Supraventricular Tachycardia

Supraventricular tachycardia (SVT) causes episodes of a fast heartbeat. Thumping heart sensations (palpitations) and other symptoms may occur during each episode. Regular medication can prevent episodes of SVT. Another treatment option in some cases is to destroy a tiny part of the heart that triggers the SVT.

How does the heart work?

The heart has four chambers - two atria and two ventricles. The walls of these chambers are made mainly of special heart muscle. Each heartbeat starts with a tiny electrical impulse produced by the sinoatrial node (SA node). This node is like a tiny timer or pacemaker at the top of the right atrium. The electrical impulse spreads through the heart muscle and makes it squeeze (contract).

1. Atria contract
   - Veins bring blood into right atrium from upper body
   - Veins bring blood into left atrium from lower body
   - SA node
   - AV node

2. Ventricles contract
   - Artery takes blood into left atrium
   - Artery takes blood to lungs
   - Soft thick arrows show blood flow
   - Bold thin arrows show electrical pathways in the heart
   - AV bundle

The electrical impulse travels first through the atria. These contract and pump blood into the ventricles. The impulse is held up slightly at the atrioventricular node (AV node) which acts like a junction box. Electricity reaches the AV node by two pathways, a fast one from above and a slower one from below. In many people (about 80%) there is very little difference between these two pathways. The electrical impulse then travels through the atrioventricular bundle (AV bundle) which acts like a wire that takes the impulse to the ventricles. This makes the ventricles contract to pump blood into the arteries.

See separate leaflet called The Heart and Blood Vessels which explains this in more detail.

What is a supraventricular tachycardia?

Tachycardia means a fast heart rate. Supraventricular means coming from above the ventricle. During an episode of SVT, the heartbeat is not controlled by the SA node (the normal timer of the heart). Another part of the heart overrides this timer with faster impulses. The source or trigger of the impulse in an SVT is somewhere above (supra) the ventricles, but the impulse then spreads to the ventricles.

There are three main types of SVT: atrioventricular nodal re-entry tachycardia (AVNRT), atrial tachycardia, and Wolff-Parkinson-White (WPW) syndrome.
Atrioventricular nodal re-entry tachycardia (AVNRT)
This is the most common type of SVT. It is most commonly seen in people in their twenties and thirties and is more common in women.

This occurs when there is an electrical short circuit in the centre of the heart. It often occurs in people who otherwise have a normal heart. Instead of the normal activation of heart from top to bottom in an orderly and timely manner, an extra impulse starts to race around this short circuit. This means that the heartbeat may rapidly increase and then produce symptoms of an SVT.

Atrial tachycardia
Atrial tachycardia is a less common type of SVT. It arises from a small area of tissue, anywhere in the atria of the heart. This area starts to fire and drive the heart, more rapidly than the heart's natural pacemaker.

In most cases, there is no underlying cause for atrial tachycardia to occur. However, it can also occur in those with heart problems (for example, a previous heart attack or heart valve problems).

Wolff-Parkinson-White (WPW) syndrome
In WPW syndrome there is an additional electrical connection (accessory pathway) between the atria and ventricles. This occurs in around 3 out of 1,000 people. See separate leaflet called Wolff-Parkinson-White Syndrome for more detail.

In addition to causing symptoms of SVT, some people may develop very fast thumping heart sensations (palpitations), resulting in severe dizziness or even a blackout. Sudden death is a complication of this condition, occurring very rarely.

Note: The term SVT is usually only used when the heart rate is fast and regular. Another condition which causes a fast but irregular heart rate, and is caused by abnormal impulses in the atria, is called atrial fibrillation. This is not dealt with further in this leaflet. See separate leaflet called Atrial Fibrillation.

Who gets supraventricular tachycardia?
In most cases, the first episode of SVT begins in childhood or early adulthood. However, a first episode of SVT can occur at any age. It is an uncommon condition, but the exact number of people affected is not known.

Certain triggers may increase the risk of developing an episode of SVT, especially in those people who have already had episodes. These may include:

- Medications. These include some asthma inhalers, some types of herbal supplements and cold remedies.
- Drinking large amounts of caffeine or alcohol.
- Stress or emotional upset.
- Smoking.

Avoiding these triggers will often reduce the frequency of SVTs.

What are the symptoms of a supraventricular tachycardia?
Symptoms last as long as the episode of SVT lasts. This may be seconds, minutes, hours or, rarely, longer.

Possible symptoms include the following.

- Your pulse rate becomes 140-200 beats per minute (bpm). Sometimes your pulse may be even faster. (The normal pulse is 60-100 bpm.)
- Thumping heart sensations (palpitations).
- Dizziness, or feeling light-headed.
- You may become breathless.
- You may occasionally feel some mild chest discomfort.
If you have angina, then an angina pain may be triggered by an episode of SVT. You may have no symptoms, or are just aware that your heart is beating fast. Sometimes your blood pressure may become low with too fast a heart rate, especially if it persists for several hours. In some cases this causes a faint or collapse. This is more likely if you are older and have other heart or lung problems.

An episode of SVT usually starts suddenly for no apparent reason. It may last just a few minutes, but can last several hours. It then stops just as suddenly as it started. Rarely, an episode lasts longer than a few hours.

The time between episodes of SVT can vary greatly. In some cases, short bursts of SVT occur several times a day. At the other extreme, an episode of SVT may occur just once or twice a year. In most cases it is somewhere in between, and an episode (paroxysm) of SVT occurs now and again.

Do I need any tests?

**Electrocardiograph (ECG)**

An electrocardiograph (ECG) traces the rhythm and electrical activity of your heart. It is a painless test and takes a few minutes to do. Small patches are put on your arms, legs and chest and are connected to the ECG machine to take a reading. If an ECG is done during an episode of SVT, it can usually confirm the diagnosis and rule out other causes of a fast heart rate. (For example, a small area within a ventricle sometimes triggers a tachycardia. It is important to rule out a ventricular tachycardia, as this tends to be more serious than SVT, and has different treatments.)

The ECG between episodes of SVT is usually normal. So, doing an ECG between episodes of symptoms may not be much help. However, if SVT is suspected, you may be asked to wear a small portable ECG recorder. Some types record an ECG continuously over 24 hours. Others are designed so that you can switch it on to record when you have symptoms.

**Specialist tests**

Once it is confirmed that you have episodes of SVT, a number of special tests are sometimes advised. These aim to find the exact location of the excitable part in your heart which is triggering the episodes of SVT. For example, you may have electrophysiology tests, where doctors insert small electrodes (wires) into your heart via one of your veins. These electrodes measure the electrical signals in your heart and can determine where any abnormal signals are coming from.

What are the treatment options for supraventricular tachycardia?

**Stopping an episode of SVT**

Many episodes of SVT soon stop on their own, and no treatment is then needed. It is sometimes possible to stop an episode of SVT by various measures, including drinking a cold glass of water, holding your breath or putting your face into cold water. However, if an episode of SVT lasts a long time or is severe, you may need to be admitted to hospital to stop it.

- Medicines which are given by injection into a vein will usually stop an SVT. Adenosine is commonly used. It works by blocking electrical impulses in the heart. Verapamil is an alternative if adenosine is not advised or is not effective. For example, some people with asthma cannot have adenosine.
- Electric shock treatment is sometimes used to stop an episode of SVT.

**Driving**

You must inform the DVLA and stop driving if the SVT has caused or might cause any symptoms when driving. You may be allowed to drive when the cause has been controlled for at least four weeks. The rules are much stricter if you drive a bus or lorry for work. For further details, see the link to the DVLA under 'Further reading & references', below.
Preventing episodes of SVT
Options include the following:

- **You can take medication** every day to prevent episodes of SVT. Various medicines can interfere with the electrical impulses in your heart. Examples include digoxin, verapamil and beta-blockers. If one does not work or causes side-effects, another can often be found to suit you.

- **Tissue destruction using a catheter (catheter ablation)** may be an option for some types of SVT. A small wire (catheter) is passed via a large vein in the top of your leg into the chambers of your heart. It is guided by special X-ray techniques. The tip of the catheter can destroy a tiny section of heart tissue that is the source or trigger of the abnormal electrical impulses. This is only suitable if the exact site of the trigger can be found by special tests, and be located accurately by the catheter tip. It can be very successful, and after the procedure you will not need to take medication to prevent SVT.

- **Not treating is an option** if episodes of SVT are infrequent, only last a short time, or cause few symptoms. The treatments above have to be balanced against the possible side-effects and risks. Some people prefer to put up with symptoms if they are not too bad and only occur now and then.

Treatment is generally only recommended for atrial tachycardia if it is causing you symptoms. However, if you experience unpleasant symptoms or a permanently increased heart rate is risking heart enlargement, your doctor may recommend treatment with medication or catheter ablation.

However, dangerous heart rhythms may, very rarely, occur in patients with WPW syndrome. So most doctors recommend treatment with ablation.

Further help & information

**Arrhythmia Alliance**
PO Box 3697, Stratford Upon Avon, Warwickshire, CV37 8YL
Tel: 01789 450787
Web: www.arrhythmiaalliance.org.uk

**British Heart Foundation**
Greater London House, 180 Hampstead Road, London, NW1 7AW
Tel: (Heart Helpline) 0300 330 3311, (Admin) 020 7554 0000
Web: www.bhf.org.uk

Further reading & references

- Whinnett ZI, Sohaib SM, Davies DW; Diagnosis and management of supraventricular tachycardia. BMJ. 2012 Dec 11;345:e7769. doi: 10.1136/bmj.e7769.
- Supraventricular Arrhythmias; European Society of Cardiology Guideline (2003)
- At a glance guide to the current medical standards of fitness to drive; Driver and Vehicle Licensing Agency

Disclaimer: This article is for information only and should not be used for the diagnosis or treatment of medical conditions. EMIS has used all reasonable care in compiling the information but make no warranty as to its accuracy. Consult a doctor or other health care professional for diagnosis and treatment of medical conditions. For details see our conditions.