



Arrhythmia Center

Comprehensive Assessment * Continuity of Care * State-of-the-Art Technology
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PATIENT GUIDE FOR EPS/RFA



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USC: SETTING THE STANDARD FOR CARE

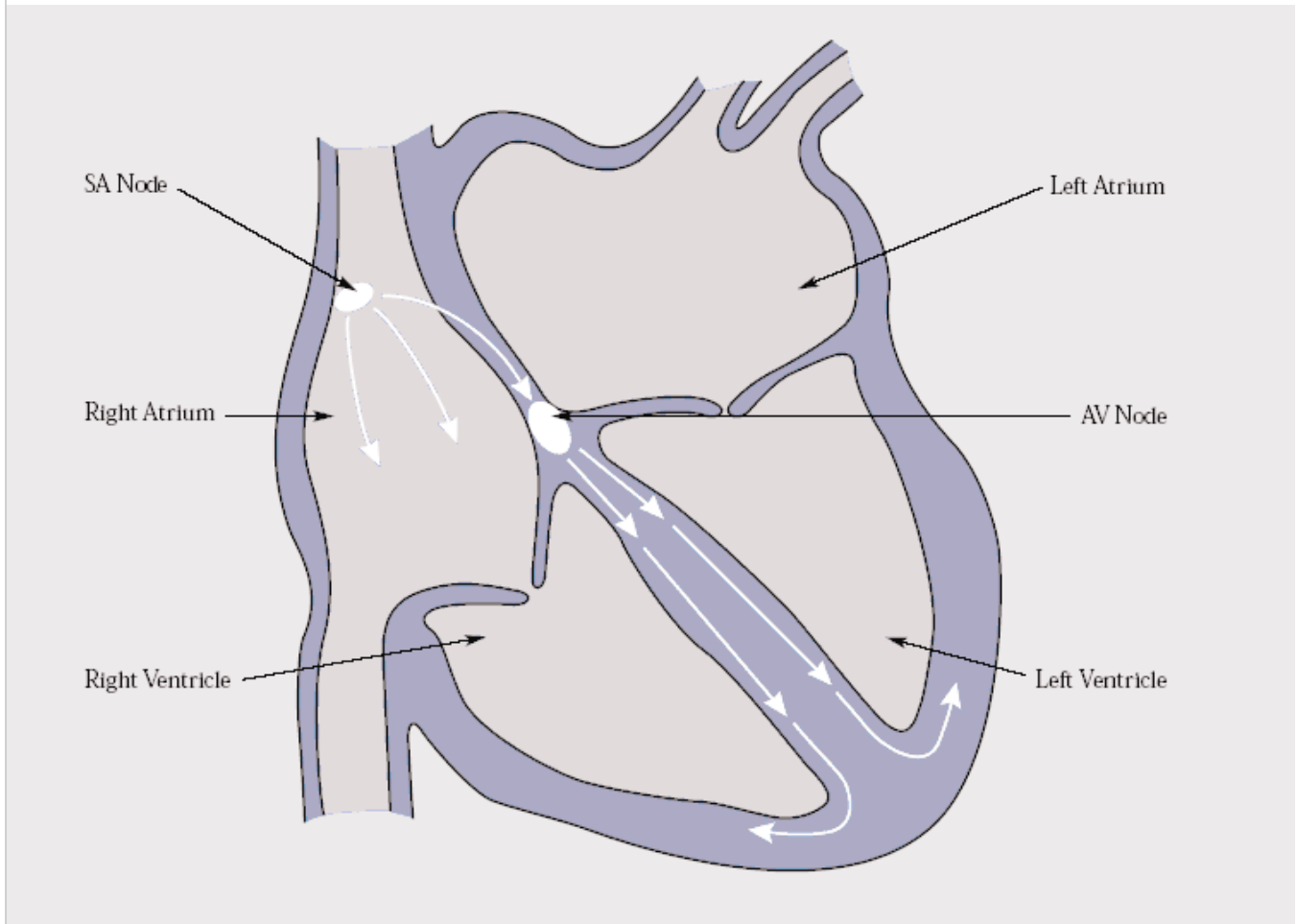
This brochure was created to assist you, your family and your friends in understanding the invasive procedures performed at USC University Hospital.

THE NORMAL HEART

Before learning the details of an EP study, you may find it helpful to understand how your heart works. Understanding how the normal heart functions will in turn help you understand your procedure. The heart is muscular and hollow, constantly pumping blood to deliver oxygen and nutrients to the body. It is comprised of four compartments or chambers - two on the right side and two on the left. The upper chamber on each side, called the atrium (plural: atria), receives and collects blood. The lower chambers - the ventricles - pump blood. All four chambers work together to move life-sustaining blood through the body.

The heart's rhythmic contractions depend on an electrical system which conducts impulses throughout the heart. The sino-atrial (SA) node (see illustration) is where the electrical impulse normally begins, setting the pace for the heartbeat. The impulse spreads through the atria, causing a contraction and squeezing blood into the ventricles. From the atria, the impulse reaches the atrioventricular (AV) node - a site where each electrical impulse slows down before it passes through to the ventricles. Normally, except at the AV node, the atrium is electrically insulated from the ventricle by fibrous tissue. Through a specialized muscle fiber system, the impulse is distributed throughout both ventricles, causing them to contract and pump blood. This normal conduction is called regular sinus rhythm - the rhythm is even and the heart beats 60 to 100 times per minute.

THE NORMAL HEART



THE PREMATURE HEARTBEAT

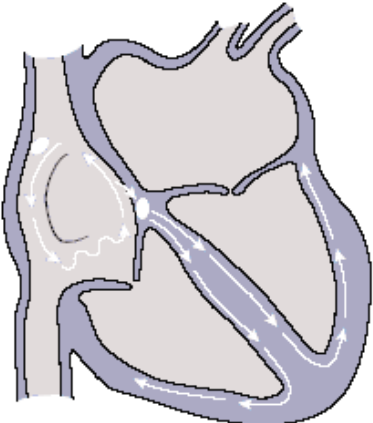
A premature heartbeat comes too soon or early and interrupts the regular pattern of the heart. Premature beats may originate in the atrium (premature atrial contractions or PACs) or in the ventricles (premature ventricular contractions or PVCs), producing a sensation that your heart is “skipping” or “flip-flopping” in your chest. Because the early beat does not allow the heart to fill properly, the following “normal” beat feels very strong due to the increased blood volume in the heart. This “pounding” sensation is what most people say bothers them.

Although premature beats are more common in people with heart disease, almost everyone has experienced a “skipped” beat once in a while, which may be due to smoking, fatigue, alcohol, caffeine, other stimulants, or may have no apparent

cause. Usually, single premature beats require no treatment. However, when they are frequent or annoying, and medication has not been able to suppress them, your doctor may recommend a test to search for their cause.

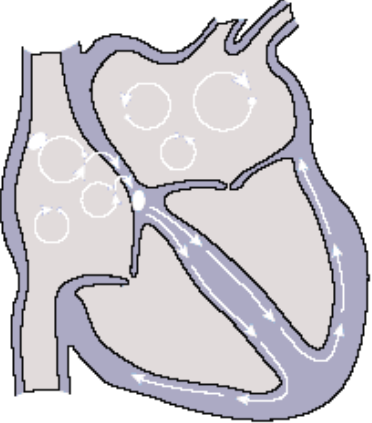
PREMATURE HEARTBEAT

ABNORMAL HEART RHYTHMS



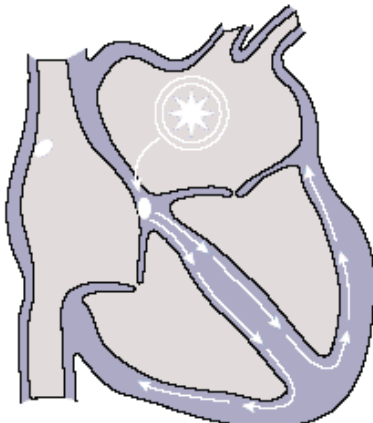
1. Atrial Flutter

Abnormal circular conduction through a large area of the right atrium.



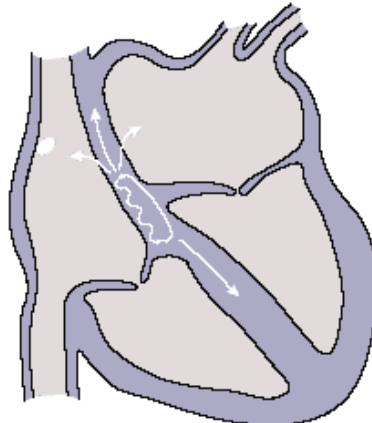
2. Atrial Fibrillation

Electrical impulses originating from multiple sites in the atria, causing irregular, erratic and unusually fast heartbeats.



3. Atrial Tachycardia

Origin of the electrical impulse from an area in the atria other than the SA node.



4. AV Nodal Reentry Tachycardia

Abnormal circular conduction in the AV node.

PREMATURE HEARTBEAT

ABNORMAL HEART RHYTHMS



5. WPW-Sinus Rhythm

An extra connection (accessory pathway) is present between the upper chamber (atrium) and lower chamber (ventricle). Patients with such a connection are said to have the Wolff-Parkinson-White syndrome (WPW). The extra connection is shown here during normal sinus rhythm.



6. WPW-Orthodromic Reciprocating Tachycardia-Common

Here, the extra connection is seen being used to complete a circuit which causes the tachycardia. The electrical impulse flows down the normal AV node from the atrium to the ventricle, then returns back to the atrium via the accessory pathway, which acts as a "short circuit" to perpetuate the arrhythmia.



7. Complete Heart Block

Interruption of the electrical impulses between the atria and ventricles.



8. Ventricular Tachycardia

Abnormal origin of the impulse from the ventricles; may be quite serious.



9. Ventricular Fibrillation

Abnormal origin of the impulse from the ventricles; is life threatening.



10. Inappropriate Sinus Tachycardia

Impulses arise near the normal sinus node but at excessive rates.

THE ELECTROPHYSIOLOGY STUDY

Your doctor has suggested that you have an electrophysiology (EP) study and possibly a radiofrequency (RF) catheter ablation.

The EP study allows doctors to:

1. provoke and examine an arrhythmia under controlled conditions;
2. acquire more accurate, detailed information than with any other diagnostic test;
3. choose the most effective treatment for you;
4. provide treatment (see catheter ablation) during the same session (in many cases.)

During the study, doctors insert special electrode catheters - long, flexible wires - into veins and guide them into the heart. These catheters sense electrical impulses and may also be used to stimulate different areas of the heart. Doctors can then locate the sites which are causing serious arrhythmias.

PREPARING FOR THE EP STUDY

Before your EP study, you should:

- get specific instructions for the day of the procedure: you will be asked not to eat or drink anything for at least 8 hours before the procedure to prevent nausea and vomiting;
- **make arrangements with a friend or family member to drive you to and from the hospital;**
- bring a list of the names and dosages of all your current medications;
- you will be instructed to stop taking certain medications several days before the study to assure more accurate results; also, blood thinners such as Coumadin (warfarin) are usually stopped 4 days beforehand. If you are taking a blood thinner, please make sure your doctor knows about this.
- be sure to mention allergic reactions you have experienced from any medications to the doctor or nurse, but also remember that a side-effect (like nausea) and an allergy are not necessarily the same thing.

Prior to your procedure, your doctor will review your medical history and examine you. He or she will also explain the purpose of the procedure, its potential benefits and possible risks.

Because an EP study is "invasive," requiring the insertion of catheters into the body, it involves some risk. The risk is small, however, and the study is relatively safe. Most patients who undergo EP studies do not experience complications, but you should discuss your particular risk factors with your doctor, as well as any questions, concerns or feelings you have.

Our EP nurse coordinator will meet with you and your family before your procedure to review this booklet and answer any additional questions you may have.

You will enter the hospital as an outpatient and have several routine lab tests, including an ECG and blood tests either in clinic or right before the study.

Final preparations for the procedure include:

- A small intravenous needle ("IV line") will be inserted into a vein in your arm for medications to be injected and to provide you with relaxation and pain relief during the procedure.
- For your comfort, empty your bladder as completely as possible before the study starts (a bedpan or urinal will be available during the procedure.)

THE PROCEDURE

The EP study is performed in the electrophysiology laboratory of the Cardiac Catheterization Lab in the hospital. You will change into a hospital gown and be placed on an x-ray table. An x-ray tube and monitoring screens will be close by, as will heart monitors and various instruments. You will be connected to monitors with electrodes and gelatin patches. A blood pressure cuff will be put on your upper arm so that we may monitor your blood pressure frequently.

A staff member will shave and cleanse the area where the catheters will be inserted (the groin and/or neck) to protect against infection. The area will be cleansed with betadine - an orange-brown, sticky antiseptic. Sterile towels and sheets will be draped over your body. It is important you find a comfortable position so that once the study begins, you will not touch the sterile working area.

During the study, you may be given some sedative medications by intravenous infusion to make you sleepy. This will serve to reduce your anxiety and relieve your discomfort. In addition, a local anesthetic will be given with a tiny needle to numb the area where the catheters are placed. You'll feel a pin-prick and possibly a stinging sensation from the anesthetic for just a few seconds.

One or more catheters will be inserted into a large vein in your groin and/or neck, and advanced to your heart. The positioning of catheters inside your heart will be monitored on a screen. You may feel pressure when the catheters are inserted but no other discomfort. The incision site is less than a quarter-inch and should not leave a scar after it heals.

There are two parts to the EP study:

1. recording the heart's electrical signals to assess the electrical function;
2. and pacing the heart to bring on certain abnormal rhythms for observation under controlled conditions.

Medications are sometimes used to stimulate your arrhythmia, so you may feel your heart racing or pounding. This may make you anxious, but you needn't be alarmed. The doctors want to induce the abnormal rhythm causing your problem, so that they can treat the arrhythmia. If you have any uncomfortable symptoms - chest pain, dizziness, shortness of breath, nausea or any other pain - tell your nurse or doctor.

YOUR ROLE DURING THE STUDY

The EP study should not cause you any pain. It is important that you stay calm and relaxed, and not move your arms or legs in the sterile working area. If you feel any discomfort, let your doctors or nurses know, so they can help you get comfortable.

In the controlled condition of the EP laboratory, induced arrhythmias are handled by well-trained personnel with state-of-the-art equipment. And, perhaps most importantly, the doctor uses the information gathered from the induced arrhythmia to prevent future occurrences.

AFTER THE STUDY: THE RECOVERY

- The catheters will be removed and pressure applied to the groin and/or neck to prevent bleeding.
- You will lie still in bed for up to three hours to allow the site of the catheter to seal. You must not move or bend your leg.

- You will be checked frequently, but if you feel sudden pain or see bleeding at the site, call the nurse immediately.
- You may be able to discuss some of the preliminary findings with your doctor after the test.
- You may be able to eat or drink if you feel well enough.

Before discharge, your doctor or arrhythmia nurse coordinator will instruct you about restrictions to normal activities, medications and follow-up care.

TREATMENT

Depending on the type and severity of your arrhythmia, and the results of various tests including the EP study, there are several treatment options. You and your doctor will decide which one is right for you.

Medications

Certain anti-arrhythmic drugs change the electrical signals in the heart and help prevent abnormal sites from starting irregular or rapid heart rhythms. Some medications need to be initiated on a monitored hospital ward.

Follow-up EP Study

To make sure the medication is working properly after two or more days in the hospital, you may be brought back to the EP laboratory for a follow-up study. Our goal is to find the drug that works best for you.

Artificial Pacemaker

Implanted inside the body, ready to pace the heart, this device is used to treat very slow heart rhythms. A pulse generator is implanted beneath the skin below the collarbone; one or more pacing wire(s) connect the pulse generator to the heart and carries electrical impulses. This implanted device will act as a safety net if your heart rate falls below the set rate.

Catheter Ablation

Radiofrequency catheter ablation destroys or disrupts parts of the electrical pathways causing the arrhythmias, providing relief for patients who may not have responded well to medications, or for whatever reason would rather not or cannot take medications. This technique has a high percentage of successfully “curing” many types of arrhythmias.

Radiofrequency catheters are positioned close to the abnormal electrical pathway and high frequency current is passed through them. The tip of the catheter - about the size of a pencil eraser - ablates (destroys) the site of the abnormal pathway using radio waves. Since scar tissue cannot transmit electrical impulses, after ablation, the heartbeat will only follow the normal electrical pathway. The ablation causes a very small scar or blemish within the heart and will not interfere with the normal conduction or normal function of the heart.

The radiofrequency catheter is a thin, flexible wire that can be externally steered to pace, monitor and locate the site of the arrhythmia. The catheter is placed in the heart using x-ray guidance and sometimes using sound waves (ultrasound catheter imaging or Carto 3-D mapping and navigation system to better locate the arrhythmia). The ablation catheter can also record the temperature where the catheter tip touches the heart wall when ablating or destroying the abnormal heart rhythm. We also have specialized ablation catheters including the cold water cooled tip for better results.

Implantable Cardioverter-Defibrillator (ICD)

We implant devices in those who are at risk for sudden cardiac death (SCD). Studies have shown that patients are susceptible to SCD when they have had a previous heart attack or heart damage. These devices are placed for primary prevention of cardiac arrest, even if a previous arrest has not occurred.

If a patient has a documented episode of cardiac arrest due to ventricular fibrillation or ventricular tachycardia, not due to a transient or reversible cause, an ICD will be implanted to deliver a life saving shock. For people who have had life-threatening rapid heart rhythms, an ICD delivers an electric shock to the heart when necessary. Like pacemakers, only larger, ICDs are usually implanted beneath the skin below the collarbone.

Familial or inherited conditions with a high risk of life-threatening ventricular tachyarrhythmias such as long QT syndrome or hypertrophic cardiomyopathy are also situations requiring device implantation.

Patients with coronary artery disease (CAD) who are post-MI, have an ejection fraction less than or equal to 35% and have inducible, sustained ventricular fibrillation (VF) during an electrophysiology study qualify for this device.

Patients with an ejection fraction less than or equal to 30% and a QRS duration greater than 120 milliseconds are also qualified for this procedure. Placement of a bi-ventricular device will assist in resynchronizing both chambers of the heart.

AFTER THE STUDY: AT HOME

- Limit your activity for the first 24 hours. Don't strain or lift heavy objects more than 10 pounds for the first week.
- If your trip home takes a long time, stop every hour and stretch your legs - walk for a few minutes to prevent formation of blood clots in your legs.
- If you notice new blood on the dressing, press firmly on the incision site for about 20 minutes. If bleeding continues, call your doctor or go to the nearest emergency room while still applying pressure.
- Leave the dressing on until the day after the study; your nurse will show you how to remove it.
- You may shower and wash over the incision in the shower when you get home.
- Don't worry if you see a bruise or a small lump under the skin at the insertion site; it will disappear within three to four weeks.

Call your doctor or the arrhythmia nurse coordinator:

- if the site becomes painful or warm to the touch
- if you have chest pain, palpitations, shortness of breath, lightheadedness or fever.

AFTER YOUR VISIT TO USC

Follow your doctor's instructions to receive the most benefit from your treatment. Follow-up visits as prescribed by your physician are essential. We will work closely with your primary physician, providing you with optimal medical care. We are committed to providing you with the most technically-advanced and personalized care. We work hard to be responsive to your needs - from teaching to safe, effective diagnosis and treatment. We are dedicated to excellence and we strive to give you all the advantages of a prestigious university hospital. If you have questions, you may contact us by calling (323) 442-5334 to speak with one of our experienced nurse educators.