Electro-Physiology Study (EPS)

Introduction

Heart rhythm is mainly controlled by the conduction system of the heart. Any abnormality in the conduction system may result in abnormal heart rhythm (arrhythmia). Electro-Physiology Study (EPS) is a test to find out the cause of arrhythmia. A patient suffering from arrhythmia may have palpitation, chest discomfort, dizziness or vertigo. In severe condition, the patient may lose consciousness or have sudden death.

Importance of Procedure

EPS is an invasive procedure that can provide specific information on arrhythmia, which is more superior to some non-invasive tests. We can base on the results of EPS and offer the most appropriate treatment such as drug therapy, surgery or catheter ablation. If you refuse this test, you may need to take long term medications to control the abnormal heart rhythm. During an arrhythmic attack, you may have palpitation, chest discomfort, dizziness or vertigo. This may result in heart failure or even sudden death.

Pre-Procedure Preparation

- You may be required to stop some or all of the anti-arrhythmic drugs before the procedure.
- If you experience severe symptom during this period (e.g. palpitation or fainting attack), please seek immediate medical attendance at nearby clinic or Accident & Emergency Department.
- You need to sign an informed consent after explanation from your doctor.
- You need to undergo investigations like blood tests and electrocardiogram.
- An IV infusion will be set up and you need to fast for 4-6 hours.
- Shaving and disinfection near the puncture site may be required.
- If you are a female, please provide your last menstrual period (LMP) and avoid pregnancy before the procedure as this procedure involves exposure to radiation.

The Procedure

- This invasive procedure is performed under local anesthesia in a cardiac catheterization centre. You are alert during the procedure, but we may give you sedation to calm you down.
- Electrodes are adhered to the chest to monitor the heart rate and rhythm. Blood oxygen monitor through your finger tip will be set up. Measurement of blood pressure from your arm will be taken during the examination.
- Small wounds are made over the groin, under the clavicle or around the neck for access to arteries or veins.

- Catheters are advanced to the heart under X-ray guidance.
- At specific sites inside the heart, we will record electric information; we then deliver tiny electric current to alter your heart rate and try to trigger arrhythmias.
- You may experience discomfort when your heart is being excited to certain rate; when an induced arrhythmia is persistent, we may use direct current cardioversion to convert it.
- The duration of the procedure may last from 30 minutes to over 1 hour depending on the nature and complexity of the arrhythmia.
- You will then be sent to the ward for observation for another 12-24 hours.

Post-Procedure Care

- After the procedure, catheters will be removed. The wound site will be compressed to stop bleeding.
- Nursing staff will check your blood pressure, pulse and wound regularly.
- Bed rest may be necessary for 4 hours or more. In particular, please do not move or bend the affected limb. Whenever you cough or sneeze, please apply pressure on the wound with your hand.
- You should inform your nurse if you find blood oozing from the wound site.

Post-Procedure Follow Up

- Usually, you can be discharged 1 day after the procedure.
- The wound will be inspected and covered with light dressing. Please keep the wound site clean and change dressing if wet. In general, showers are allowed after 2 days.
- Please avoid vigorous activities (household or exercise) in the first 3 days after the procedure. Bruising around the wound site is common and usually subsides 2-3 weeks later. If you notice any signs of infection, increase in swelling or pain over the wound, please come back to the hospital or visit a nearby Accident and Emergency Department immediately.
- Usually, your doctor has explained to you the results of the procedure before discharge. Should you have further questions, you and your close relatives can discuss with your doctor during subsequent follow-up.

Risks and Complications

- The procedure carries certain risks. (Reference 1)
- Major complications account for about 0.1%. These include damage to blood vessels and the heart that may need surgical intervention, and death due to uncontrollable complications.
- Minor complications (about 4%) include infection and bleeding at puncture site, blockage of blood vessel by clot, and arrhythmia.

- Other potential risks include air embolism resulting in death or neurological damage, retained foreign body such as guide wires.
- Device deployment complications include device dislodgement, device entrapment and wire fracture.

Remarks

- It is hard to mention all the possible consequences if this procedure is refused.
- The list of complications is not exhaustive and other unforeseen complications may occasionally occur. The risk quoted is in general terms. In special patient group, the actual risk may be higher.
- Should a complication occur, another life-saving procedure or treatment may be required immediately.
- If there is further query concerning this procedure, please feel free to contact your nurse or your doctor.

Reference

1. Page RL, Joglar JA, Caldwell MA, et al. 2015 ACC/AHA/HRS Guideline for the Management of Adult Patients with Supraventricular Tachycardia. J Am Coll Cardiol. 2016;67(13):e27.
2. Horowitz LN, Kay HR, Kutalek SP, et al. Risks and complications of clinical cardiac electrophysiologic studies: a prospective analysis of 1,000 consecutive patients. J Am Coll Cardiol. 1987;9(6):1261.