

Patient Resources: Supraventricular Tachycardia (SVT)

In order to better understand SVT in children, let's begin with the normal electrical pathway (conduction) of the heart.

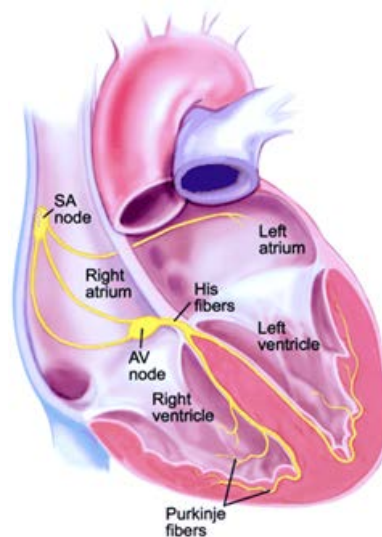
Normal Conduction of the Heart:

The sinus node (sinoatrial node or SA node) is the heart's own pacemaker. The electrical impulse is normally initiated here. The impulse travels across the atria (top 2 collecting chambers) stimulating contraction or "squeeze" and will eventually push blood into the ventricles (the bottom 2 pumping chambers)

The impulse then reaches the AV node (atrioventricular node). This is referred to as the "gateway" to the ventricles. The AV node receives the impulse from the SA node.

The impulse moves through special electrical tissue starting at the Bundle of His, moving to the bundle branches. This stimulates ventricular squeeze, which pumps blood to the lungs and the rest of the body. Each of these cycles is a "heart beat". Below is a picture of cardiac conduction system.

Normal heart rate varies in children based on age. Infants and children have a faster heart rate compared to adults. The normal adult heart rate is 60-100 beats per minute.

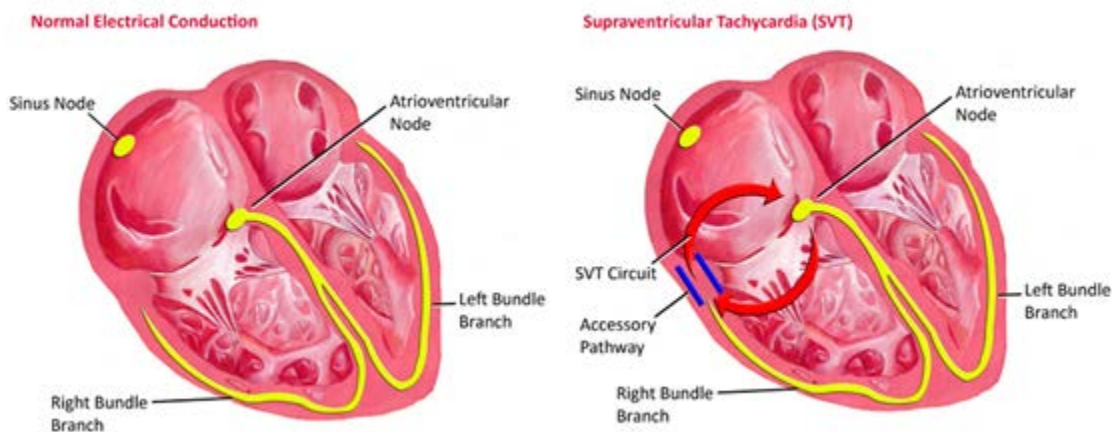


Normal conduction system

Image: Circulation.2002;106:e206-e208

What is SVT?

Supraventricular tachycardia, most commonly referred to as SVT, is the most common type of abnormal fast heart rhythms in children. SVT is a broad term and includes many different forms all with similar type of symptoms. The type of SVT is classified based on the path of electrical signal during the tachycardia. SVT begins in the upper chambers of the heart, (Atria), travels through an abnormal electrical circuit within the AV node (AV node reentrant tachycardia or AVNRT), or, through an extra abnormal pathway, called an accessory pathway or bypass tract (AV reentrant tachycardia or AVRT). An accessory pathway is an extra band of tissue/fibers that connect the atria to the ventricles. The images below show the electrical conduction of these two types of tachycardia.



AVNRT

Image: Circulation. 2002;106:e206-e208

AVRT

Image: Circulation. 2002;106:e206-e208

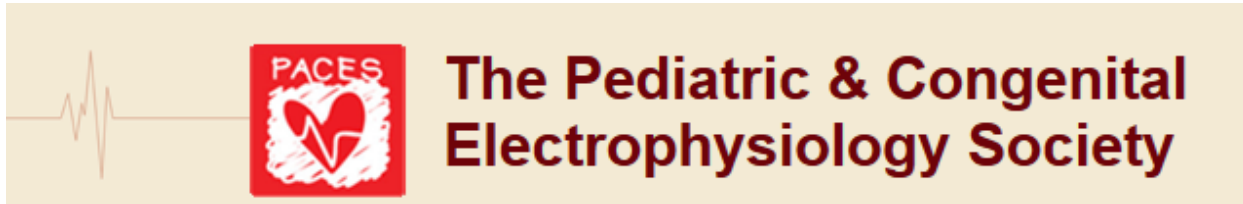
General characteristics of SVT include:

- Abnormal fast heart: rate can be as high as 220-320 bpm in younger children

Although SVT is not usually dangerous, if left untreated it can affect the heart's ability to pump normally.

What are the symptoms?

- Palpitations- the feeling of a rapid or erratic heart beat while sitting quietly or at rest or faster than normal heart rate with exercise
- Dizziness
- Fainting (syncope)
- Chest pain
- Shortness of breath
- Heart pounding
- Feeling pulsations in your throat



- Sudden sense of a fast heart rate and a sudden end to the to the fast heart rate
- Toddlers and younger (when verbal) children may describe symptoms as their “heart beeping”

Infants cannot communicate their symptoms but they may exhibit signs of:

- Poor feeding
- Profuse sweating with feeding
- Being Listless/lethargic
- Appearing generally ill
- Breathing faster than normal

These symptoms can be brief but can also last for several hours.

How can this be diagnosed?

Your doctor or health care team may refer you to a pediatric electrophysiologist (EP) or someone who specializes in children with heart rhythm disorders. Your EP team may use one or multiple tools to help diagnose SVT. A heart monitor during the symptoms is the best way to diagnose SVT and can include.

- ECG
- Holter monitor
- Event monitor
- Exercise test

A more detailed description of these can be found in the Basic EP Fact sheet located in the patient resources section.

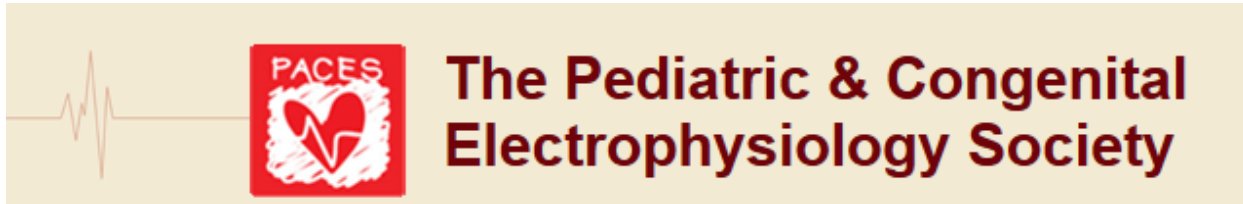
How is this treated?

Your EP team may prescribe medication for treatment. Medication is not a cure but can decrease the number of episodes and help to control symptoms. In most cases, these medications are taken daily.

The vagus nerve is a nerve in the body that can affect the heart rate. When it is stimulated, the heart rate can slow down. Certain maneuvers, called vagal maneuvers, are designed to stop the SVT by stimulating the vagus nerve.

For older children, vagal maneuvers include:

- “Bearing down”: pretending as if you are having a bowel movement - blowing on your thumb
- Doing a headstand, if you already know how to do one.
- Putting very cold water/ice on your face



For babies or young children who can't follow these directions, vagal maneuvers include:

- Place an ice pack over the eyes for 15-30 sec. A frozen bag of vegetables works really well. Avoid placing anything around the infant's nose.
- Pressing the infant's knees to the chest for 15-30 seconds

If the episode lasts a long time, your child is ill or has fainted or you don't feel comfortable doing these maneuvers at home, you can call your doctor or go to an emergency room. If your child appears very ill, you should call 911. In the emergency room, your child may receive an intravenous (IV) medication to stop the SVT. If the medication is not successful and your child remains ill, a brief electrical shock (cardioversion), may be required. This is usually done while your child is sedated.

Can SVT be cured?

When medications are not successful, there are frequent symptoms, or you/your child chooses not to take medicine for SVT, there is a procedure to treat SVT. This is a curative procedure and is done by a pediatric electrophysiologist in a specialized room equipped to treat children with arrhythmias. Your child will have sedation or general anesthesia for this procedure. During the procedure, the electrophysiologist, anesthesia team and other specialized EP members (including nurses, nurse practitioners, physician assistants and EP technicians) will help take care of your child.

During the procedure, specialized small plastic tubes or catheters are placed in the veins near the hip (groin) and sometimes in the veins in the neck. The catheter is placed into the vein and is eventually positioned in the heart. These catheters are designed to record electrical signals of the heart and help locate the cause of the tachycardia. Once that area is found, a specialized catheter can destroy that tissue that causes the abnormal signals. The destruction of this small area of tissue is called ablation. Ablation may be performed with a catheter that heats up the tissue (radiofrequency catheter) or one that freezes the tissue (cryoablation).

Recovery from this procedure is very minimal and usually your child is back to participating in all activities within 1 week. Your child may complain of sore legs for a few days but can be back to full activity relatively quickly. There are no stitches involved with this procedure.

Your pediatric EP team will discuss this procedure with you and can let you know if this is an appropriate treatment. You can search for a pediatric electrophysiologist in your area on this website.