

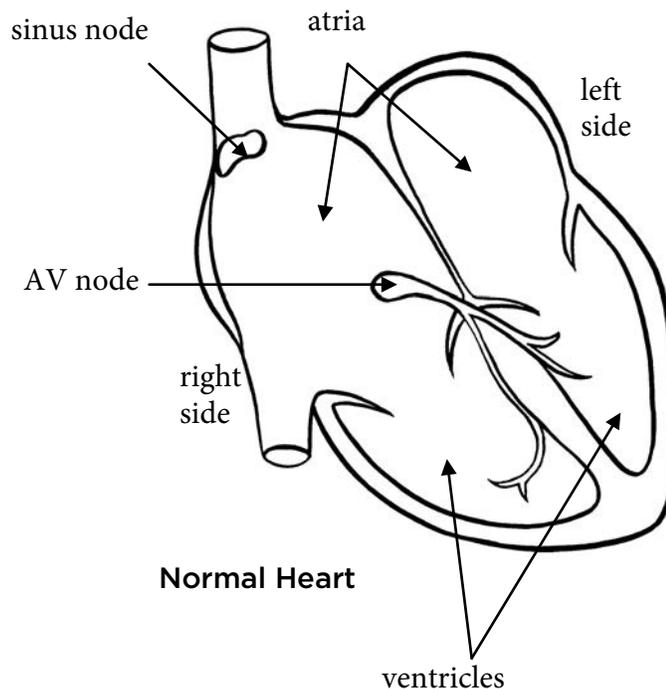
Supraventricular Tachycardia

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Learning that your child has Supraventricular Tachycardia (SVT) can bring about many questions. This handout may help you understand how the heart works and what happens during an episode of SVT. There are different forms of SVT. It is important to ask your child's doctor or nurse any questions you have about their SVT that may not be answered in this handout.

How does the heart work?

The heart has four chambers that work like a pump. The atria are the two chambers at the top of the heart, which receive blood from the body. The two chambers on the bottom of the heart, called ventricles, pump blood out to the body. It is important for all four chambers of the heart to work in sequence with one another to create an effective pump.

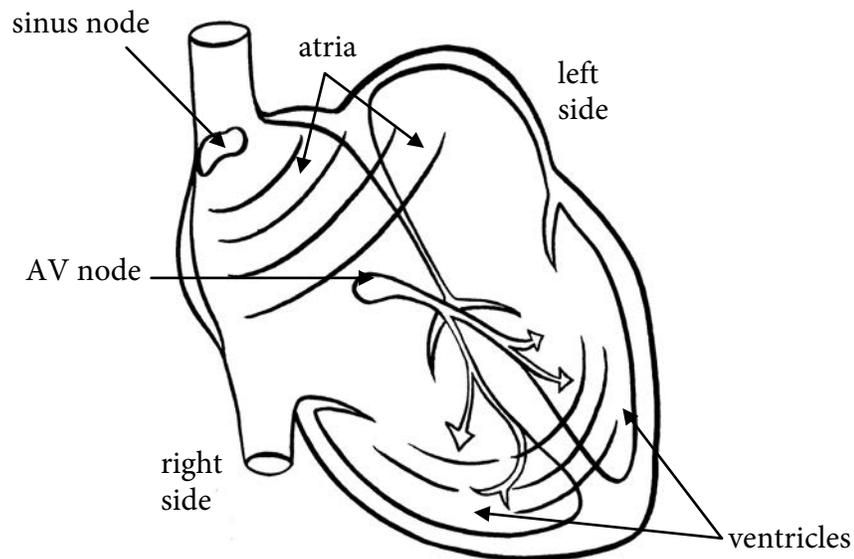


The sinus node (see diagram above) is located at the top of the right atrium. This node is known as the “pacemaker” of the heart and it works to control the normal heart rate. It makes the heart beat slower during times of rest or sleep, and beat faster with exercise, or when you are scared or excited.

Each heartbeat begins with an electrical wave (signal) that passes from the sinus node through the atria. This signal travels through the atria much like the ripples created in water when a pebble is thrown in (see below diagram). This electrical signal makes the atria contract and squeeze, causing them to beat.

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Next, the electrical signal moves from the atria into the junction between the atria and ventricles. This junction is known as the atrioventricular node (AV node), and is part of the normal conduction system. For the signal to travel from the atria down to the ventricles, it must move through the AV node. The heart's conduction system is similar to a cable that runs from the atria to the ventricle, and helps to transmit the signal. The electrical signal will pass through the AV node. The AV node will delay the signal slightly then pass it on to the ventricles, making them beat.



The Heart's Normal Electrical System

After the ventricles beat there should be no way for the electrical signal to travel backwards up to the atria. This completes the heartbeat cycle and the next heartbeat is started in the sinus node and follows the same path.

What is Tachycardia?

Tachycardia is a broad term used to describe fast heart rates and rhythms (“tachy” means fast and “cardia” means heart). There are many different types of tachycardia. Sinus tachycardia is a normal increase in heart rate, in response to activity (running or playing), or fear and excitement.

Abnormal tachycardias can occur in different places in the heart. Some occur only in the atria (atrial flutter, atrial tachycardia) and some occur only in the ventricles (ventricular tachycardia). SVT involves both the atria and the ventricles. This handout will describe the two most common types of SVT.

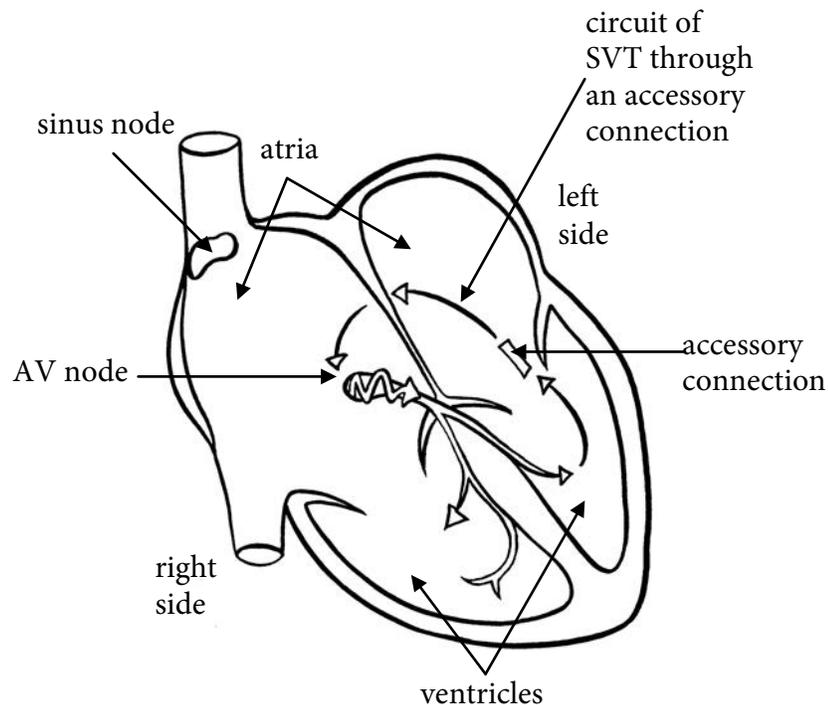
What are the two most common types of Supraventricular Tachycardia?

The two most common types of SVT are SVT using an accessory connection and SVT from an AV node reentry.

SVT using an accessory connection

In the normal conduction system, the only way for an electrical signal to get from the atria down to the ventricles is through the AV node. When an accessory connection is present, this creates a “shortcut” for the electrical signal, also known as an “accessory pathway.” This shortcut causes the electrical signal to travel through the heart without going through the AV node.

The accessory connection is made up of a tiny fiber of muscle (smaller than a hair), which connects the atria and ventricles in a way that it is not supposed to. The connection can allow the signal to move from top to bottom, as well as from bottom to top without traveling through the AV node. After the conduction travels from the ventricles backward to the atria, the signal can then travel through the AV node back to the ventricles and continue around in a circle until the SVT has stopped.



SVT Using an Accessory Connection

The diagram above shows an example of an accessory connection on the left side of the heart. These connections can be almost anywhere that the atria meet the ventricles - on the right, left or middle part of the heart.

One specific type of SVT using an accessory connection is called Wolff-Parkinson-White Syndrome (WPW). In WPW the electrical signal arrives at the ventricles too soon. An ECG (electrocardiogram) will show that an extra pathway or shortcut exists from the atria to the ventricles.

This extra pathway or accessory connection may allow very fast and dangerous heart rhythms to occur. If a very fast heart rhythm occurs in the atria it is called atrial fibrillation. In atrial fibrillation the accessory connection

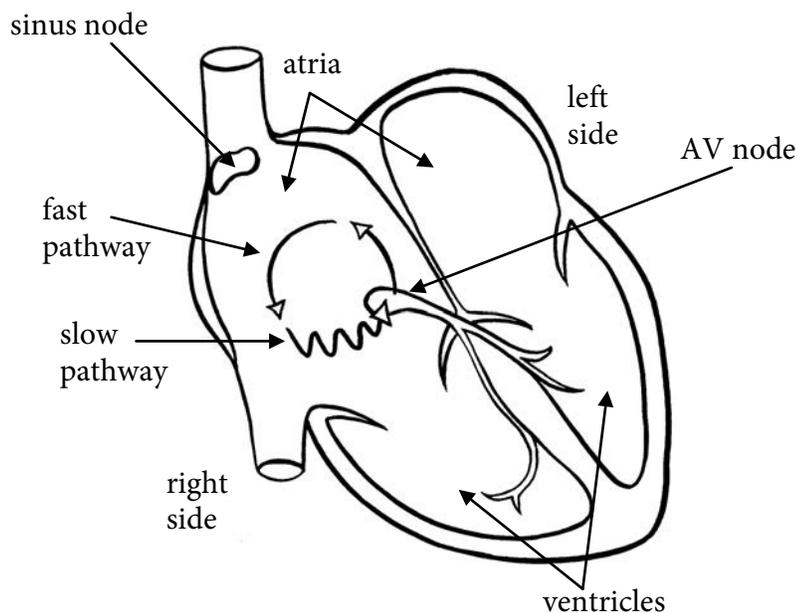
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may allow fast electrical signals to get to the ventricles too quickly. This can cause a fast and irregular heart rhythm in the ventricles called ventricular fibrillation.

Ventricular fibrillation caused by an accessory connection is very rare but can be dangerous and life threatening. Your child's cardiologist (a doctor who treats people with heart problems) will be able to tell you more about this and if your child is at risk. In some cases your child may need more testing to find out if their accessory connection puts them at high risk of ventricular fibrillation. It is important to note that not all accessory connections are related to WPW.

SVT from AV node reentry

Another common form of SVT in children is caused by a short circuit in the AV node. This is called AVNRT (atrioventricular nodal reentry tachycardia). In AVNRT the electrical signal goes rapidly from one part of the AV node to the other, back and forth in a circle. Every time the circle goes around, the atria and the ventricles beat, causing a fast heart rate, until the AVNRT stops.



SVT from AV Node Reentry

AVNRT often takes place when your child is playing or being active, but it can also occur at rest. AVNRT is not a life threatening heart rhythm.

If my child has an episode of SVT how do I stop it?

Sometimes SVT can be stopped by having your child do special exercises called "vagal maneuvers." These maneuvers increase the stimulation to the vagus nerve which has branches that go into the heart. This slows the conduction of electrical signals through the AV node, which makes the heart rate slow down.

To Learn More

- Heart Center
206-987-2015
- Electrophysiology
Nurse Line
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- After hours and on
weekends (hospital
operator)
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- Pediatric Cardiology
of Alaska
907-339-1945
- Ask your child's
nurse or doctor
- www.seattlechildrens.org

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hospital, call the
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the interpreter the
name or extension you
need.

If your child is having an episode of SVT, have them try one or all of these vagal maneuvers to help slow down their heart rate. Help your child:

- Bear down like they are trying to have a bowel movement.
- Get into a head stand against the wall. If your child is small enough you can hold them upside down by their ankles.
- Apply an ice pack to the face to breathe in cold air, or dunk their head in an ice-water bath.

Sometimes these maneuvers will not be able to stop the SVT and your child may need medicine. If the vagal maneuvers do not work to stop the episode of SVT within 20 minutes, you should call your child's cardiologist or take your child to the emergency room.

What are the treatments for SVT?

There are a few options for treating your child's SVT. One option for treatment is to watch and wait, without any therapy. Your doctor may suggest this if your child does not have many episodes of SVT or the episodes are short.

A second option for treatment is the use of medicines. There are many medicines that can control the episodes of SVT. Most types of SVT do not "go away" all by themselves. The medicines may have to be taken for a long time to keep the SVT from coming back.

The third option for treatment is called cardiac ablation. Cardiac ablation uses catheters, thin plastic tubes that look like spaghetti, to destroy the small pieces of tissue that are causing the heart rhythm problem. The success rate for a cure is very high, but some families may not want their child to have a procedure to treat SVT.

In most cases, there is not one right answer for choosing how to treat SVT. You should talk about these options with your child's cardiologist to help decide what will be best for your family.