



Supra Ventricular Tachycardia Ablation Patient Information

The Heart

The heart is a pump responsible for maintaining blood supply to the body. It has four chambers. The two upper chambers (the right atrium and left atrium) are the chambers, which receive blood as it returns from the body via the veins. The lower chambers (the right and left ventricle) are the chambers responsible for pumping the blood out to the body via the arteries. Like any pump, the heart has an electrical system that controls how it functions.

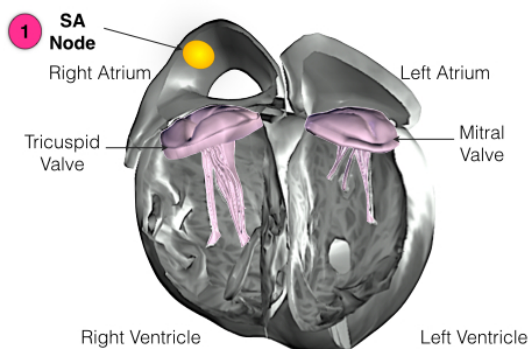
Normal heart rhythm

In order for the heart to do its work (pumping blood throughout the body), it needs a sort of spark plug or electrical impulse to generate a heartbeat. Normally this electrical impulse begins in the upper right chamber of the heart (in the right atrium) in a place called the sino-atrial (SA) node. The SA node is the natural pacemaker of the heart. The SA node gives off electrical impulses to generate a heartbeat in the range of 60 to 100 times per minute. If you are exercising, doing strenuous work or you are under a lot of stress, your heart rate may be faster. When you rest or sleep your heart rate will slow down. If you take certain medications, your heart rate may be slower. All of this is appropriate.

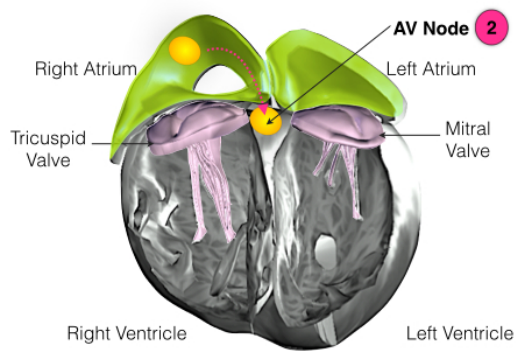
From the SA node, the electrical impulse is relayed along the heart's conduction system. It spreads throughout both the right and left atria causing them to contract evenly.

When the impulse spreads over the right atrium it reaches the atrio-ventricular (AV) node. This is a very important structure in the heart because it is the only electrical connection between the top chambers and the bottom chambers. It is therefore the only way in which an electrical impulse can reach the pumping chambers (the ventricles). The impulse spreads through the AV node and down into the lower chambers or ventricles of the heart. This causes them to contract and pump blood to the lungs and body.

Normal Electrical Rhythm

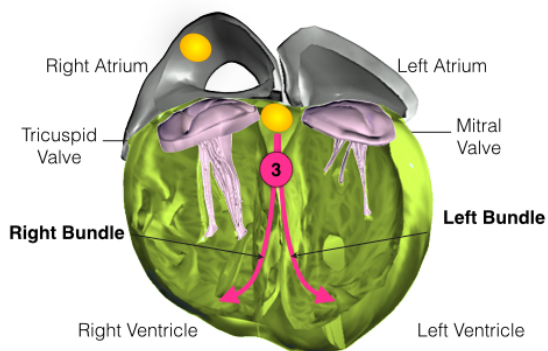


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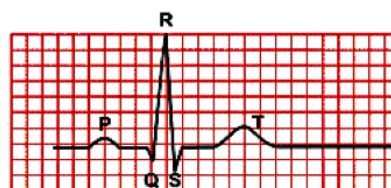
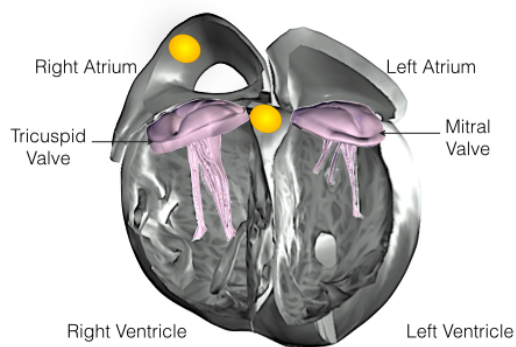
2 "Electrical conduction then activates both atria and travels to a structure called the **AV-Node**. The **AV node** acts as the 'gate keeper' of all electrical impulses to the ventricles."



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3 "After electrical conduction passes through the AV node it travels down the **Left and Right Bundle Branches** which activates the Ventricles and tells them to contract "



"The hearts normal contraction can be seen on the ECG. This ECG shows normal sinus rhythm and is made up of a series of waves called the P, QRS and T wave"

What is Supraventricular tachycardia?

In some hearts, an abnormal heart rhythm develops in the top part of the heart when an electrical impulse either starts from a different location other than the SA node, or follows a route (or pathway) that is not normally present. When this occurs the heart will suddenly start racing. The heart rate is usually over 150 beats per minute and often over 200 beats per minute. Certain things in some people can trigger episodes. These include caffeine, alcohol, anxiety, exercise or sudden movements such as bending over. However, often these episodes can occur at any time without a trigger. During an episode, you will usually be aware of the rapid beating of your heart.

Other symptoms might include dizziness (blacking out may occur but is unusual), shortness of breath, sweating, chest pain and anxiety. After an episode it is usual to feel very tired.

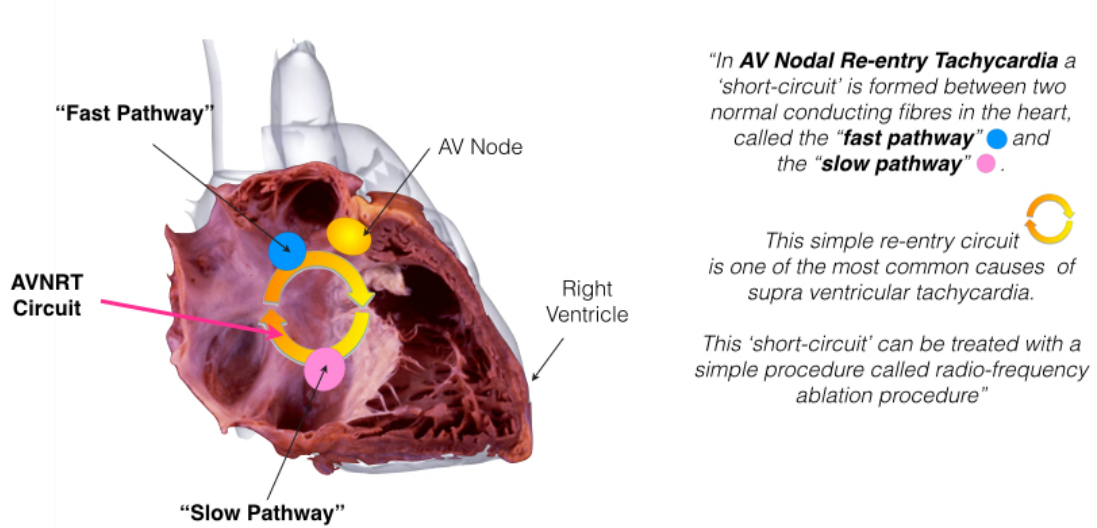
Is Supraventricular tachycardia dangerous?

In the vast majority of cases SVT is a benign condition. This means that it will not cause sudden death, will not damage the heart or cause a heart attack and will not shorten life expectancy. There are some rare exceptions that will be discussed with you if relevant.

How does Supraventricular tachycardia occur ?

There are 3 main types of SVT. It will not always be obvious which type of SVT you have prior to the electrical study of your heart.

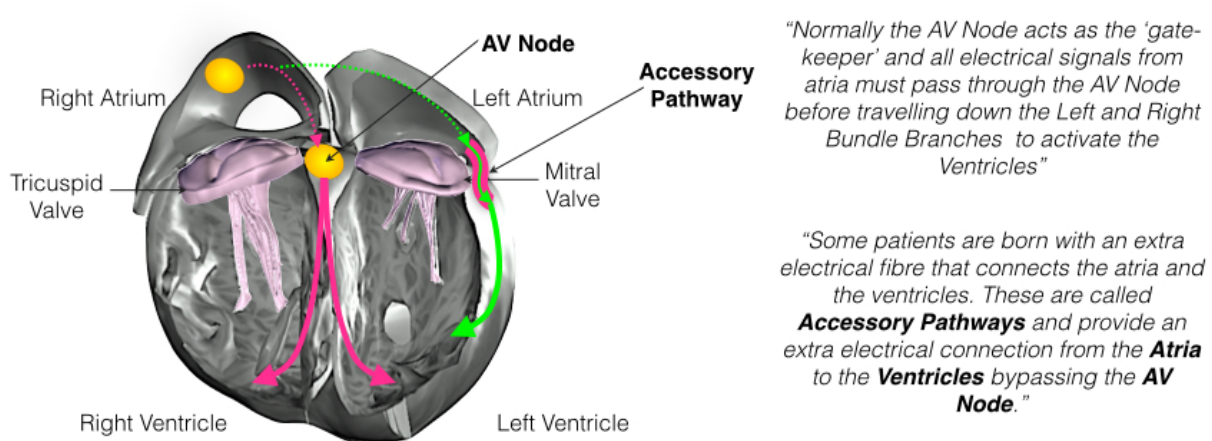
1. AV Nodal Re-entry Tachycardia (AVNRT)



This is the most common form of SVT. An abnormal short circuit (circular conduction) occurs near the AV node. Instead of a single AV node between the top and bottom chambers, there is a second connection that is abnormal. This extra connection has been present since birth. As a result of having 2 connections a short-circuit can occur.

2. Atrio-Ventricular Re-entrant Tachycardia and Wolff Parkinson White Syndrome

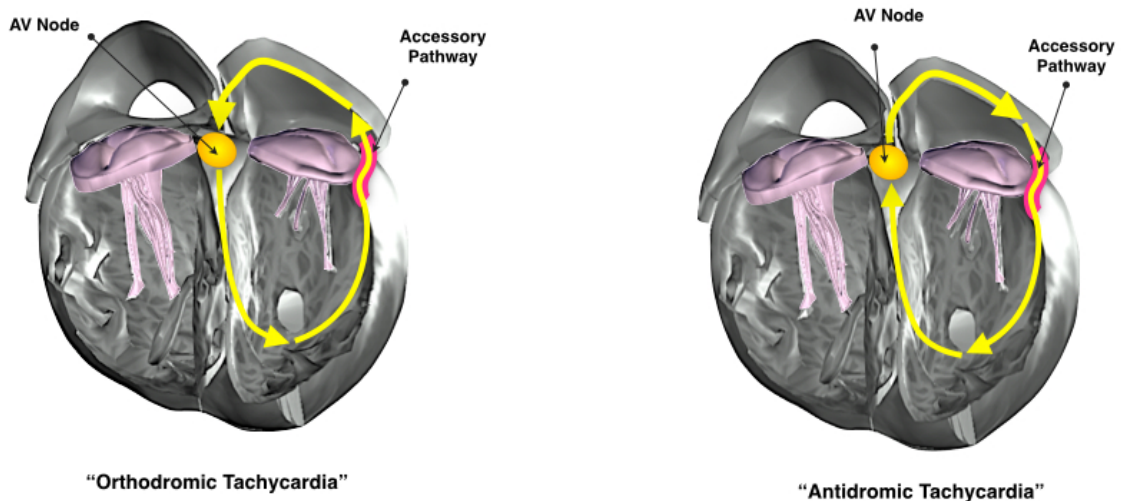
AVRT is an abnormal electrical circuit utilising the AV node and an "accessory pathway" connecting the Atria and Ventricles. These "accessory pathways" are small electrical connections or fibres that have been present since birth. As a result of having these extra electrical connections or "accessory pathways" a short-circuit can develop resulting in palpitations. This condition is sometimes termed the Wolff-Parkinson-White Syndrome or WPW.



2. Atrio-Ventricular Re-entrant Tachycardia and Wolff Parkinson White Syndrome..cont

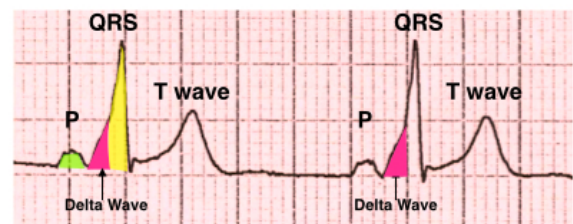
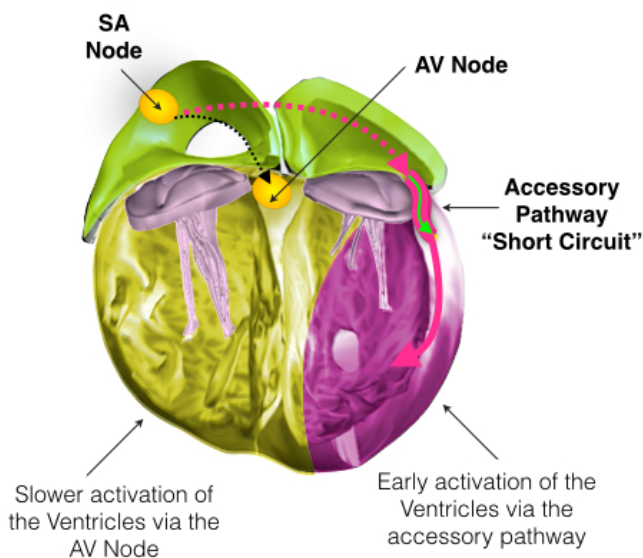
Accessory pathways provide the 'short-circuit' required for re-entry circuits and can result in palpitations. The two common circuits are shown below. The most common circuit utilises the accessory pathway to conduct from the Ventricle back to the Atrium. This is called "**Orthodromic Tachycardia**" and leads to a narrow complex SVT on the 12 lead ECG.

The other circuit uses the accessory pathway to conduct from the Atria to the Ventricles. This is called "**Antidromic Tachycardia**" and results in a wide complex SVT on the 12 lead ECG. Both circuits use the normal AV Node as one limb to complete the re-entry circuit.



Wolff Parkinson White Syndrome (WPW)

Patients with WPW have an accessory pathway that can be seen on the 12 lead ECG. The accessory pathway acts as a short-circuit to the AV node which means the ventricles are activated much earlier than in the normal situation. This earlier activation of the ventricles is called 'pre-excitation' and can be seen on the ECG as the classical "Delta Wave" which is diagnostic of WPW syndrome

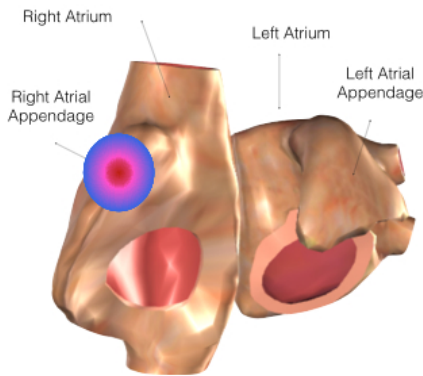


"In WPW, the accessory pathway acts as a bypass tract connecting the Atria to the Ventricles, 'short-circuiting' the AV node.

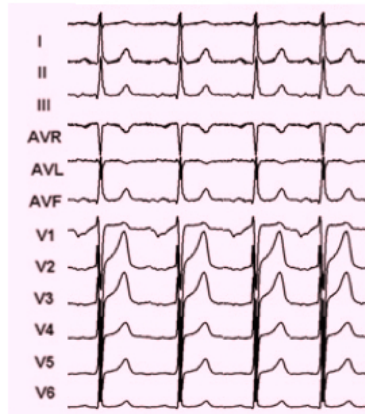
"This leads to much earlier activation of the ventricles compared to normal (called pre-excitation). This is results in the classical 'delta-wave' on the ECG (pink). The rest of the ventricle is activated via the slower conducting AV node"

3. Atrial Tachycardia

This is the least common form of SVT. There is an extra abnormal origin of the electrical impulse from a small area in the atria other than the SA node. It is not known when or why such an extra focus develops.



Atrial tachycardia originating from the Right Atrial Appendage



"ECG of atrial tachycardia"

"Atrial tachycardias are caused by small nests of rapidly firing cells within normal atrial tissue. They are called focal tachycardias"

"Rapid firing of these abnormal cells leads to a rapid heart rate which can cause symptoms such as palpitations and shortness of breath"

What treatments are available for Supraventricular tachycardia?

There are 3 main options for people with SVT.

1. No treatment at all. Because SVT is a benign condition, for those people having infrequent and short-lived episodes that are not troublesome one option is to simply live with it.
2. Medication. For people who do not wish to continue having episodes a second option is to take regular daily medication. There are a variety of different possible medications. Medications reduce the frequency and severity of episodes but do not cure the problem. There is also the possibility of developing side-effects from these drugs.
3. Radiofrequency Ablation. This is a procedure that cures the condition.

What is radiofrequency ablation (RFA)?

Radiofrequency is a low power, high frequency energy that causes a tiny region of the heart near the tip of the catheter to increase in temperature, thus ablating (or cauterising) a small area of abnormal tissue.

Radiofrequency energy has been used for decades by surgeons to cut tissue or to stop bleeding. For the treatment of palpitations, a much lower power of radio-frequency energy is used.

What happens prior to the procedure?

You will need to stop taking any medication that you have been prescribed for your abnormal heart rhythm 5 days prior to your procedure. If you are taking anti-coagulation (blood thinning) medication eg warfarin then you will need to stop this for one week prior to your procedure. If this has not been discussed with you, or if you are unsure please call us.

For procedures being performed in the morning you will usually be admitted to hospital on the evening before. For afternoon procedures you may be admitted on the morning of the procedure. Prior to the procedure you will require an ECG and blood test.

You will be required to fast for at least six hours before the study. If your procedure is in the afternoon you may have a light early breakfast. If your procedure is in the morning, **DO NOT EAT OR DRINK AFTER MIDNIGHT**, except for sips of water to help you swallow your pills.

What happens during a Radiofrequency Ablation Procedure?

The photo below shows an ablation procedure.



You will be transferred to the Electrophysiology Laboratory (EP lab) from your ward. Usually before leaving your ward you will be given a light sedative and your groin will be shaved.

The EP lab has a patient table, X-Ray tube, ECG monitors and various equipment. The staff in the lab will all be dressed in hospital theater clothes and during the procedure will be wearing hats and masks. Many ECG monitoring electrodes will be attached to your chest area and patches to your chest and back. These patches may momentarily feel cool on your skin.

A nurse or doctor will insert an intravenous line usually into the back of your hand. This is needed as a reliable way to give you medications during the study without further injections. You will also be given further sedation if and as required. You will also have a blood-pressure cuff attached to your arm that will automatically inflate at various times throughout the procedure.

The oxygen level of your blood will also be measured during the EP study and a small plastic device will be fitted on your finger for this purpose. Your groin area and possibly your neck will be washed with an antiseptic cleansing liquid and you will be covered with sterile sheets leaving these areas exposed.

An anesthetist will be present for many procedures. The procedure may be performed under local anaesthetic with sedative medication or under full general anaesthetic. This will be discussed with you before the procedure. If the procedure is performed under local anaesthetic, the doctor will inject the anaesthetic to the area in the groin where the catheters are to be placed. After that, you may feel pressure as the doctor inserts the catheters but you should not feel pain. If there is any discomfort you should tell the nursing staff so that more local anaesthetic and sedative medication can be given. Occasionally it is also necessary to place a catheter in a vein in the side of the neck.

The catheters are positioned in your heart using X-Ray guidance. Once the catheters are in place you may feel your heart being stimulated and usually your abnormal heart rhythm will be induced. When the type of abnormal rhythm has been identified and the abnormal tissue localised, the radiofrequency ablation will be applied to this spot. This may cause a transient warm discomfort in the chest.

Radiofrequency ablation procedures are lengthy and the average duration is approximately 2 to 3 hours.

What is the success rate of Radiofrequency Ablation for SVT?

The success rate of the procedure depends on which type of SVT is present but is usually approximately 95% to 98%. The risk of tachycardia returning or recurring after an apparently successful procedure is approximately 1% to 2%.

What should you expect after a Radiofrequency Ablation Procedure?

After your procedure you will be transferred back to your ward where you will have to lie flat for 4-6 hours. During this time, it is important to keep your legs straight and your head relaxed on the pillow.

Most patients stay in hospital overnight and their heart rhythm may be monitored during this time.

The groin area may feel sore and bruised for several weeks after the procedure. You should avoid strenuous physical activity and sports for 2 weeks after the procedure until this has settled. Most people take approximately 1 week off work.

Some people may experience minor chest discomfort and brief palpitations due to extra beats of the heart for several days after the procedure. This is due to the irritation caused by the ablation in the heart and will settle. If this persists or is not mild, it should be reported to our team.

What risks are involved in a Radiofrequency Ablation Procedure?

Radiofrequency ablation procedures are performed on a daily basis at the Royal Melbourne Hospital. It is a common and very low-risk procedure. However, should a complication arise, it will be dealt with at once.

The world-wide complication rate for Radiofrequency ablation procedures is less than 0.5%.

Although most people undergoing Radiofrequency ablation do not experience any complications, you should be aware of the following risks.

- *Local bleeding, blood clot or haematoma* (blood collection) - this may occur at the catheter insertion site.
- *Rapid abnormal heart rhythm* - this may actually cause you to pass out for a very short period of time and in some cases a small electric shock may be required to restore your normal rhythm.
- *Perforation or damage* - very slight chance that this may occur to either a heart chamber or to the wall of one of the arteries.
- *Heartblock* - depending on the location and type of your abnormal rhythm being ablated, there is a chance of damage occurring to the heart's normal electrical system (the AV node). This may be temporary, but permanent damage would result in a **permanent pacemaker** being inserted. This would have to be performed immediately at the time of the procedure.
- Major complications - stroke, heart attack, death are very rare. More than 1200 patients with supraventricular tachycardia have been successfully treated at The Royal Melbourne Hospital during the last ten years by radio-frequency ablation, and no major complications have occurred.

Radio-frequency ablation is an effective and safe way to cure patients suffering from Supra-ventricular tachycardia.

Please do not hesitate to discuss any aspect of the procedure including potential complications with your doctor.