



Electrophysiology Heart Study

- EPS -

What is an EPS?

EPS is short for **E**lectro**P**hysiology heart **S**tudy. This procedure looks at the electrical system of your heart. An EPS will show if you have a heart rhythm problem and what is causing the problem. This procedure is done when you have problems such as fainting, dizziness, heart palpitations or an abnormal heart beat.

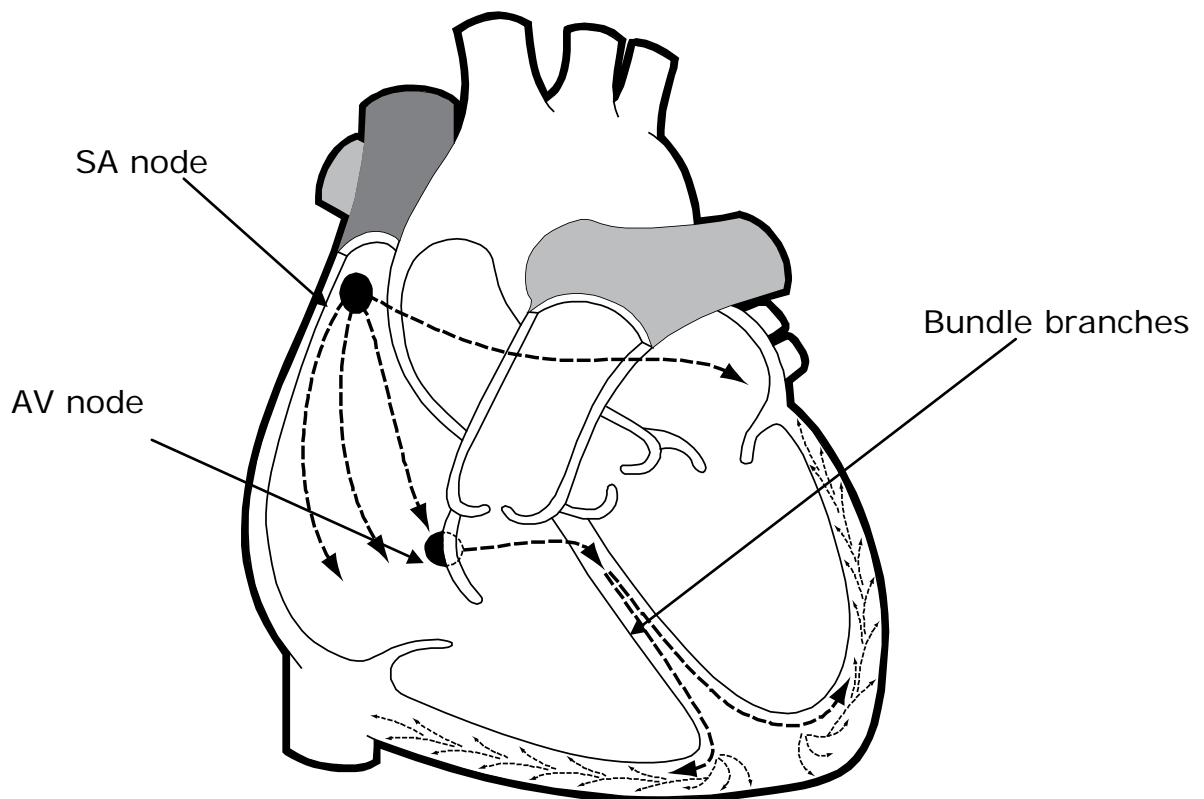
How does the heart work?

To understand this procedure, you need to know how the heart's electrical system works.

The sinoatrial node (SA node) is a natural pacemaker. It starts the electrical signal that travels across the upper 2 chambers or atria of the heart to the atrioventricular node (AV node).

The AV node transfers the electrical signal from the upper part of the heart to the lower 2 pumping chambers or ventricles. The bundle branches are specialized tissue that help send electrical impulses through the ventricles. This makes a normal heart beat.

This makes a normal heart beat, called normal sinus rhythm.



The electrical system coordinates the pumping action of the heart's 4 chambers.

What causes heart rhythm problems?

Problems happen when the heart beats too fast or too slow. Some people are born with heart rhythm problems. Problems may also be caused by aging or heart disease.

There are many different kinds of arrhythmias.

Problems occur when the heart beats too fast or too slow. When this happens you may feel:

- dizzy
- faint
- short of breath
- very tired
- palpitations (pounding in your chest)

The treatment for heart rhythm problems may include one or more of the following:

- medication
- a pacemaker
- a defibrillator
- ablation

Why do I need to have an EPS?

You are having an EPS to show what type of heart rhythm problem you have.

What are the risks of an EPS?

The risks vary with each person and are related to your health condition and type of arrhythmia.

Your doctor will explain your risks to you before the procedure and ask you to sign a consent form. Make sure you understand the risks and benefits of the procedure before you sign the consent form.

Possible risks for EPS include:

- bleeding from the vein at the puncture site
- bruising or infection at the puncture site
- small risk of stroke, heart attack or death
- small risk of complete heart block needing pacemaker
- small risk of bleeding or air leak around the lungs and heart

Where will I have my procedure?

Your procedure will be done in the Cardiac Arrhythmia Unit, also called the Electrophysiology (EPS) Lab.

The unit is at the Hamilton General Hospital. The EPS is done by a specially trained doctor, called an electrophysiologist.



Where do I go when I arrive at the hospital?

Go to Admitting. After you have been admitted, you will be directed to the Cardiac Arrhythmia Unit. You may bring 1 or 2 family members or friends to be with you before and after your procedure.

In the Cardiac Arrhythmia Unit:

- You will change into a hospital gown.
- An intravenous (IV) will be started in your arm.
- You will be asked to empty your bladder just before the procedure.
- You will have hair clipped in your groin and chest areas.
- You may have a tube put into your bladder to drain urine.
- You will be given some sedation to help you relax.
- You may wear your glasses, hearing aids and dentures.
- You will be taken to the EPS Procedure Room.

What can I expect in the EPS Procedure Room?

A team of doctors and nurses who specialize in heart rhythms will greet you. They will be wearing operating room clothes. You will meet the doctor who will do the procedure. This team will be with you throughout the procedure.

The room is cool to protect the computers and special equipment.

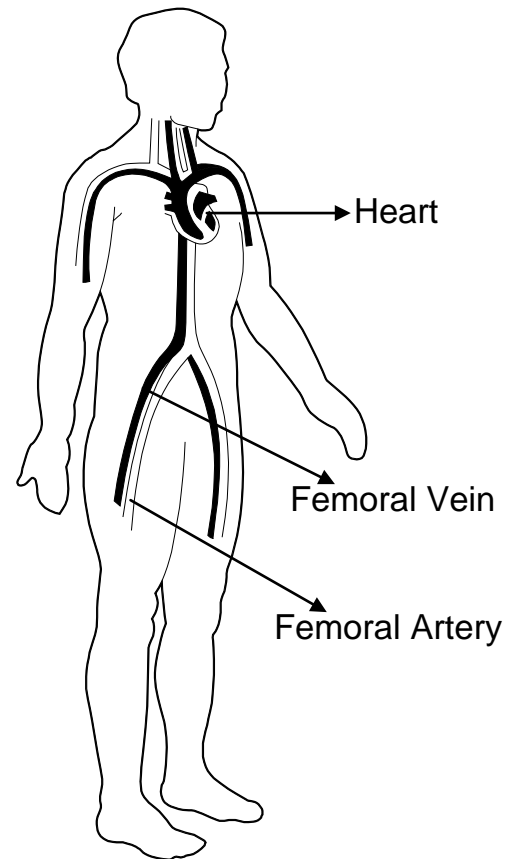
You will not receive a general anesthetic.

You will be given medication through your intravenous throughout the procedure to keep you comfortable.

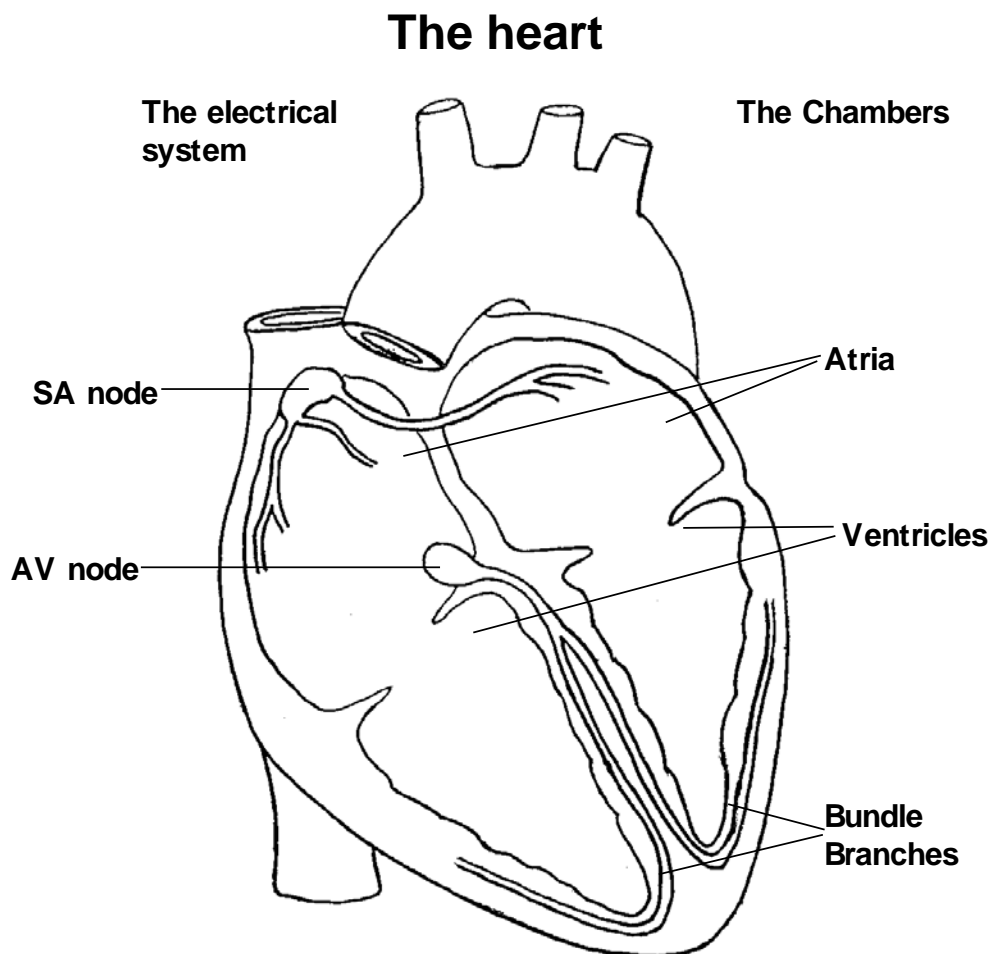
If you are uncomfortable, let your nurse know.

How is an EPS done?

- You will lie on a special table that is hard and narrow.
- You will be connected to an electrocardiography (ECG) monitor and a blood pressure cuff to monitor you during the procedure.
- You will also be connected to a number of sticky pads to help the doctor do the procedure safely.
- Clipped areas will be cleaned with an antiseptic.
- Sterile sheets will be placed over you. The staff will provide you with as much privacy as they can.
- The site will be injected with a local anesthetic or “freezing”. This will sting for a few moments and then the area will become numb. You will feel pressure and movement at the site during the procedure, but should not feel pain.
- The doctor will use a needle to access a vein in your groin (femoral vein) and sometimes in your neck or shoulder. A small thin hollow tube called a sheath is inserted through the skin into the vein. Temporary pacemaker wires are placed through the vein into your heart. These wires are very thin and flexible. The doctor watches an x-ray screen to guide the wires into your heart.
- An x-ray camera will move over you during the procedure, but will not touch you.
- The pacemaker wires measure the timing of your heart’s electrical system. The doctor can tell what problem is causing your problems. For example, a slow heart beat may cause dizziness.



- Some of the pacemaker wires send small electrical impulses called “pacing”. You cannot feel the impulses. The doctor may use these wires to trigger your problem to see what happens inside your heart when you have symptoms. You may feel your heart beating quickly or missing a beat.
- If you are having an ablation, a special catheter will be placed through a sheath in your groin to your heart. The end of the catheter will heat up and cauterize (destroy) the tissue causing the problem.
- If you are uncomfortable, let your nurse know.
- You may receive medication to speed up or slow down your heart.
- When the procedure is done the wires are removed. The puncture site seals itself so there is no need for stitches. Bandages are placed over the site where the wires were put in.



The electrical system coordinates the pumping action of the heart's 4 chambers

What happens after an EPS?

While you are in the hospital

- You will return to the Arrhythmia reception area to recover.
- You will feel sleepy. You may have trouble remembering some parts of the procedure afterwards. When you wake up these effects will go away.
- You will rest in bed for 4 hours. The head of your bed may be raised up to 30°.
- You will keep your leg straight and your head on the pillow for 4 hours.
- Drink fluids and eat while you are resting.
- Call the nurse if you need to use the bathroom while in bed. You will be given a bedpan or urinal.
- You may need to stay in the hospital overnight or you may go home after 4 hours. If you need to stay overnight, you will be transferred to another area.

**You must arrange to have someone drive
you home from the hospital.
Do not drive for 48 hours.**

What do the results mean?

The results of this procedure will be different for each person. The doctor will talk to you about your results and treatment options after the procedure.

When you go home

- Although you may feel fine the next day, the effects of the sedation may still be with you. Do not operate heavy equipment or power tools. You may want to delay signing contracts or other financial decisions for that day.
- Limit your lifting to less than 4 kilograms or 10 pounds for the next 2 to 3 days.
- If you see blood on your bandage, place firm pressure on the area for 5 minutes. If bleeding continues, call your doctor or go to the Emergency Department.
- If you develop a lump under your bandage and it continues to get bigger, place firm pressure on the bandage. Then, call your doctor or go to the Emergency Department.
- You may remove your bandage the next morning.
- You may shower the next morning. Do not soak in water, such as a pool, hot tub or bathtub for the next 3 days.
- You can walk or do gentle exercises when you get home. Do not do strenuous exercise for the next 3 days.
- Ask your doctor when you will be able to return to your regular exercise routine.
- Ask your doctor when you will be able to return to work. The type of work you do will determine when you can return to work.

Will I have to take any medications?

Before you go home, talk about your medications with your doctor or nurse.

Follow-up appointments

Talk to your doctor or nurse about your follow-up appointments.

Types of heart rhythm problems

Your heart rhythm problem is called:

- AV Nodal Reentrant Tachycardia
- Atrial Fibrillation
- Atrial Flutter
- Wolff-Parkinson-White Syndrome (W.P.W.) or Accessory Pathway
- Ventricular Tachycardia
- Other _____

AV Nodal Reentrant Tachycardia (AVNRT)

This is one of the most common forms of fast heart beats. Fast heart beats are also called tachycardia. Tachycardia is caused by an AV node that has two pathways inside. One pathway is fast and one is slow. Sometimes during stress or exercise, these pathways create an electrical circle. This circle is like a revolving door spinning fast. It feels like your heart is racing.

Some people are able to stop the tachycardia by changing their breathing, bearing down or by other methods. Over time, it may become harder to control.

In order to prevent the tachycardia, you need to stop one of the pathways. The doctor ablates one pathway so there is only one path to follow.

Atrial Fibrillation (AF or AFib)

When the natural pacemaker starts each heart beat, the heart has a regular beat called normal sinus rhythm. When you have Atrial Fibrillation, many parts of your atria heart muscle start heart beats. This causes irregular heart beats. Atrial Fibrillation is also called AF or A Fib.

Many people with Atrial Fibrillation are treated with medications alone. Some people need to have ablation for relief of their symptoms.

❑ **Atrial Flutter**

This heart rhythm happens when there are very fast electrical impulses starting in the atria. The impulses are called "flutter waves". You can have 300 flutter waves a minute. Some of the flutter waves go to the ventricles. It causes the ventricles to beat very fast, making your whole heart beat too fast, sometimes up to 150 beats or more a minute.

The flutter waves form a circle. The doctor ablates a line to break the electrical circle. This leaves you with a normal heart beat.

❑ **Wolff-Parkinson-White (W.P.W.) Syndrome or Accessory Pathway**

When you have W.P.W. Syndrome, your heart beat follows more than one pathway between the atria and the ventricles. These pathways are like very fine strands of muscle. When your heart beats, the impulse travels along the normal path as well as an abnormal path. Some people have more than one abnormal path.

Sometimes the impulse goes around in a circle using the normal and abnormal paths. This can cause a very fast heart beat called tachycardia. The heart beat may be as high as 300 beats a minute. When this happens, you may feel unwell, dizzy, lightheaded or nauseated. You may also feel your heart pounding or racing in your chest. W.P.W Syndrome is treated by ablation.

Ablation destroys the extra pathway. This leaves you with a normal conduction system and heart rhythm. Some pathways are harder to find and treat. You may need to have more than one pathway ablated.

❑ **Ventricular Tachycardia**

Some fast heart rhythms come from the lower chamber of the heart, called the ventricles. These fast rhythms can be due to a heart attack scar or a weak heart. The treatment for tachycardia may include medications, implantable defibrillator or ablation.

Ablation may stop the electrical impulses that cause the tachycardia. It can break the circle of electricity around the scar or destroy the pinpoint spot.

Websites

Canadian Heart Rhythm Society – www.chrsonline.ca

Heart Rhythm Society – www.HRSonline.org

Heart and Stroke Foundation – www.hsf.ca

Mayo Clinic – www.mayoclinic.com

Biosensewebster – www.biosensewebster.com/patientEducation/

Common terms

This list explains common terms you may hear or read about. If you would like more information, ask the team.

Ablation (also called Radio Frequency Ablation)

A treatment for abnormal heart rhythms. Heart tissue that causes abnormal heart rhythms is destroyed using a special catheter. Ablation leaves the normal pathways in place.

Ablation and Pacing

A procedure for atrial fibrillation in which the AV node is destroyed and a pacemaker is put in to maintain a normal heart rhythm.

Antiarrhythmic Drugs

Medications to treat abnormal heart rhythms.

Arrhythmia

A change in the heart rhythm that makes the heart beat too fast, too slow or irregularly. This is also called dysrhythmia.

Bradycardia

The slowness of the heart beat.

Cardioversion

A therapy used to treat rapid heart beats.

Defibrillation

A technique where an electric shock is given to the heart to treat life threatening arrhythmias.

Dual Chamber Pacing

A pacemaker that senses and treats arrhythmias in both the upper and lower heart chambers.

Echocardiogram

A test that uses ultrasound pulse waves. This test shows a picture of the heart and how it contracts during a heart beat.

Event Recorder

A device that shows the electrical activity of the heart. It is used to diagnose fainting when regular testing does not reveal the cause. It may be applied outside the body or implanted under the skin.

Heart Block

A condition where electrical impulses are unable to travel from the atria to the ventricles.

Holter Monitor

A small portable monitor that continuously records the heart rhythm for about 24 hours.

Implantable Cardioverter-Defibrillator or ICD

A device that is implanted under the skin like a pacemaker. It senses and treats heart rhythms that are too fast or too slow. It can also deliver an electric shock if a life-threatening rhythm happens.

Implantable Loop Recorder

A small monitor that is implanted for up to 14 months. It is used to diagnose fainting.

Pacemaker

A pacemaker is used to help the heart beat at a normal rate. There are 2 types of pacemakers. One is called a temporary pacemaker and one is called a permanent pacemaker. A temporary pacemaker remains outside of your body and may stay in place for 5 to 7 days. A permanent pacemaker is placed under the skin of your chest or stomach.

Pacing

A procedure that uses an electrical signal to stimulate the heart to beat.

Palpitation

The feeling of strong or forceful heart beats. The heart beats are usually fast or irregular.

Sudden Cardiac Death (SCD)

Death caused from the sudden loss of heart function.

Supraventricular Tachyarrhythmias (SVT)

Abnormal heart rhythms that start in the upper chambers of the heart, called the atria.

Syncope

The medical term for fainting.

Tachycardia

Fast heart beats.

Tilt Table Test

A test to find the cause of repeated fainting or syncope.

Ventricular Fibrillation

A rapid and chaotic heart rhythm that causes sudden cardiac death. The treatment is electric shock to reorganize the heart rhythm.
