



British Heart  
Foundation

# Dealing with abnormal

# Heart

# rhythms

*Michelle White*

**FIGHT  
FOR EVERY  
HEARTBEAT**

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## ABOUT THE BRITISH HEART FOUNDATION

As the nation's heart charity, we have been funding cutting-edge research that has made a big difference to people's lives.

But the landscape of cardiovascular disease is changing. More people survive a heart attack than ever before, and that means more people are now living with long-term heart conditions and need our help.

Our research is powered by your support. Every pound raised, every minute of your time and every donation to our shops will help make a difference to people's lives.

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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').

Some people who have an arrhythmia may feel unwell, and being diagnosed with an arrhythmia can cause some anxiety, even if your 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 this booklet but, if you have atrial fibrillation, you will find more information in our booklet **Atrial fibrillation (AF)**.

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 someone 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, an enlarged heart, or heart valve disease.

The symptoms of an arrhythmia will depend on what type of arrhythmia you have, and how it affects the way your heart works. The most common symptoms of an arrhythmia include palpitations (which might feel like a thumping or fluttering sensation in your chest), dizziness, breathlessness, and in some cases collapsing or losing consciousness.

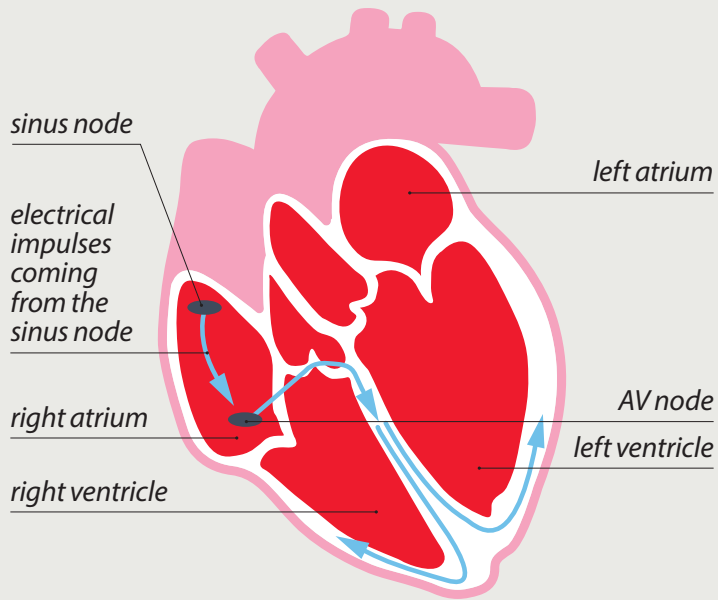
There are many different types of arrhythmias. This booklet describes the most common types.

Your heart is a muscular pump which pumps blood through to your lungs, your brain, and the rest of your body. It has four chambers – two upper ones called the right and left **atria**, and two lower ones called the right and left **ventricles**. See the diagram on the next page.

Your heart's pumping action is controlled by tiny electrical impulses produced by a part of the right atrium called the **sinus node**. The sinus node is sometimes called your heart's 'natural pacemaker'.

These impulses make the atria contract and push blood into the ventricles. The impulses travel to the ventricles through the **AV node** (atrio-ventricular node). This acts like a junction box and is sometimes called the AV junction. When the impulse reaches the ventricles, the ventricles both contract, pushing the blood out of your heart to your lungs, your brain, and the rest of your body. In a normal heart rhythm, each impulse from the sinus node makes the atria and the ventricles contract regularly.

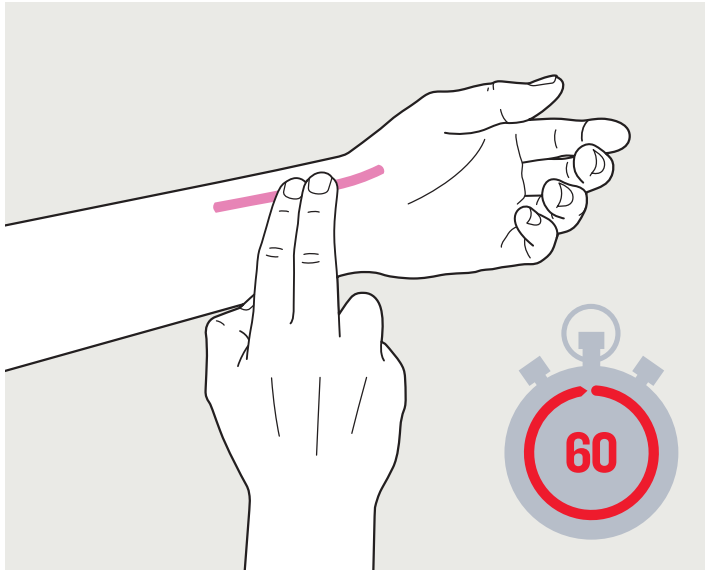
## Normal electrical signals in the heart



While you are resting, your sinus node normally produces between 60 and 100 impulses a minute. It's your heart pumping the blood that produces your **pulse**, which you can feel, for example, at the artery in your wrist. The rate and rhythm of your heart can be measured by taking your pulse. The **rate** is how quickly your heart beats, and the **rhythm** is how regular or irregular the beats are.

## 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**.



# CHECKING YOUR 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.

A normal heart rate is between 60 and 100 beats per minute while you are resting.

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's 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.

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's called **sinus bradycardia**. If the sinus rhythm is faster than 100 bpm, it's called **sinus tachycardia**.

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 50).

## Treatment

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

## Sinus tachycardia

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

Sometimes a sinus tachycardia is a sign of an underlying condition such as an overactive thyroid gland (thyrotoxicosis) or severe anaemia. Or it may be because you are dehydrated, or 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 is rarely needed. However, if an underlying condition is causing the sinus tachycardia, you may need to have treatment.



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## **PALPITATIONS**

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The term 'palpitations' is often used to describe the sensation of feeling your own heart beating. Some people say palpitations feel like:

- a fluttering in their chest, or
- their heart pounding, or
- 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.

If you're concerned about palpitations, make an appointment to see your doctor. They may arrange for you to have an **ECG**. You may also need a **24-hour ECG recording**. We describe these tests on page 19.

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**Palpitations are common,  
and many people will  
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in their lives.**

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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.

An ectopic beat happens when cells other than the sinus node release an electrical discharge, causing an 'extra' or early heartbeat. There is often a pause after the extra beat, giving the sensation of a 'missed' beat. Ectopic beats can happen in patterns – for example, there may be one before every other normal heartbeat, or three ectopic beats in a row.

Most people have ectopic beats at some time in their lives, and most are unaware of having them, or may have them while asleep. Some people have them often, but don't have any symptoms, while others may have very few but have symptoms such as palpitations.

Most people who get ectopic beats have nothing to worry about. People of all ages can get them, 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 some more tests (see page 19).

If you have no underlying heart condition, and your doctor tells you that the ectopic beats are harmless, it's unlikely you'll need to have any more tests or treatment.

### **What are the symptoms of an arrhythmia?**

Symptoms can include palpitations (see page 14), dizziness, breathlessness, and in some 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 26 to 51. These include:

- **fast heart rhythms** – called **tachycardias**, and
- **heart blocks** and **slow heart rhythms** – called **bradycardias**.

### **Tests and treatment**

On the next page we describe the different **tests** that are used to diagnose arrhythmias. On pages 36 and 52 we explain the **treatments** you might have if you are diagnosed with an arrhythmia.

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

### **ECG**

This is also called an **electrocardiogram**.

An ECG records the electrical activity of your heart. It can show an arrhythmia, but only if it is happening at the time of the ECG. Sometimes an ECG can show features that 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. If you ever go to an emergency department with an arrhythmia, take the copy of your ECG with you.

### 24-hour ECG recording

This is 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 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

This is also called an **exercise tolerance test** or **ETT**.

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

Sometimes underlying heart conditions can cause arrhythmias. An exercise ECG monitors your heart while you're exercising and when your heart is working under increased pressure.

### Cardiac event recorders

If you have symptoms that don't happen frequently, you may be given a small electrical recording device to keep with you, so you can record your heart's rate and rhythm at particular times. The hospital staff will tell you how to record any irregular rhythm that you feel, and how to send the recording to them.

### Cardiac memory device

A cardiac memory device is a type of cardiac event recorder. When you feel an irregular heart rhythm, you hold the device to your chest to make a recording. You then transmit the recording to your hospital by placing the device next to the mouthpiece of your phone.

### Implantable loop recorder

An implantable loop recorder is a small, slim device – about the size of a packet of chewing gum or a computer memory stick – which is implanted under the skin. (Some newer devices are even smaller than this.) You activate the device when you feel the abnormal rhythm. The hospital staff will show you how to do this.

## Electrophysiological studies

This is also called an **EP study**, **EPS** or **electrophysiological testing**.

An EP study aims to 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 26).

If you need an EP study, your doctor will refer you to a cardiac electrophysiologist. This is a doctor 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, they may do a **catheter ablation** treatment at the same time as they do the test. We describe this treatment on page 39.

There are some risks involved in an EP study. For more on this, see *Possible complications* on page 42.

## Echocardiogram

This is 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 19 to 23, see our booklet **Tests**.

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# GLENN'S STORY

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Glenn, now 68, had a heart attack in 1999. Following treatment, it was found that he had frequent ventricular ectopics and episodes of ventricular tachycardia.

“At first, they thought I had vertigo, but after wearing a 24-hour ECG monitor, they found I had an abnormal heart rhythm. I was referred for an ablation at my local hospital. They attempted the procedure in 2011 and 2012, but unfortunately they both failed. I was eventually referred to the John Radcliffe Hospital in Oxford, and finally on the fourth attempt they managed to significantly reduce my abnormal heart rhythms, which was tremendous!

My advice to someone with these problems is to not lose heart – if you have an unsuccessful ablation then try again. Persistence definitely paid off for me. I now have heart failure, but the ablation gave me a much better quality of life and more energy to do things, and I feel better in myself. I'm really glad I kept trying.”

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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 below.

Other fast heart rhythms come from within the ventricles, and are called **ventricular arrhythmias**. We describe these on pages 32 to 35.

It's important to understand that these fast heart rhythms are different to the faster heart rhythm (sinus tachycardia) that everyone will experience, for example, while doing intense exercise.

### **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. They can occur in very young people with no other health issues.

SVT often comes on suddenly, with no obvious cause. Symptoms can often be relieved by using the Valsalva manoeuvre (see page 37).

### **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 their heart beat very fast. In most cases, there are no other heart problems.

In 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 bypasses the normal route. This means that the electrical impulse can travel extremely

quickly from the atria to the ventricles. 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 36 to 43.

### Atrial fibrillation (AF)

Atrial fibrillation – or AF for short – is an irregular and sometimes fast abnormal heart rhythm that starts in the atria. It is the most common type of arrhythmia. In the UK, more than 1 million people have AF.

#### What causes AF?

AF happens when electrical impulses in the atria fire in an uncoordinated way.

### Treatment

People usually need treatment to try and control their AF. What type of treatment you need will depend on several factors, including what type of AF you have, the symptoms you're having, and your overall health.

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 anticoagulant medicines to help prevent blood clots from forming.

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

### Atrial flutter

Atrial flutter is a type of heart rhythm that starts in the atria. It is usually fast and happens when electrical impulses circulate very rapidly around the atria. The atria often beat in a regular rhythm at a rate of 300 beats a minute. 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 AF, which we described on page 28).

Some people have both atrial flutter and AF.

### What causes atrial flutter?

People who have atrial flutter usually have an underlying heart condition. 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.

For more information about these treatments, see page 36.

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 an anticoagulant medicine such as warfarin.

### 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 not clear what causes inappropriate sinus tachycardia, but it is thought that it happens because of an abnormality with the sinus node.

### 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 symptoms, but with varying results (see page 39).

If an underlying condition is causing the arrhythmia, you may need to have treatment for that condition.

### **Ventricular arrhythmias**

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

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

The two main types of ventricular arrhythmias are ventricular tachycardia (VT) and ventricular fibrillation (VF). These are extremely fast, life-threatening arrhythmias. If you have, or if your doctor thinks you may have had, an episode of VT or VF, they 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 56).

### **What causes it?**

VT usually happens when someone has an underlying heart condition, 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 on these, see our booklet *Life with Inherited Abnormal Heart Rhythms*.

### Treatment

The treatment for VT aims to stop the VT, both to reduce the person's symptoms and to prevent a cardiac arrest.

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 36 to 44.

### Ventricular fibrillation (VF)

Ventricular fibrillation – or VF for short – is an extremely fast, life-threatening 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 33.

### 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 56 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 58.



For information on Heartstart, a course in emergency life saving skills, see page 66.

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)
- 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 while it is happening
- to prevent an arrhythmia, or
- to control the rate of an arrhythmia (rate control).

### 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 medicine to 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

This is also known as **electrical cardioversion**. Cardioversion can be a successful treatment for various types of tachycardias, particularly **AF** 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 doctor may decide to repeat the cardioversion. Or, they 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.

### 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.

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# Catheter ablation is a very successful treatment for certain types of fast heart rhythms.

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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 catheter is 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 usually takes between one and four hours, depending on the type of arrhythmia you have, but it can take longer.

Afterwards, the catheter is 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 catheter was inserted) is, and how much sedation you have had.

## 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. For example, ablations for certain SVTs,

Wolff-Parkinson-White syndrome and atrial flutter have proved very successful.

Some people who have catheter ablation treatment may not be completely cured, but may have fewer and shorter episodes of arrhythmias after the treatment.

Ablations for AF can be complex and may require more than one attempt. Your doctor will discuss the chances of success and any possible complications with you before you have the procedure.

### 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 06). Your doctor will

be able to discuss with you how high this risk is in your particular case. In some cases like this, a pacemaker may be needed. (See page 52 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*.

### **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 implanted just under your collarbone, and has leads into your heart. If you have an episode of VT or VF, the ICD can deliver an electrical shock directly to your heart, to try and 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 52).

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**Finding out more  
about your arrhythmia  
can help you improve  
your quality of life.**

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For more information about ICDs, see our booklet **Implantable cardioverter defibrillators (ICDs)**.



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 19). Different patterns on the ECG indicate different types of heart block.

### AV heart blocks

These are also called **atrio-ventricular 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. Other symptoms can include dizziness, feeling light-headed, lethargy, confusion and sometimes breathlessness.

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

The type of treatment you have will depend on your heart rate and symptoms, and 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 52, or our booklet *Living with a pacemaker*.

## 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 an underlying heart condition 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

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.

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 doctor 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. They are occasionally used for people who have both fast and slow heart rhythms due to tachybrady syndrome.

Some people who are having a catheter ablation procedure may need to have a pacemaker fitted.

Pacemakers are also sometimes used for conditions such as AF. For more on this, see our booklet *Atrial fibrillation (AF)*.

### 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 implanted just under your collarbone. 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 **Living with a pacemaker**.

---

# MICHELLE'S STORY

---

"My heart problems started in 2002 when I was 25 and I collapsed at work. The doctor explained to me that my mitral valve was not fully developed, so for years my heart had been pumping harder to compensate for the defect, and my heart was enlarged.

I felt like my whole world was crushed. Looking back, there were loads of tell-tale signs. I was very athletic at school, but after any race I felt as if my heart was coming out of my mouth. I never thought there was a problem with my heart though.

I had a loop recorder device fitted, to find out if I had any heart rhythm problems. It showed that my heart was slowing down or even stopped and then kicked back in. I had a pacemaker fitted in 2006.

The way I look at it, it happened and I'm still here. I've been given a second chance and I want to make the most of it. I feel as if a new chapter in my story has begun."

---



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

A person who is having a cardiac arrest may develop a dangerously fast heart rhythm which can be fatal. It is sometimes possible to shock the heart back into a normal heart rhythm by giving **defibrillation**. This means giving the heart an electrical shock using a defibrillator.

There are now **public access defibrillators** – or **PADs** for short – in many workplaces, shopping centres, train stations, leisure centres and village halls. It's very easy to use a PAD. The machine gives clear, spoken instructions and you don't need training to use one.

Once attached to a person in cardiac arrest, the PAD will instruct you whether or not a shock is needed and how to deliver it.

Find out where the PADs in your local area are. For more information, go to [bhf.org.uk/defibs](https://www.bhf.org.uk/defibs)

The most important thing you can do to help save a person's life is **CPR – cardiopulmonary resuscitation**. This, along with defibrillation, can double someone's chance of survival in some cases. We explain how to do this on the next pages.

---

# CALL PUSH RESCUE

---

If someone has had a cardiac arrest, they will be unconscious, and either not breathing or not breathing normally. The person needs immediate help or they will die within minutes.

**First** check that it is safe to approach the person.

To find out if the person is conscious, gently shake him or her, and shout loudly, 'Are you all right?' If there is no response, the person is unconscious.

You will need to assess the person's **airway** and **breathing**.

Open the person's airway by tilting their head back and lifting their chin.



Look, listen and feel for signs of normal breathing. Only do this for up to ten 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.

Now remember: **Call Push Rescue**

---

# CALL...

---

**Call for help.**

If the person is unconscious and is either not breathing or 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.**



---

# PUSH...

**Push hard and fast on the centre of the chest.**

---



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

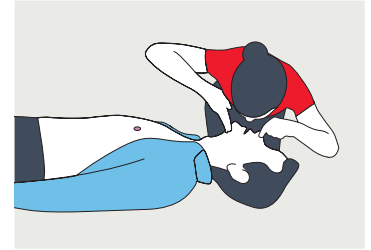
that the chest is pressed down between five and six centimetres each time. Do this at a rate of about 100 to 120 times a minute. That's about two each second.

---

# RESCUE...

**Give rescue breaths.**

---



After 30 compressions, open the airway again by tilting the head back and lifting the chin, and give two of your own breaths to the person. These are called rescue breaths.

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 five seconds to give the two rescue breaths.

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

Keep doing the 30 chest compressions followed by two 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.

### **If you prefer not to give rescue breaths**

If you'd rather not give rescue breaths, call 999 and then deliver **hands-only CPR**. Keep doing the chest compressions – at a rate of about 100 to 120 times a minute.

For more on this, see [bhf.org.uk/handsonly](https://www.bhf.org.uk/handsonly)



For more information about training in how to do CPR, see page 66.

## **FOR MORE INFORMATION**

### **British Heart Foundation website**

[bhf.org.uk](https://www.bhf.org.uk)

For up-to-date information on cardiovascular disease, the BHF and its services.

### **Genetic Information Service**

**0300 456 8383**

(A similar cost to 01 or 02 numbers.)

For information and support on inherited heart conditions.

### **Online community**

[community.bhf.org.uk](https://community.bhf.org.uk)

Share your experiences, stories, tips and ideas with other people like you in our online community.

### **Heart Helpline**

**0300 330 3311**

(A similar cost to 01 or 02 numbers.)

For information and support about your heart condition and keeping your heart healthy.

### **Twitter**

[@TheBHF](https://twitter.com/TheBHF)

Get our latest news and views directly into your Twitter feed.

### **Facebook**

[facebook.com/bhf](https://facebook.com/bhf)

Join the conversation and get our latest news and updates on Facebook.

## Booklets and DVDs

### To order our booklets or DVDs:

- call the BHF Orderline on **0300 200 2222**
- email [orderline@bhf.org.uk](mailto:orderline@bhf.org.uk) or
- visit [bhf.org.uk/publications](http://bhf.org.uk/publications)

You can also download many of our publications from our website.

Our resources and services are free of charge, but we rely on donations to continue our vital work. If you'd like to make a donation, please call our donation hotline on **0300 330 3322** or visit our website at [bhf.org.uk/donate](http://bhf.org.uk/donate)

## Heart Information Series

This booklet is part of the *Heart Information Series*. The booklets in this series are:

- Angina
- Atrial fibrillation (AF)
- Blood pressure
- Cardiac rehabilitation
- Caring for someone with a heart condition
- Coronary angioplasty
- Diabetes and your heart
- Heart attack
- Heart failure
- Heart rhythms
- Heart surgery
- Heart transplant
- Heart valve disease
- Implantable cardioverter defibrillators (ICDs)
- Keep your heart healthy
- Living with a pacemaker
- Medicines for my heart
- Peripheral arterial disease
- Reducing your blood cholesterol
- Returning to work
- Tests

## Our services

For more information about any of our services, contact the BHF on **0300 330 3322** or visit **bhf.org.uk**

## Nation of life savers

The BHF has a vision to create a nation of life savers. As part of that vision, we're doing everything we can to make sure the UK public know CPR and can use public access defibrillators. Join the fight for every heartbeat and help us save the lives of thousands of people across the UK every year. Find out more at **bhf.org.uk/cpr**

- **Heartstart** is a free, two-hour course where you can learn CPR and other emergency life saving skills.
- Our **Call Push Rescue Training Kit** is available free to eligible secondary schools, and for a small fee to workplaces and community groups. It has everything you need to learn CPR, including a training DVD.

## Heart Matters

Heart Matters is the BHF's free, personalised service offering information to help you lead a heart-healthy

lifestyle. Join today and enjoy the benefits, including *Heart Matters* magazine and access to online tools. Call the **Heart Matters Helpline** on **0300 330 3300**, or join online at **bhf.org.uk/heartmatters**

## Heart Support Groups

Local Heart Support Groups give you the chance to talk about your own experience with other heart patients and their carers. They may also include exercise classes, talks by guest speakers, and social get-togethers. To find out if there is a Heart Support Group in your area, contact the **Heart Helpline** on **0300 330 3311**.

## Make yourself heard – Heart Voices

Heart Voices gives you the skills, confidence and knowledge you'll need to influence health services for the benefit of heart patients and their families across the UK. By signing up, you'll join a network of representatives that speaks out on behalf of heart patients and their carers, and get opportunities to have your say. Visit **bhf.org.uk/heartvoices** for more information and to sign up.

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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](https://www.bhf.org.uk/contact). Or, write to us at:

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 Birmingham B26 3YU.

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# THANK YOU

This booklet is part of the *Heart Information Series*. We distributed 2 million booklets from this series last year. Without your hard work and support the British Heart Foundation wouldn't be able to provide this vital information for people with heart conditions.

Donate to the fight at **bhf.org.uk/donate**, or text **FIGHT** to **70080** to donate £3 to fund our life saving research.

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**British Heart  
Foundation**

For over 50 years our research has saved lives.

We've broken new ground, revolutionised treatments  
and transformed care.

But heart and circulatory disease still kills one in four  
people in the UK.

That's why we need you.

With your support, your time, your donations,  
our research will beat heart disease for good.

**FIGHT  
FOR EVERY  
HEARTBEAT**

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