

## **EP Studies-Basics for Patients & Families**

### **What is an EP Study? What is an Ablation?**

An EP study (EPS) involves studying the heart's electrical activity to look for irregularities that cause arrhythmias. If your heart rhythm doctor finds an arrhythmia, they may be able to do an ablation, where they burn or freeze an area in the heart to eliminate the source of the arrhythmia.

### **Who Needs an EP Study?**

EP studies are typically performed in patients with known abnormally fast heart rates, called tachyarrhythmias. The most common tachyarrhythmias in children who do not have structural congenital heart disease are supraventricular tachycardia (SVT), Wolff-Parkinson-White (WPW) syndrome, and ectopic atrial tachycardia (EAT). Patients with structural congenital heart disease can have any of these arrhythmias but are also more likely than other people to develop atrial flutter and, sometimes, atrial fibrillation. Some patients with specific kinds of ventricular tachycardia may benefit from EP study as well. The key point to remember is that whatever the arrhythmia is called, it is caused by something abnormal in the heart's electrical system.

Before a patient is brought in for an ablation, their heart rhythm doctor will want to have an electrocardiogram (EKG) that shows an arrhythmia. This is because the symptoms of an arrhythmia – like palpitations or dizziness – can be caused by many different things that don't require an EP study and won't be helped by an ablation. If a patient is having severe enough symptoms, though, their doctor may recommend an EP study even without a documented arrhythmia.

### **How is an EP Study Performed?**

An EP study is done by placing long, soft, flexible tubes called catheters into the big blood vessels in the body. Usually, catheters are put in the large veins on both sides of the groin and, sometimes, also on the right side of the neck. Patients who have congenital heart disease and have had surgeries that change how the veins and arteries connect – or don't connect - to the heart may have catheters placed into different blood vessels at different locations. These catheters are maneuvered through the blood vessels and put in specific locations in the heart to map out the heart's electrical activity.

### **How Does Ablation Prevent Arrhythmias?**

During an ablation, small areas of scar are created by burning or freezing the spot the arrhythmia comes from. This eliminates the electrical signals causing the arrhythmia, which then prevents it from happening in the future.

### **What are the Steps of an EP Study?**

Once a patient is sedated or asleep, the catheters are placed, similar to a large IV. There are no incisions, or sutures. These catheters are small and flexible – like very long spaghetti noodles – and are advanced into different parts of the heart.

Once they're in place inside the heart, the catheters can do two things:

1. They can sense the electrical activity of the heart and

2. They can give a small electrical stimulus to the heart to speed up the heart rate. This is called pacing the heart.

Different pacing maneuvers will be delivered to study the electrical activity in the heart – including trying to trigger the arrhythmia. This is important because it identifies the properties of the abnormal electricity, and the location.

Once the heart's electrical activity has been studied and the source of the arrhythmia has been identified, your heart rhythm doctor decides if it is safe to do the ablation. In rare cases, the extra electrical connection is so close to heart's regular electrical system that your doctor may not want to risk accidentally damaging the regular electrical parts of the heart and will decide not to do the ablation.

To perform the ablation, a special catheter is placed that can sense, pace, AND burn or freeze inside the heart. Depending on the location of the abnormal electricity, one may burn or freeze the abnormal circuit, but sometimes they may use both during the same procedure.

Once the area of abnormal electricity has been ablated, they will start a waiting period in the procedure room. Usually, this waiting period lasts about 30 minutes, but may be longer for some patients. During this time, your doctor will repeat a lot of the pacing tests they did at the beginning of the procedure. They are basically checking their work – looking to make sure the short circuit is actually gone and that the arrhythmia cannot be triggered anymore. If more tachycardia is seen, your doctor may decide to do more ablation – and then repeat the waiting period afterwards.

After the procedure is complete, all catheters are removed, and pressure and dressings are applied to the areas that were accessed. The average amount of blood loss during the procedure is about 1 teaspoon. In rare cases, they may use special devices to close the hole after they take the catheters out.

### **What Happens After the Procedure?**

Care after an EPS may vary at different hospitals, but commonly patients have to lay flat with their legs straight for a period of time to decrease the risk of bruising or bleeding from the sites that were accessed. You may or may not need to spend the night in the hospital, depending on your doctor's recommendation and usual practice.