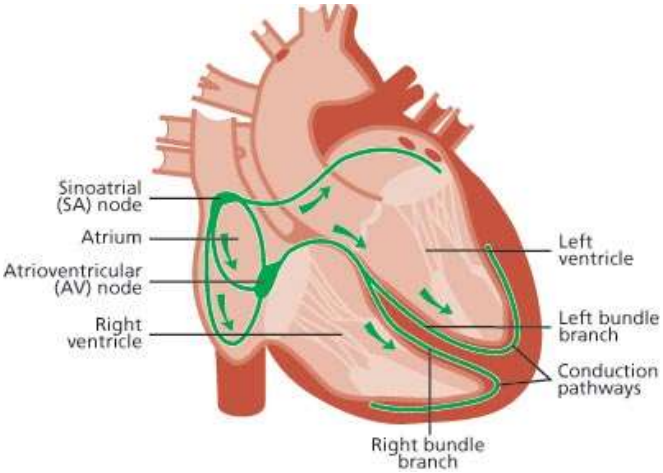
Great Ormond Street Hospital for Children
NHS Foundation Trust

What does having ventricular tachycardia mean? Information for young people

Ventricular tachycardia is a type of arrhythmia or abnormal heart rhythm. It is caused by the electric signals in the heart starting in a different place and travelling a different way through the heart. If you have had ventricular tachycardia on your ECG you will have some investigations and sometimes you will need to have some treatment. This information sheet from Great Ormond Street Hospital (GOSH) explains ventricular tachycardia and how they can be treated.

The heart has an electrical system that makes it pump. The normal electrical impulse starts in a specialised area of heart tissue in the right atrium called the SA Node. It then passes from the right atrium through to the ventricles via the AV node.

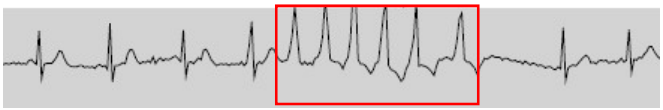


As the impulse passes through the atria (collecting chambers) it contracts forcing it to pump blood into the ventricles (pumping chambers). It has the same effect when it passes through the ventricles which pump blood to the body. The heart muscles then relax and the atria fill with blood again.

(normal sinus rhythm)

This electrical impulse travels through the heart each time it beats. It is something that happens naturally – you can't feel it.

With ventricular tachycardia (VT), the electrical impulse starts from the ventricles before an electrical impulse can be made by the atrium and causes the heart to beat in a different way.



Ventricular tachycardia is a regular fast heartbeat which starts from the ventricles (pumping chambers) instead of starting from the SA node in the atria. Due to the speed of contraction and the origin of the beat, the heart may not have time to fully fill with blood before pumping. For some people if the heart rhythm stays in VT it cannot

pump blood effectively around the body which can lead to a drop in blood pressure which can cause syncope (fainting), or to cardiac arrest. Other people may not experience this and their blood pressure remains stable.

Types of ventricular tachycardia?

Ventricular tachycardia can be described as sustained or non-sustained, and monomorphic or polymorphic.

Non-sustained VT lasts for only a few beats or seconds (less than 30 seconds) and may not cause any symptoms.

Sustained VT lasts for 30 seconds or more, or until medical intervention is needed. Sustained VT may cause symptoms such as dizziness, pre-syncope (feeling faint), syncope (fainting), breathlessness, and may lead to cardiac arrest requiring medical intervention in the form of a life-saving shock from a defibrillator.

Monomorphic VT, the beats look the same because they originate from the same point in the ventricles. This can be caused by a small area of abnormal electrical tissue.

Polymorphic VT, the beats vary in appearance because they arise from different points in the ventricles. This can be caused by heart muscle disease, electrolyte imbalance, or channel ion disease. Although these causes are more serious they are also very rare, you will have tests at the hospital to investigate these.

Your medical team will decide based on your tests if you have a structurally normal heart and safe VT. If this is the case you will continue to be monitored and may be offered treatment if you have symptoms, or very frequent VT that could lead to changes to the heart muscle. Alternatively if there is a concern of underlying disease such as heart muscle disease - cardiomyopathy, channel ion disease, or arrhythmogenic cardiomyopathy you will be monitored closely and if you are at risk of a life threatening event you will be offered an implantable cardioverter defibrillator (ICD).

What are the symptoms of ventricular tachycardia?

Ventricular tachycardia can be picked up on an ECG if a person has presented with symptoms to their GP or A&E. In most cases, it is diagnosed after symptoms, but sometimes ventricular tachycardia is diagnosed by accident, if a person has an electrocardiogram (ECG) as part of a general check-up for instance

If symptoms are present, they can include dizziness, palpitations, tiredness, shortness of breath, fainting (syncope) or almost fainting (pre-syncope), collapse. If you are having episodes of fainting or collapse you need to let your doctor know. Some people with VT do not notice symptoms. If you are experiencing symptoms in the red flags box you should seek immediate medical attention.

In younger children and babies who are unable to say what they are feeling they may have symptoms such as reduced feeding, or breathlessness.

Red flags

- Changes in behaviour, lethargy, irritation
- Changes in circulation: colour change such as dusky or pale skin, clamminess or cool hands and feet
- Breathlessness or breathing difficulties
- Dizziness or feeling faint (pre-syncope)
- Collapse

How is ventricular tachycardia diagnosed?

A variety of tests will be performed to check how your hearts electrical system is working as well as cardiac function. Our routine screening includes:

- An **ECG** records the electrical signal as it is conducted throughout the heart. It is a simple test performed by placing sticky electrodes on the child's chest, legs and wrists. An ECG is entirely safe, takes a few minutes and causes no pain, although the child may be anxious about the stickers and connecting wires.
- An **Echo** is an ultrasound scan of the heart. A picture of the heart is produced from which an accurate assessment of the size and function of the heart can be made. The scan takes from 30 to 40 minutes. As before this test is not painful, but children sometimes find the jelly on the probe a bit uncomfortable. Children can watch their favourite videos during the scan.
- An **exercise test** is a specially modified test that assesses the rhythm and function of the heart at a faster rate, while the child is on an exercise bicycle or a treadmill. Blood pressure and breathing are also monitored during the test. This test is usually only performed on children over the age of eight years due to their size.

  Exercise testing also provides us with an objective measurement of improvement, stability or worsening of heart function over time. The test takes approximately 45 minutes and allows symptoms not obvious at rest to become apparent when the heart is working harder. We recommend children to wear loose comfortable clothing and trainers for the test.

- An **MRI scan** uses a magnetic field rather than x-rays to take pictures of your child's body. The MRI scanner is a hollow machine with a tube running horizontally through its middle. Your child will lie on a bed that slides into the tube. An MRI scan usually lasts between 20 minutes and an hour.
- A **24-hour ECG recording** (or Holter) uses a small box similar in size to a mobile phone, from which three leads are attached by sticky pads to your child's chest. This is an ECG monitor that continuously records the heartbeat over 24 to 48 hours. Children wear the monitor under their clothes and can continue with their normal daily life including sport and exercise. You and your child will be asked to document your child's activities during the 24 to 48 hour period to match with the recording when the box is analysed. When the test is finished, you will be required to return the monitor to GOSH so that the results can be analysed.
- **Blood tests** are taken to look for electrolyte changes, infection markers, and indicators for an underlying heart muscle disease.

How is ventricular tachycardia treated?

A cardioverter defibrillator is used to shock the heart back into a normal sinus rhythm if a person has collapsed because of VT.

Medication, usually a beta blocker help to lower the heart rate and reduce the chance of VT occurring. Sometimes when you start this medication you may feel dizzy and tired but this should settle over time.

A procedure called an electrophysiology study (EP) and ablation may be suggested. The doctor will use either cryoablation (freezing therapy) or radio frequency ablation (heating therapy) on the affected area, which should stop the abnormal signals. Ablation works by using a targeted beam of energy to destroy the tissues causing the

abnormal signals. You can read more about EP studies here: https://www.gosh.nhs.uk/conditions-and-treatments/procedures-and-treatments/electrophysiology-ep-study/

A device called a loop recorder may be inserted. This is a small device inserted superficially under the skin on the chest which monitors the hearts rhythm. This device is used to monitor the heart rhythm for a longer period of time you can read more about loop devices: https://www.gosh.nhs.uk/teenagers/tests-and-treatments/living-implantable-loop-recorder/.

An implanted cardioverter defibrillator (ICD) may be suggested if your medical team think there is a risk you may collapse or have previously collapsed. An ICD is inserted in the wall of the chest and will continually monitor the heart rhythm and deliver a life-saving shock if it detects an abnormal rhythm. You can read more about ICD's on our website.

Conditions can progress and it is therefore important to keep you under monitoring at the hospital, the frequency of your check-ups will be determined by your medical team.

Can I drink caffeinated drinks?

Tea and coffee can be consumed within recommended guidelines unless you have been advised otherwise, energy drinks contain high levels of caffeine and should be avoided.

Can I exercise?

Exercise limitations will be discussed with you in clinic. If you have experienced any fainting this should be discussed with your doctor.

Any questions?

You can get in touch with the Arrhythmia Service on 0207405 9200 extension 5298, email them on gos-ecg.tr.gosh@nhs.net or contact them via MyGOSH once you have registered. More information about MyGOSH is at www.gosh.nhs.uk/your-hospital-visit/mygosh

Electro-Physiology Service

Arrhythmia Alliance – call 01789 867 501 (24 hour helpline) or visit their website at www.heartrhythmcharity.org.uk

British Heart Foundation – call their Heart Helpline on 0300 330 3311 or visit their website at www.bhf.org.uk