

Electrophysiology / Radio Frequency Ablation

What is an Electrophysiology Study (EPS)?

An EP study is a low risk procedure that has been performed in major medical centres for many years.

The EP study makes it possible to study your abnormal heart rhythm under controlled conditions and diagnose your particular problem.

Who requires EPS?

Patients are referred for EPS for many reasons.

Some of the more common reasons are:-

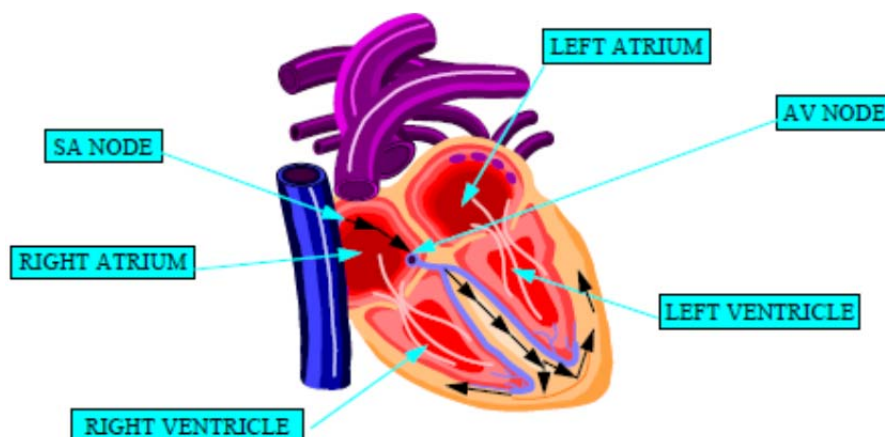
- rapid or irregular heart beat (often associated with shortness of breath, chest pain or dizziness). Common terms used are palpitations, racing heart or missed beats.
- blackout or dizziness.
- abnormal findings on an ECG.

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 (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 exertional work or you are under a lot of stress, your heart rate may be faster. If you take certain medications, your heart rate may be slower.

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.

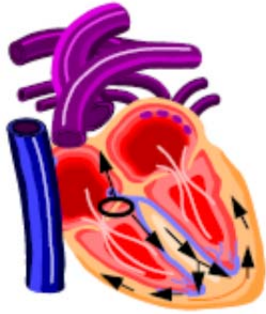
Next, the impulse reaches the atrio-ventricular (AV) node. This special tissue has control over sending the signal to the lower chambers or ventricles of the heart. This causes them to contract and pump blood to the lungs and body.



How do abnormal heart rhythms occur?

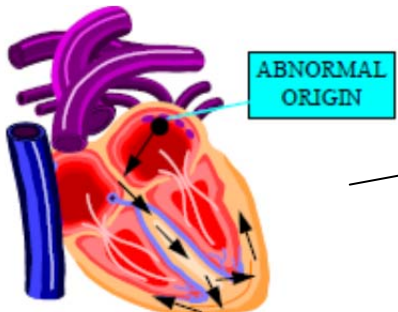
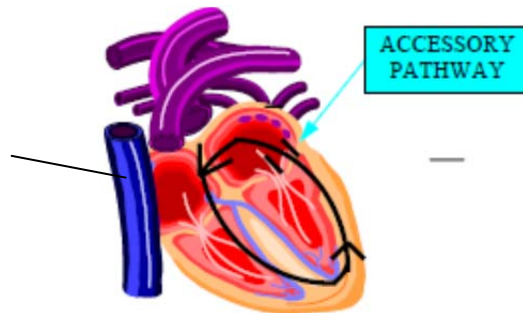
In some hearts, an abnormal heart rhythm develops when an electrical impulse either starts from a different location, other than the SA node, or follows a route (or pathway) that is not normally present.

Your doctor will explain the exact nature of your abnormal heart rhythm and the following diagrams should help you understand the mechanism.



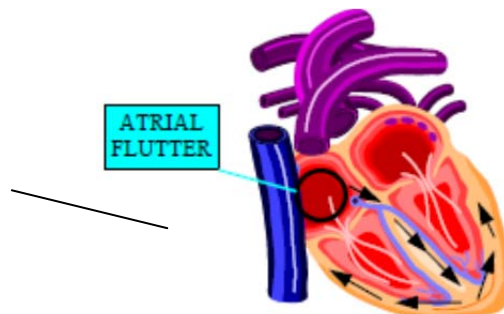
AV Nodal Re-entry Tachycardia
Abnormal circular conduction occurs near the AV node.

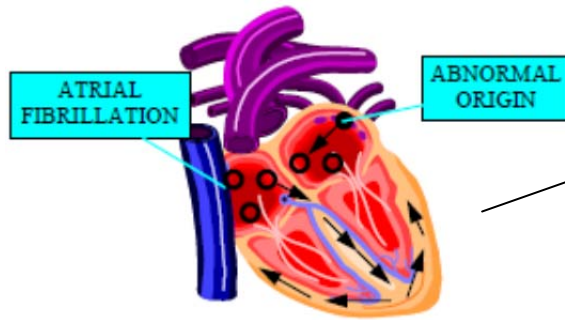
Re-entrant Tachycardia
Abnormal circular conduction utilising the AV node and an "accessory pathway" connecting the atria and ventricles.



Atrial Tachycardia
Abnormal origin of the electrical impulse from a small area in the atria other than the SA node.

Atrial flutter
A single abnormal electrical short-circuit originates from the right atrium

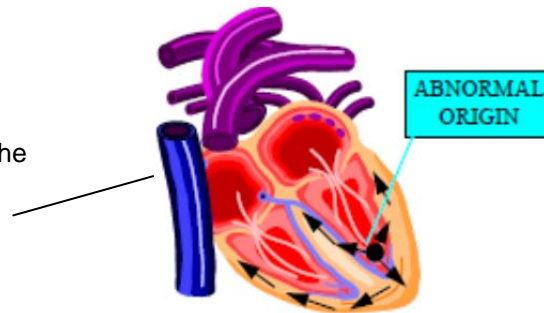




Atrial fibrillation

Abnormal electrical impulses originating usually in the left atrium trigger multiple moving short-circuits in both atria.

Ventricular Tachycardia
Abnormal origin of the electrical impulse from the ventricles.



What happens prior to your procedure?

You will receive a letter outlining the date of your procedure and date and time of your admission to the hospital admission.

In some cases a letter asking you to cease taking your medication is enclosed. This generally refers only to the medication you are taking for your abnormal heart rhythm and this should be stopped 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 5-7 days prior to your procedure.

If you are to be admitted to the Alfred Hospital, you will be required to attend a Pre-admission clinic on the day prior to your procedure. Some country patients may need to make arrangements to stay overnight with family or friends.

At the pre-admission clinic you will see a doctor who will record your medical history. You will also require an ECG and blood test. The doctor will also confirm the time you should be at the hospital for admission the following day.

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 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 an EP study?

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 theatre 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, which 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 or arm will be washed with an antiseptic cleansing liquid and you will be covered with sterile sheets leaving these areas exposed.

The doctor will inject local anaesthetic to the area where the catheters are to be placed. After that, you may feel pressure as the doctor inserts the catheters but let the staff know if there is any discomfort so some more local can be given. Once the catheters are in place you may feel your heart being paced and possibly your abnormal heart rhythm will be induced.

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 a small area of 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 is used.

Which patients are suitable for RFA?

Depending on the findings at your EP study it may be possible to ablate the mechanism for your abnormal heart rhythm. This is usually done at the same time as your EP study as the necessary electrodes within the heart are already in place.

Are there alternatives to radiofrequency ablation?

Before the advent of radio-frequency ablation patients had two options to control their palpitations. One is life-long medication, which works well in some patients, but requires the patient to take daily medication. There is also the possibility of side-effects from these drugs.

The other way of controlling the problem was by open-heart surgery to cut the accessory pathway. This was a very successful technique and many patients were cured of their palpitations in this way. Besides the small risk of open heart surgery and operation leaves a permanent scar on the chest.

What risks are involved in an EP study/RFA?

The EP study is a very low-risk procedure and should a complication arise, it will be dealt with at once. The world wide complication rate for EP/RF studies is less than 0.5%.

Although most people undergoing EP/ RF studies do not experience any complications, you should be aware of the following risks.

- *Local bleeding 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. This may be temporary, but permanent damage would result in a pacemaker being inserted.
- Major complications - stroke, heart attack, death are very rare.

Radio-frequency is an effective and safe way to cure patients suffering from palpitations.

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

What to expect after your procedure

After your procedure you will be transferred back to your ward where you will have to lie flat for 4 hours depending on which blood vessels have been punctured. 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 majority of patients have 2-3 days away from work.

Special note

If there is any chance you may be pregnant, please notify the doctor before your procedure.