

Patient information factsheet

Bradyarrhythmias (slow heart rhythms)

The normal electrical system of the heart

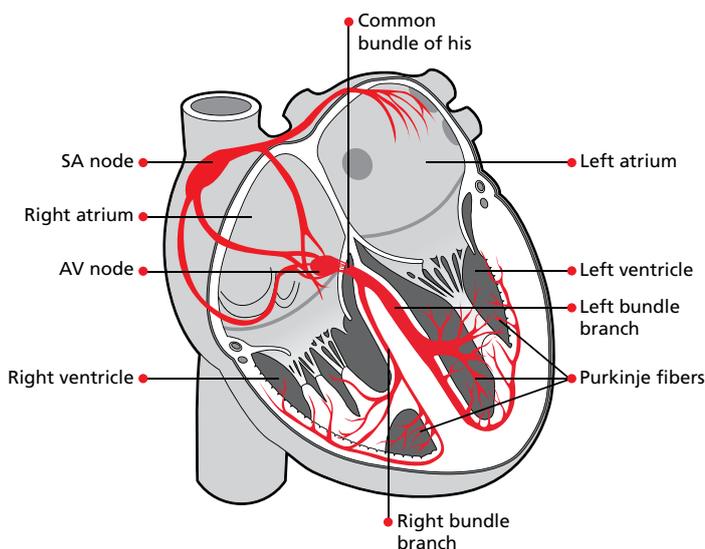
The heart has its own electrical conduction system. The conduction system sends signals throughout the upper chambers (atria) and lower chambers (ventricles) of the heart to make it beat in a regular, coordinated rhythm. The conduction system consists of two nodes that contain conduction cells and special pathways that transmit the impulse.

A normal heartbeat begins when an electrical impulse is fired from the sinus node (also called sino-atrial or SA node), in the right atrium. The sinus node is responsible for setting the rate and rhythm of the heart and is therefore referred to as the heart's pacemaker.

The electrical impulse fired from the SA node spreads throughout the atria, causing them to contract and squeeze blood into the ventricles. The electrical impulse then reaches the atrioventricular node (AV node), which acts as a gateway, slowing and regulating the impulses travelling between the atria and the ventricles. As the impulse travels down the pathways into the ventricles the heart contracts and pumps blood around the body. The cycle then begins again.

A normal adult heart beats in a regular pattern 60 to 100 times a minute; this is called sinus rhythm.

Diagram of the heart's electrical system



Arrhythmia

Sometimes if the conduction pathway is damaged, blocked, or an extra pathway exists the heart's rhythm changes. The heart may beat too quickly (tachycardia), too slowly (bradycardia) or irregularly. This may affect the heart's ability to pump blood around the body. These abnormal heartbeats are known as arrhythmias. Arrhythmias can occur in the atria or in the ventricles.

Bradycardia

Bradycardia is a term that describes a number of different conditions in which the heart beats at an unusually slow rate. If impulses are sent from the sinoatrial node (SA node) at a slow rate, or if the impulses are delayed as they travel through the conduction system, the end result is a slower heartbeat or pulse. Sinus bradycardia is an unusually slow heartbeat due to normal causes and commonly occurs in athletes or during a state of deep relaxation. It can also occur in patients with heart disease or in response to different medications. The severity and treatment required of the bradycardia depends on the area of the heart affected. In many cases, a temporarily slow heartbeat is not medically important by itself. For instance, sinus bradycardia is a normal response to deep relaxation or being in excellent physical shape. However, bradycardia may also be caused by age-related deterioration of the heart's electrical conduction system, coronary heart disease or by medications prescribed to treat arrhythmias or high blood pressure. Once these medications have been reduced or discontinued, the bradycardia will usually resolve on its own.

Causes, signs and symptoms of bradycardia

Some types of bradycardia produce no symptoms, and others may cause dizziness, weakness or fainting (syncope).

- **Sick sinus syndrome** occurs when the heart's natural pacemaker, the SA node, fails causing an irregular heartbeat. Patients with sick sinus syndrome may experience a slow heartbeat (bradycardia), a fast heartbeat (tachycardia) or heartbeats that swap between fast and slow (brady-tachy syndrome or tachy-brady syndrome). Patients may experience dizziness, tiredness, weakness or fainting (syncope). Although it is more common in elderly people it can occur in children, often after cardiac surgery.
- **Heart block** (atrioventricular block or AV block) occurs when electrical impulses are slowed or blocked as they travel from the atria through the AV node into the ventricles.

The symptoms and treatments for heart block depend on its severity. The different types of heart block and the treatment options available are explained below.

- **First-degree heart block** occurs when the electrical impulses slow as they pass through the AV node. However, all impulses reach the ventricles. First-degree heart block rarely causes any symptoms, and is often found in athletes. No treatments are generally necessary.
- **Type 1 second-degree heart block** occurs when the electrical impulses are delayed to a greater extent with each heartbeat until a beat is skipped entirely and the cycle then repeats itself. This may cause dizziness and other symptoms. In such cases, a pacemaker may be required.
- **Type 2 second-degree heart block** occurs when some of the electrical impulses from the SA node are unable to reach the ventricles, for example every third or fourth impulse. This is usually because of an underlying disease. A pacemaker may be required to control and regulate the heart rhythm.
- **Third-degree heart block (complete heart block)** occurs when no electrical impulses reach the ventricles. This is usually as a result of underlying disease or medications. In the absence of any electrical impulses from the atria the ventricles produce impulses on their own; these are called ventricular escape beats. However, these heartbeats are usually slow and the patient may feel very unwell. Sometimes the patient remains relatively well and a pacemaker can be implanted after a few days. Occasionally, this condition needs to be treated more quickly and if a pacemaker cannot be implanted immediately, the doctors will put a temporary pacemaker wire into the heart to keep the heart pumping regularly until the permanent pacemaker system is implanted.

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Treatment options for bradycardia

Commonly symptomatic bradycardia is treated by discontinuing any medications that slow the heartbeat, treating any underlying conditions and/or by implanting a permanent pacemaker.

A pacemaker is a small device, approximately the size of a fifty pence piece used to detect and treat slow heart rhythms. It is implanted beneath the skin below the collarbone and connected to a pacing wire placed inside the heart. The pacemaker fires a small electrical impulse to stimulate the heart to beat when it detects that the heart rate/pulse is going too slow.

Cancellations

Unfortunately we do sometimes have to cancel procedures. If this happens to you, we will always try to explain the reason. We fully appreciate that this is a stressful time for you and your family and we will do our best to provide you with a new date that is convenient for you as soon as possible.

Further information and contacts

We cannot guarantee that a particular person will perform the procedure. The person will, however, have appropriate experience.

If you have any questions regarding your forthcoming procedure please call **023 8120 8436** to speak to a cardiac rhythm management clinical nurse specialist. If you have a query relating your admission date please contact the cardiac rhythm management coordinator on **023 8120 8772**.

You can also email crmnurses@uhs.nhs.uk

The following websites also provide useful information:

www.bhf.org.uk

www.heartrhythmcharity.org.uk

If you need a translation of this document, an interpreter or a version in large print, Braille or on audio tape, please telephone 023 8120 4688 for help.