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How does the heart work?

Your heart works as both a mechanical pump and an electrical organ. It can beat because it makes electrical signals. These signals travel through electrical pathways of your heart (Figure 1). This causes the muscle to contract and pump blood through your body.

Normally these signals come from a small area in your heart called the sinoatrial (SA) node. This area is in the upper right chamber or right atrium.

The SA node signals will reach the two upper chambers of the heart (the atria). This then causes atria's to contract at the same time. When both atrias contract they fill the two lower chambers (the ventricles) with blood.

As the electrical signal travels through the ventricles. It causes them to contract. This pumps blood out to your body. The heart muscle contracting (ventricles) is what you feel as a heartbeat. After a brief rest, the cycle begins again.

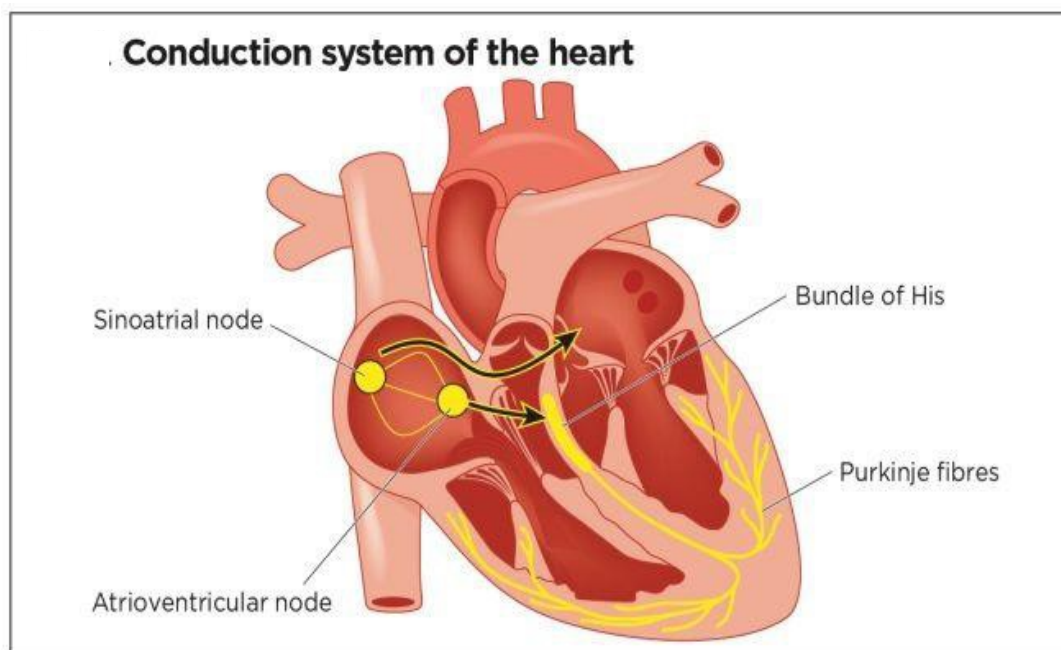


FIGURE 1

What is SVT or VT?

Sometimes you can have a disruption in the heart's usual electrical pathway. It will cause an abnormal heart rhythm. This is called an arrhythmia.

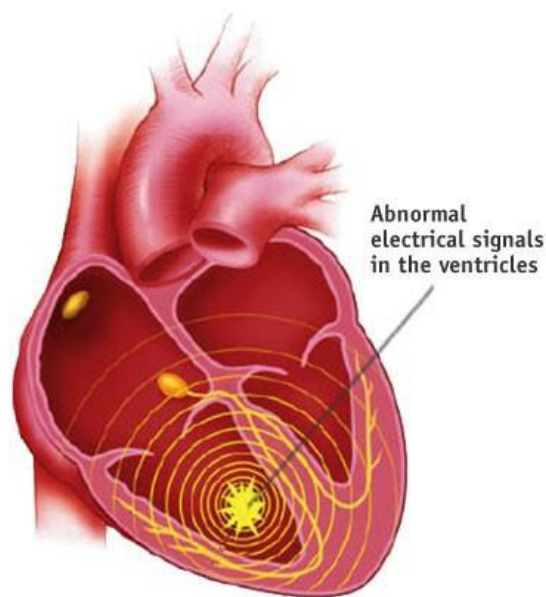
Supraventricular Tachycardia (SVT)

Abnormal heart rhythms that begin in the upper chambers of the heart are usually rapid. People who experience supraventricular arrhythmias can have different symptoms. You may feel dizzy or light-headed. You may feel chest tightness or palpitations. Some people do not have any symptoms at all.

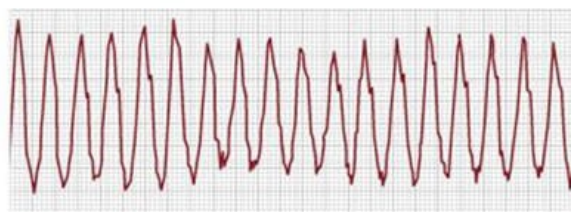
SVT can last for only a few seconds or for longer periods of time. They are usually not life-threatening. However, they can disrupt the regular flow of blood through the body. This can cause you to feel unwell or have other, more serious, symptoms.

Ventricular Tachycardia (VT) or Premature Ventricular Contractions (PVC)

Ventricular arrhythmias take place in the lower part of the heart. They can be a bit more dangerous. If there are just extra beats, these are called PVCs. If you have a lot of PVCs, this can negatively affect your heart function. This can cause dizziness, palpitations, or fatigue. During VT the heart beats so fast that it cannot properly pump blood to the rest of the body. This can cause extreme dizziness, fainting, or sometimes a collapse.



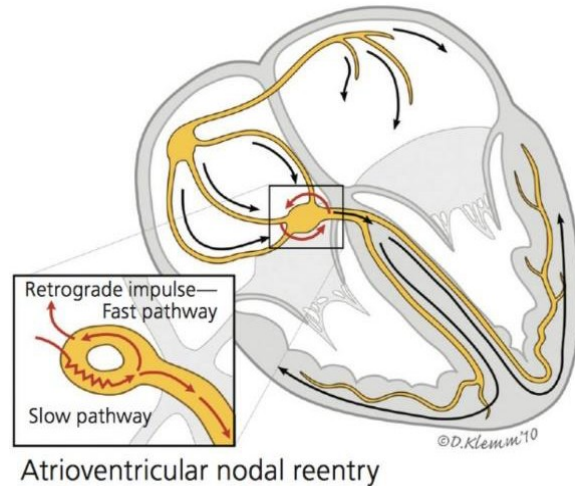
Ventricular Tachycardia ECG



What are the different types of SVT?

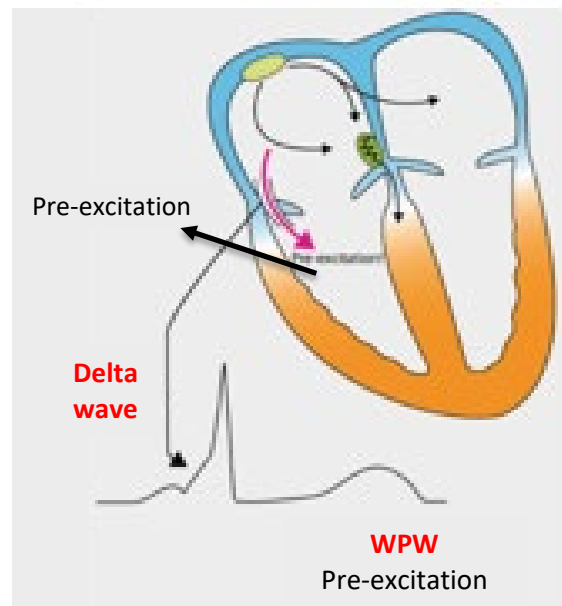
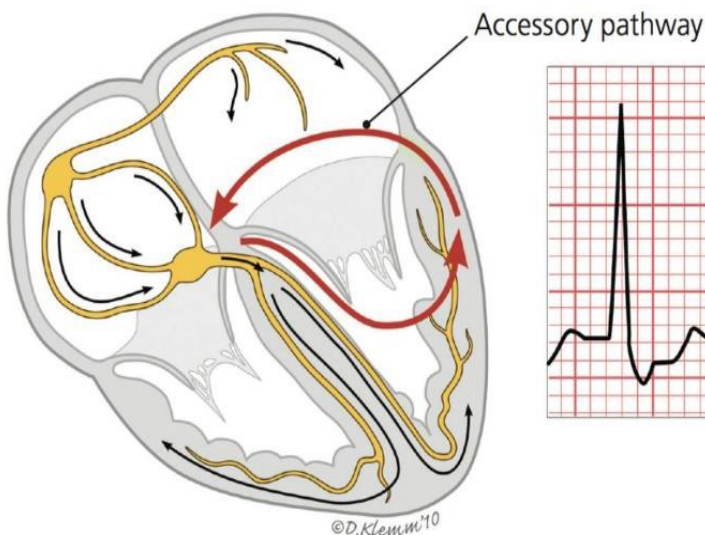
AV Nodal Re-entry Tachycardia (AVNRT)

AVNRT occurs when the electrical impulse gets caught up in extra fibers around the AV node. It then starts to rapidly circle the AV node. This causes a rapid heart rate. You may feel a pounding sensation in your neck.



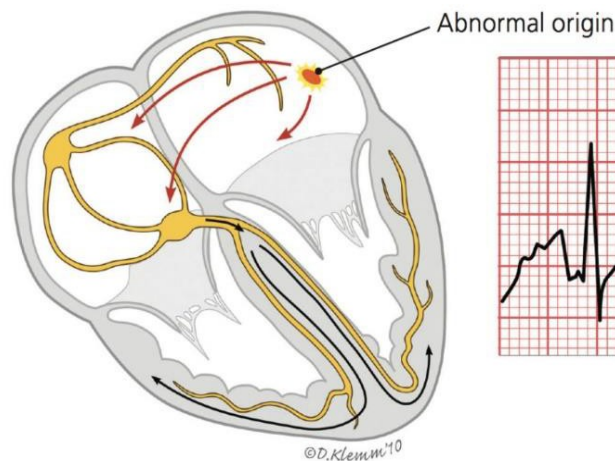
AV Re-entrant Tachycardia (AVRT) and Wolff-Parkinson-White (WPW) Syndrome

People with AVRT/WPW syndrome were born with an extra electrical pathway in their heart. This extra pathway connects the atria and the ventricles but completely bypasses the normal AV node pathway. When the electrical impulse goes through the extra pathway, it can cause periods of very rapid heartbeat.



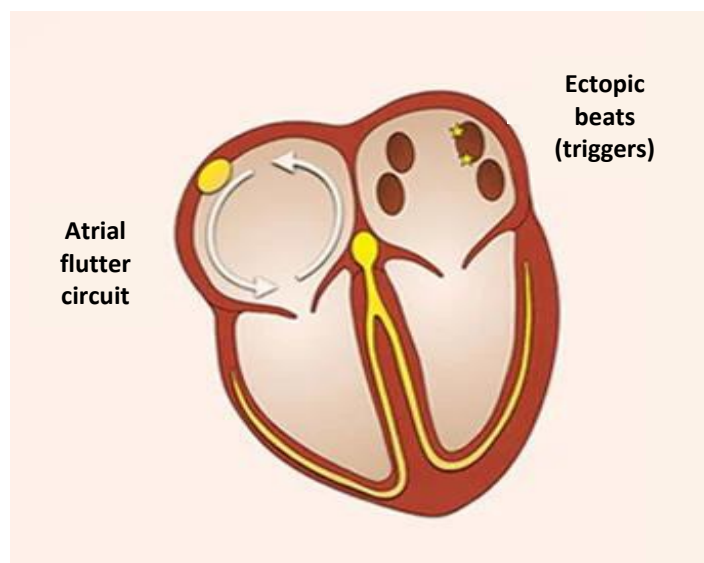
Atrial Tachycardia

With atrial tachycardia, the electrical impulse starts somewhere in the atria other than the SA node. This causes an abnormally rapid heart rate.



Atrial Flutter

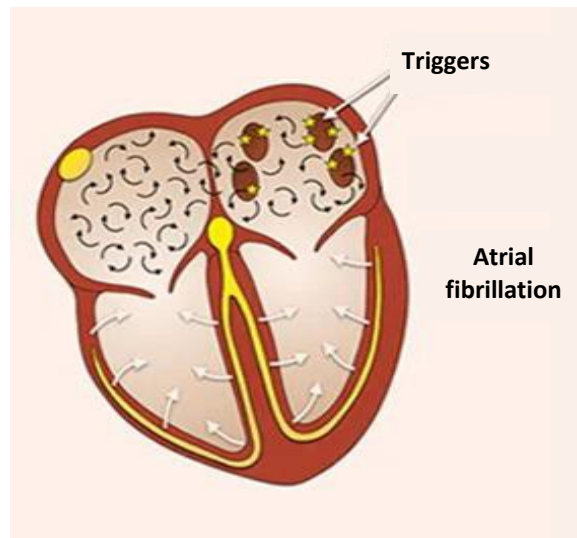
Atrial flutter is similar to atrial fibrillation but less common. In atrial flutter, the electrical impulse that starts in your atria gets disrupted. This creates an electrical short circuit in a circular feedback loop. It sets off a series of rapid-fire impulses, causing your heart to beat quite fast for some time. Patients with atrial flutter often have atrial fibrillation.



Atrial Fibrillation (AF)

AF is the most common type of abnormal heart rhythm. It is an irregular heart rhythm. It occurs when the electrical impulse that starts in your atria gets disrupted. The electrical signals from the left atria start to trigger rapid and disorganized electrical signals. This causes atria to quiver rather than contract normally.

These abnormal signals randomly pass through to the ventricles. This results in an irregular heartbeat which may be fast.



Catheter ablation of atrial fibrillation is covered in a separate pamphlet. Your health care provider will give you the other pamphlet.



What is an Electrophysiology Study (EPS)?

To fully understand and treat your heart arrhythmia, your doctor may recommend an electrophysiology study (EPS). The purpose of the EPS is to have a detailed look at your heart's electrical system. This will help to see if there are any problems.

EPS use soft catheters with tiny electrodes at their tips. The electrodes map and evaluate the electrical activity inside your heart. The wires are inserted through veins in your groin or your neck. They are threaded up to the inner chambers of your heart. You will not feel the wires in your heart.

During the procedure, your doctor records and measures your heart's electrical pathways. They may even use tiny electrical pulses to stimulate the arrhythmia. It can then be studied. Your doctor may also give you different medications through your intravenous (IV) line. This will allow the doctor to see how they affect the arrhythmia.

Most EPS are done with gentle sedation. You will also be given a local anesthetic. This will numb the area where the wires go into your vein. You may not be completely asleep during the procedure. The doctor may not be able to trigger your rhythm problem if you are completely asleep. Some EPS and ablation procedures such as atrial flutter will be done with general anesthesia. This means that you will be sleeping through the procedure.

You may feel yourself go into your arrhythmia during the study. Do not worry, this is normal. Your doctor will have full control over the arrhythmia and can stop it if required.



What is a Catheter Ablation?

Catheter ablation is done much the same way as an EP study. Most standard catheter ablations are done right after the EP study. It involves threading a thin catheter through the veins in your groin. The catheter will go up to the areas inside your heart where the abnormal electrical disruptions are occurring.

Once the arrhythmia source is identified and located it can be fixed. Heating or freezing energy will be delivered for 30 to 90 seconds at a time through one of the catheters to the abnormal pathway. Sometimes it is necessary to deliver the energy few times to ablate (eliminate) the abnormal pathway. You may feel a little burning in your chest while this is happening. Please let us know if it is uncomfortable and we can give you some more medication.

When it appears that the abnormal pathway has been ablated, the physician will test it. This is make sure that your abnormal heart rhythm can no longer be triggered.

Usually, the EP study and ablation procedure are pre-planned to occur at the same time. Sometimes the decision to go forward with ablation is not decided until you have had the EP study. Your doctor will then determine if an ablation is the best treatment option for you.

The following conditions are often treated with catheter ablation with success rates of 90-95% or more:

- Typical atrial flutter
- AV re-entry tachycardia (AVRT) Wolf-Parkinson-White (WPW) syndrome
- AV nodal re-entry tachycardia (AVNRT)

The following catheter ablations have a first time success rate of 70-75%:

- Atrial tachycardia (AT)
- Atrial fibrillation
- Atypical left sided atrial flutter

Ventricular Tachycardia (VT) or Premature Ventricular Contraction (PVC):

- Success rate for VT/PVC ablation depends on the location of the arrhythmia and your overall state of health.
- Your doctor will discuss the success rate with you during your appointment.

Are there risks to an EPS and/or Ablation?

EP studies and standard ablation procedures are very safe. However, as with any invasive procedure, there can be complications. The overall procedure risk is 1-2%. There is small risk of bruising or swelling of the puncture site.

Rare complications (<1%) include:

- Excessive bleeding where the catheters were put in

Very rare complications (<0.5%) include:

- The heart or lungs can be punctured
- Blood clot inside the vein
- Heart attack or stroke

If we need to perform the ablation near your heart's normal electrical system (like the AV node), there is a risk we could damage your heart's natural pacemaker. You may then need a permanent pacemaker (<0.5%). If a pacemaker is required, you can live a normal life. Pacemaker insertion is a relatively minor procedure. However, we will avoid this as much as possible.

We will monitor you closely during and after the procedure.



VT or PVC Ablation

Those who undergo a VT/PVC ablation, the complications are listed above. They may have a different degree of risk. This will be reviewed with your doctor at the appointment.

How do I prepare for an EPS or Ablation?

You will be told if you need any special tests or preparations before having EPS or ablation.

These are general guidelines for you to follow before you have your EPS or ablation. Be sure to follow any specific instructions you receive.

Some general instructions will include:

Do not eat or drink anything the morning of your procedure.

Blood thinners, anti-arrhythmic and rate control medications may be stopped before the procedure. This information will be given to you once your procedure is booked. All other medications can usually be taken as prescribed the morning of your procedure with sips of water.

The procedure will take anywhere from 1-4 hours. Please expect to be at the hospital for at least 4 to 8 hours. In some cases, you may stay overnight.

You will register in our computer system. You will then go to the Pre/Post Heart Investigation Unit (PHIU). PHIU nurses will ask you some questions and get your medical history. They will help you get ready for your procedure. You will change into a hospital gown. Your groin and shoulder area will be clipped of hair and cleaned. You will have an intravenous (IV) placed in your arm. You will then be taken to the EP lab (procedure room).



What happens after my EPS and/or Ablation?

You will be on bed rest for up to 5 hours after your procedure.

You must keep your head on a pillow and your affected leg straight. You will be reminded to do these two things. This will reduce bleeding from insertion sites. The nurses will check you often to ensure there is no bleeding. Please note that there may be bruising or discoloration at the insertion site. Some bruising, stiffness, or soreness at the insertion site is expected. A small bruise or lump is normal and will likely go away on its own. You are more likely to have bruising if you were on a blood thinner before your procedure.

Some numbness or tingling in the puncture limb immediately after the procedure is normal. This should disappear by the time you are ready to go home.

You may drink and have a snack before you go home.

Most people will go home the same day. Please have a ride arranged for your discharge home. If you feel well, you can drive 24 hours after your procedure.

Return to normal activities usually takes 3-7 day. Do not do any strenuous activity for the first 48 hours. This includes straining, excessive stair climbing or squatting. Do not lift anything over 10 lbs. during the first week. This will help your insertion site to heal.

Monitor for:

- **Fever** – check your temperature daily for the first week. If you have fever greater than 38.0°C or greater than 101°F; you need to contact your family physician right away or go to your local emergency department (ED). Then let the Arrhythmia Clinic know.
- **Severe chest pain** – promptly go to ED. Bring your “Procedure Summary” letter stating the type of ablation you had.
- **Mild to moderate central chest pain or aching** – that is worse when you are lying down or when you take a deep breath is normal. This often means some irritation of the lining of your heart after ablation. It usually resolves after a few days. If it is more than mild, contact the clinic. You may be able to take anti-inflammatory medication to help with this.

Before you go home, your doctor and nurse will go over the procedure. You will receive:

- **“Connect the DOTS” brochure.** It will outline the care of your insertion site. It will tell you when to call your family physician or the Arrhythmia Clinic. It will also tell you when to go to the ED.
- **“Procedure Summary” letter.** This letter should be taken with you if you need to see a doctor. It also needs to be taken with you if you go to the ED with ablation related issues.
- **“Ambulatory Visit Instruction Sheet”** listing your medication changes. Most people do not need follow up in the clinic. If your doctor wants to see you in the clinic, the nurse will review this with you.

Not everyone requires follow-up post ablation. Commonly those post AF, atypical atrial flutter or VT ablation need follow-up. Only those needing follow-up will be contacted by the Arrhythmia Clinic. They will be given dates of their tests and clinic appointments.

Patient Resources:

- St. Mary's General Hospital Website www.smgh.ca
- Heart Rhythm Society, PVA ablation video and overview of other types of cardiac ablation procedures.

Heart Rhythm Society, patient resources <https://upbeat.org/>
<https://upbeat.org/common-treatments/catheter-ablation>

- Heart and Stroke Foundation (in the search bar type "ablation or arrhythmia") HeartandStrokeFoundationwww.heartandstroke.ca
- Thrombosis Canada (information on blood thinners and AF) ThrombosisCanadawww.thrombosiscanada.ca
- Mayo Clinic (in the search bar type "heart arrhythmia or cardiac ablation") www.mayoclinic.org

How should I contact you?

You can contact us at:

St. Mary's General Hospital

Arrhythmia Clinic

911 Queens Blvd

Kitchener, ON N2M 1B2

Phone: 519-749-6578 ext. 1500



The content of this document has generously been provided by Southlake Regional Health Centre.

