people who haven’t got damage to their heart muscle, but who are at risk of developing ventricular arrhythmias. This is usually because they have inherited certain genes. This is what can happen in people with **Long QT syndrome** or **Brugada syndrome**. For more information, see our booklet *Inherited heart conditions: Sudden arrhythmic death syndrome*.

**Treatment**

The treatment for VT aims to stop the VT, both to reduce the person’s symptoms and to prevent the VT causing a cardiac arrest (see page 31).
If you are very unwell, immediate treatment usually includes intravenous (through a vein) anti-arrhythmic medicines, or electrical cardioversion, or both.

In the longer term, treatment can include anti-arrhythmic medicines, or possibly catheter ablation treatment. You may need to have an implantable cardioverter defibrillator (ICD) fitted, depending on what caused the VT and the underlying condition of your heart.

For more information about all these treatments, see pages 33 to 40.

**Ventricular fibrillation (VF)**

Ventricular fibrillation – or VF for short – is a fast heart rhythm which causes your heart to ‘fibrillate’, or quiver, instead of pumping blood around your body. This is a cardiac arrest.

**What causes it?**

The most common cause of VF is a heart attack. Most people who get VF have it either during or just after a heart attack. Other possible causes of VF are the same as those for VT given on page 30.

**Treatment**

A cardiac arrest is a medical emergency. Without
treatment the person will die within minutes. It is sometimes possible to shock the heart back into a normal rhythm using a defibrillator. See page 51 for more on this.

To find out what to do if someone has collapsed and is not responding and may be in cardiac arrest, see page 53.

For information on Heartstart, a course in emergency life-support skills, see page 58.
Treatments for fast heart rhythms

Some fast heart rhythms don’t need any treatment, but some do. This section gives information about the treatments used for SVTs (including atrial flutter), and for ventricular tachycardia (VT) and ventricular fibrillation (VF). You may need to have one or more of these treatments, depending on the type of arrhythmia you have.

Medicines

Medicines are used in three main ways:

- **to stop an arrhythmia** (this is called rhythm control or chemical cardioversion)
- **to prevent an arrhythmia**, and
- **to control the rate of an arrhythmia** (rate control).

Medicines to prevent arrhythmias and to control the rate of arrhythmias are usually taken as tablets. Medicines to stop arrhythmias are usually given intravenously (through a vein).

Pill in the pocket

Most people who take medicines to prevent arrhythmias have to take their medicine every day. However, if you
only very rarely have an arrhythmia, your doctor may give you a prescription for a particular dose of one or more medicines which you take if you ever get the arrhythmia again. This is to try to stop the abnormal rhythm and convert it back to normal. This is sometimes called the **pill in the pocket**. You should only use this method if your doctor has advised you to and has given you a prescription for it.

## How to help stop SVTs

The **Valsalva manoeuvre** is a technique that can sometimes help to stop an SVT. It stimulates the vagus nerve – a nerve that is responsible for slowing the heart rate normally. If you occasionally get SVTs, your doctor or nurse may show you how to use the technique whenever you have an episode of a fast heart rhythm. It involves taking a deep breath and pushing down into your abdomen as if you were constipated.

**Sucking ice-cubes** or **splashing your face with ice-cold water** can also sometimes help to stop an SVT.
Cardioversion

Also known as **electrical cardioversion**.

Cardioversion can be a successful treatment for various types of tachycardias, particularly **atrial fibrillation** and **atrial flutter**. In certain circumstances it can also be performed in an emergency for a person with VT.

**What happens?**

First, you will be given a short-acting general anaesthetic or heavy sedation. This will make you sleep through the whole procedure.

Electrodes, attached to large sticky pads, are put on your chest. A doctor or specialist nurse then applies one or more controlled electrical shocks to the chest wall, using a defibrillator machine. The aim of this is to change your heart rhythm back into a normal rhythm. The procedure does not usually cause any side effects.

Cardioversion doesn’t always stop the abnormal rhythm. Sometimes it is successful to start with, but the fast heart rhythm may come back again within hours, weeks or months after cardioversion.

If an arrhythmia does come back again, your cardiologist may decide to repeat the cardioversion. Or, he or she may consider giving you other treatment.
Catheter ablation

This treatment may be used if you get repeated episodes of abnormal fast heart rhythms and your medicine has not had much effect on them. It may also be used if, for some reason, you can’t take the medicine.

Catheter ablation can only be done if you first have an EP study (see page 22), so the ablation is often done in the same session as the EP study.

Catheter ablation is widely used in the UK now, but it can only be done in specialist units, and for certain types of fast heart rhythms.

What happens?

You will be asked not to eat or drink anything for a few hours before the procedure.

Most people need only a local anaesthetic and sedation when they have this treatment. The procedure for inserting the catheter is the same as for an EP study, as described on page 22.

At the end of the catheter there are small electrodes that detect which parts of the heart tissue are causing unwanted electrical impulses. Radio-frequency energy can be used to destroy particular areas of heart tissue to prevent the abnormal heart rhythms from happening.
and to restore a normal rhythm.

While you are having the catheter ablation, you may feel like you are having palpitations, and the procedure can make some people feel a bit dizzy. When the catheters are inserted, you may feel a sensation in your chest, but this should not be painful. The team of staff will be monitoring you and reassuring you.

A catheter ablation treatment can take between one and four hours. But it can take longer to do some types of catheter ablation.

Afterwards, the catheters are taken out. You will need to rest for a few hours. How long you need to rest for will depend on how your puncture wound (where the catheters were inserted) is, and how much sedation you have had. The nursing staff will let you know about this.

**How successful is it?**

Catheter ablation is a very successful treatment for certain types of fast heart rhythms, and has a relatively low risk of complications. The success rate depends on which type of arrhythmia you have, where the extra electrical pathways are, and how many you have. (Some people need more than one ablation.) For example, ablations for certain SVTs, such as those due to Wolff-Parkinson-White syndrome, have proved
Some people who have catheter ablation treatment may not be completely cured, but may have fewer and shorter episodes of arrhythmias after the treatment.

Possible complications

Having a catheter ablation does involve some risks. Major complications are rare but the risks should all be explained to you before you agree to have the treatment.

The risks are higher when catheter ablation is used to treat certain types of supraventricular tachycardias, because the treatment involves destroying some of the electrical pathways very near or within the AV node (see the illustration on page 9). Your cardiologist will be able to discuss with you how high this risk is in your particular case. In some cases like this, a pacemaker may need to be fitted. (See page 47 for more on pacemakers.)

Another possible complication is that there can be bleeding from the vein in the groin where the catheters were put in, leaving a haematoma (where blood collects under the skin). This can feel uncomfortable and can cause bruising.

Arrhythmias often happen during the treatment. These can help to detect the areas of the heart that need
ablation, but sometimes the person needs to have treatment to stop an arrhythmia during the procedure.

Also, having a catheter ablation does mean that you are exposed to some radiation. For more on this, see our booklet *Tests for heart conditions*.

**ICD (implantable cardioverter defibrillator)**

An ICD may be used for people who have had, or are at risk of having, *ventricular tachycardia* (VT) or *ventricular fibrillation* (VF).

**What is it?**

An ICD is a device that is usually put under the skin in your chest, and has leads into your heart. It is similar to a pacemaker, but a bit bigger.

If you have an episode of VT or VF, the ICD can deliver a small electrical shock direct to your heart, to get it back into a normal rhythm. An ICD can also be combined into one device with a pacemaker, if a pacemaker is also needed (see page 47).

For more information about ICDs, see our booklet *Implantable cardioverter defibrillators (ICDs)*.
CASE STUDY - Matt Rylatt, aged 55

Matt Rylatt was diagnosed with Wolff-Parkinson-White syndrome but after successful treatment with ablation therapy he is no longer restricted by his symptoms.

“As a teenager I used to play a lot of football, and simply bumping into another player on the pitch would trigger an episode of palpitations. The episodes were a nuisance and became more frequent as I got older.

In my early 30s I was eventually diagnosed with Wolff-Parkinson-White syndrome. I was started on medicines that helped control my symptoms but they didn’t completely disappear.

My cardiologist suggested I had a procedure called catheter ablation, and I can honestly say it was the best thing I have ever done. It has completely changed my life.

Since the ablation I haven’t had one single episode of palpitations. I’ve been able to enjoy sports without any restrictions and have even represented Great Britain for my age group in a number of swimming, cycling and running events.”
Heart blocks and slow heart rhythms

Most heart blocks are when the electrical impulses sent by the atria to the ventricles are delayed or are blocked. This does not cause the heart to stop beating altogether, and rarely causes symptoms. Some heart blocks can cause a bradycardia (a slow heart rhythm), but others don’t.

On the next pages, we describe the following types of heart rhythms:

- AV heart blocks
- bundle branch blocks, and
- tachybrady syndrome.

Tests

The main way to diagnose a heart block is by having an ECG (see page 20). Different patterns on the ECG indicate different types of heart block.

AV heart blocks

Also called atrioventricular heart blocks.

An AV heart block is where there is a delay or block in the electrical impulses travelling between the atria and the ventricles.
There are different ‘degrees’ of AV heart block – first degree, second degree and third degree. First-degree AV heart block doesn’t cause symptoms and doesn’t need treatment. But the symptoms of some second-degree and third-degree AV heart blocks can be serious, and include episodes of collapsing. This is sometimes called a Stokes-Adams attack. Other symptoms are feeling dizzy, extremely tired, confused or breathless, and fluid retention (when there is too much fluid in the body).

In some people, these heart blocks are always there, while in others they are paroxysmal (which means that they come and go). Some heart blocks may develop into higher degree AV heart blocks if they are left untreated.

**What causes them?**
The possible causes of AV heart blocks include:

- coronary heart disease, including a heart attack
- cardiomyopathy
- congenital heart disease
- ageing of the electrical pathways in the heart
- electrolyte imbalances, and
- some medicines.

**Treatment**
If you do need to have treatment, the type of treatment
will depend on your heart rate and symptoms, and on what has caused the heart block.

People who have a second-degree or third-degree AV heart block with a very slow heart rate – either with or without symptoms – will usually need to have a permanent pacemaker implanted. Young people who have congenital heart disease may have a second-degree or third-degree AV heart block but often don’t have a slow heart rate. If they don’t have any symptoms from this, their condition may be stable and they may not need a pacemaker.

If you have a second-degree or third-degree AV heart block that was caused by a heart attack, you may need only a temporary pacemaker. If the normal rhythm hasn’t recovered a few weeks after your heart attack, you may need to have a permanent pacemaker fitted.

For more information on pacemakers, see page 47, or our booklet *Pacemakers*.

**Bundle branch blocks**

A bundle branch block is when the electrical impulses travel through the ventricles more slowly than normal, due to a block in the electrical pathway. This delay does not cause symptoms.
There are two types of bundle branch blocks. These are called **left** and **right bundle branch blocks**. The blockages can be seen as a particular pattern on an ECG.

**What causes them?**
Right bundle branch block (RBBB) can happen naturally in people with a normal heart and with no heart disease. Other causes of right bundle branch block include coronary heart disease, or a problem with the structure of the heart such as a hole in the heart, and some lung conditions.

Left bundle branch block (LBBB) usually means that there is some underlying heart disease such as:

- coronary heart disease (including a heart attack)
- cardiomyopathy
- thickening of the heart muscle (left ventricular hypertrophy) which can be caused by high blood pressure or aortic stenosis (narrowing around the aortic valve), or
- wearing and ageing of the electrical pathway.

**Treatment**
A bundle branch block itself doesn’t need treatment, but it could be a sign of an underlying condition, which you may need to have treatment for.
Tachybrady syndrome

Sick sinus syndrome

Tachybrady syndrome is one type of sick sinus syndrome.

Sick sinus syndrome is the name given to several conditions in which there is a problem with the heart’s natural pacemaker – the sinus node – and it doesn’t work properly. The sinus node is a group of cells in the right atrium of the heart which produce electrical impulses that spread throughout the heart and make it beat. (See the diagram on page 9.)

When the sinus node does not work properly, it can cause the heartbeat to become too fast or too slow, even while you are resting. It can also cause the heart rate to alternate between fast and slow rhythms. This is known as tachybrady syndrome. (‘Tachy’ means fast, and ‘brady’ means slow.) An example of this is when atrial flutter (a fast heart rhythm) alternates with a slow heart rhythm. There may also be sudden pauses in the electrical activity of the heart, which can lead to symptoms such as collapsing.

What causes it?

Tachybrady syndrome is most commonly seen in older
people, and the most likely cause is ageing of the electrical conduction system in the heart. Other causes include coronary heart disease – for example, after a heart attack – and some medicines.

**Treatment**
People with tachybrady syndrome may need a combination of **medicines** to control their fast heart rhythms. They may also need to have a **pacemaker** fitted to prevent pauses in the heart rhythm and slow heart rhythms. See the next page for information on pacemakers.
Treatments for heart blocks and slow heart rhythms

Some heart blocks and slow heart rhythms don’t need any treatment, but some do. This section gives information about the treatments used for AV heart blocks and tachybrady syndrome – medicines and a pacemaker. You may need to have one or both of these treatments, depending on your condition.

Medicines

Your cardiologist will review the medicines that you are taking, to make sure that they are not causing or contributing to a heart block or slow heart rhythm.

If you have a very slow heart rhythm and are unwell, the doctors may give you intravenous medicines (medicines given through a vein) to speed your heart up temporarily.

Pacemakers

A pacemaker is a common treatment for people who get heart block, particularly for those who get symptoms such as collapsing. And they are occasionally used for people who have both fast and slow heart rhythms due to tachybrady syndrome.
Occasionally, people who are having a catheter ablation procedure may need to have a pacemaker fitted.

Pacemakers are also sometimes used for controlling fast heart rhythms such as atrial fibrillation. For more on this, see our booklet *Atrial fibrillation*.

**What is a pacemaker?**

A pacemaker is a small device with two parts – the pacemaker box which contains a battery and electrical circuit, and one or more electrode leads. The pacemaker box is put under the skin on your chest. The leads go from the pacemaker box, through a vein in your chest, into your heart. The pacemaker sends out electrical impulses into the heart muscle to help it beat at a normal rate.

For more information on both permanent and temporary pacemakers, see our booklet *Pacemakers*. 
What to do if you think you or someone else is having a heart attack

A heart attack is when a part of the heart muscle suddenly loses its blood supply. This is usually due to coronary heart disease.

Heart attack? Know these symptoms

- Pain or discomfort in the chest that doesn’t go away.
- The pain may spread to the left or right arm …
- … or may spread to the neck and jaw.
- You may feel sick or short of breath.
What to do if you think someone is having a heart attack

1. Send someone to call 999 for an ambulance immediately.

2. If you are alone, go and call 999 immediately and then come straight back to the person.

3. Get the person to sit in a comfortable position, stay with them and keep them calm.

4. If the person is not allergic to aspirin, give them an adult aspirin tablet (300mg) to chew if there is one easily available. If you don’t have an aspirin next to you, or if you don’t know if the person is allergic to aspirin, just get him or her to stay resting until the ambulance arrives.
What’s the difference between a heart attack and a cardiac arrest?

A **heart attack** is when one of the coronary arteries supplying blood to the heart muscle becomes blocked. If this happens, the affected part of the heart muscle will begin to die because it is not getting oxygen.

A **cardiac arrest** is when a person’s heart stops pumping blood round their body and they stop breathing normally.

Many cardiac arrests in adults happen because the person is having a heart attack. A person who is having a heart attack may develop a dangerously fast heart rhythm which can cause a cardiac arrest and be fatal.

If someone has a cardiac arrest, it is sometimes possible to shock the heart back into a normal heart rhythm by giving the heart an electrical shock using a defibrillator. Defibrillation needs to happen very quickly. A cardiac arrest is the most serious medical emergency. For every minute that a person is in cardiac arrest before defibrillation, their chances of survival are reduced by about 10%.

All frontline ambulance staff are trained in resuscitation, and all emergency ambulances, cars and bikes carry a defibrillator. Ambulance services also have community
first responders. These are local volunteers who are specially trained in life-saving skills and in how to use a defibrillator. These people can often get to a scene more quickly than an ambulance. They work alongside the core ambulance staff.

Buying time before defibrillation by doing CPR (cardiopulmonary resuscitation) can double someone’s chance of survival. CPR involves giving chest compressions and rescue breaths. (We explain how to do this on page 56.)
What to do if someone has collapsed and is not responding, and may be in cardiac arrest

Think DRS, ABC.

**D** = Danger
Check for danger. Approach with care, making sure that you, the person and anybody nearby are safe.

**R** = Response
Check for response. To find out if the person is conscious, gently shake him or her, and shout loudly, ‘Are you all right?’

**S** = Shout
If there is no response, shout for help.

You will need to assess the person and take suitable action. Now, remember ABC – airway, breathing, CPR.
A = Airway
Open the person’s airway by tilting their head back and lifting their chin.

B = Breathing
Look, listen and feel for signs of normal breathing. Only do this for up to 10 seconds. Don’t confuse gasps with normal breathing. If you’re not sure if their breathing is normal, act as if it is not normal.

C = CPR
If the person is unconscious and is not breathing normally, they are in cardiac arrest.

Call 999 immediately.
• Send someone else to call 999 for an ambulance while you start CPR.
• Or, if you are alone with the person, call 999 before you start CPR.
If you have not been trained to do CPR, or if you’re not able, or not willing, to give rescue breaths, give chest compressions only. This is described in step 1 on the next page. Keep doing the chest compressions – at a rate of about 100 to 120 times a minute – until:

- the ambulance crew arrives and takes over, or
- the person starts to show signs of regaining consciousness, such as coughing, opening their eyes, speaking, or moving purposefully and starts to breathe normally, or
- you become exhausted.
Start CPR

1  Chest compressions

Start chest compressions.

Place the heel of one hand in the centre of the person’s chest. Place the heel of your other hand on top of your first hand and interlock your fingers. Press down firmly and smoothly on the chest 30 times, so that the chest is pressed down between 5 and 6 centimetres each time. Do this at a rate of about 100 to 120 times a minute – that’s about two each second.

2  Rescue breaths

After 30 compressions, open the airway again by tilting the head back and lifting the chin, and give two rescue breaths to the person.

To do this, pinch the soft parts of the person’s nose
closed. Take a normal breath, make a seal around their mouth with your mouth, and then breathe out steadily. The person’s chest should rise and fall with each breath. It should take no more than 5 seconds to give the two rescue breaths.

Then give another 30 chest compressions and then 2 rescue breaths.

3 Continue CPR
Keep doing the 30 chest compressions followed by 2 rescue breaths until:

- the ambulance crew arrives and takes over, or
- the person starts to show signs of regaining consciousness, such as coughing, opening their eyes, speaking, or moving purposefully and starts to breathe normally, or
- you become exhausted.
Emergency life-support skills

For information about a free, two-hour course in emergency life-support skills, contact Heartstart at the British Heart Foundation (see page 60 for contact details). The course teaches you how to:

- recognise someone who may be having a heart attack
- deal with someone who is choking
- deal with someone who is bleeding seriously
- deal with someone who is unconscious but breathing normally, and
- do cardiopulmonary resuscitation (CPR), if someone has a cardiac arrest.
How your support can help

Over recent decades, research funded by the BHF has contributed to some of the greatest breakthroughs in heart science. For example, BHF Professor Robert Anderson studied how electrical conduction worked in the heart. He discovered that a fast heart rhythm was caused by an abnormality in the heart’s electrical conduction system, where extra tissue caused a short circuit. BHF-funded researchers looked into the possibility of removing this tissue through a procedure called catheter ablation – a technique that is now widely used in the UK.

More and more people are now surviving to live with the often debilitating consequences of heart disease, in particular heart failure. Fortunately, we can treat heart failure, but we can’t cure it because the heart can’t repair itself. The next big challenge is to discover how to help the heart repair itself, so that heart failure can be cured rather than treated. Visit the Research pages on our website bhf.org.uk to see how your support can make a difference.
For more information

**British Heart Foundation website**
bhf.org.uk
For up-to-date information on heart disease, the BHF and its services.

**Heart Helpline**
0300 330 3311 (a similar cost to 01 and 02 numbers)
For information and support on anything heart-related.

**Genetic Information Service**
0300 456 8383 (a similar cost to 01 and 02 numbers)
For information and support on inherited heart conditions.

**Booklets and DVDs**
To order our booklets or DVDs:
- call the BHF Orderline on 0870 600 6566, or
- email orderline@bhf.org.uk or
- visit bhf.org.uk/publications

You can also download many of our publications from our website. For a list of resources available from the BHF, ask for a copy of *Our heart health catalogue*. Our booklets are free of charge, but we would welcome a donation. (See page 2 for how to make a donation.)
Heart Information Series

This booklet is one of the booklets in the *Heart Information Series*. The other titles in the series are as follows.

Angina
Atrial fibrillation
Blood pressure
Cardiac rehabilitation
Caring for someone with a heart condition
Coronary angioplasty
Diabetes and your heart
Having heart surgery
Heart attack
Heart rhythms
Heart transplantation
Heart valve disease
Implantable cardioverter defibrillators (ICDs)
Keep your heart healthy
Living with heart failure
Medicines for your heart
Pacemakers
Peripheral arterial disease
Physical activity and your heart
Primary angioplasty for a heart attack
Reducing your blood cholesterol
Returning to work with a heart condition
Tests for heart conditions
Heart Matters

Heart Matters is the BHF’s free, personalised service to help you live with a healthy heart. Join today and enjoy the benefits, including *heart matters* magazine, a Heart Helpline and an online members’ area with articles, recipes and lifestyle tips. You can join online at [bhf.org.uk/heartmatters](http://bhf.org.uk/heartmatters) or call **0300 330 3300** (a similar cost to 01 and 02 numbers).
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Have your say

We would welcome your comments to help us produce the best information for you. Why not let us know what you think? Contact us through our website bhf.org.uk/contact. Or, write to us at the address on the back cover.
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Coronary heart disease is the UK’s single biggest killer.

For over 50 years we’ve pioneered research that’s transformed the lives of people living with heart and circulatory conditions. Our work has been central to the discoveries of vital treatments that are changing the fight against heart disease.

But so many people still need our help.

From babies born with life-threatening heart problems to the many Mums, Dads and Grandparents who survive a heart attack and endure the daily battles of heart failure.

Join our fight for every heartbeat in the UK. Every pound raised, minute of your time and donation to our shops will help make a difference to people’s lives.