Percutaneous Closure of Atrial Septal Defect

Introduction

Atrial septal defect (ASD) is the most common congenital heart lesion in adult, in which there is a congenital defect at the septum that separates the left and the right atria. As a result, there is abnormal shunting of blood from the left to the right atrium. If the shunting is significant enough, it causes volume overload of the right heart system. Percutaneous closure of ASD is done by implanting a closure device across the defect. It is performed under the guidance of X-ray, through percutaneous method.

Importance of Procedure

Patient with ASD may experience no symptoms in early years of life but may be complicated by pulmonary hypertension, congestive heart failure, arrhythmias, cerebral abscess and stroke starting from middle age. Some of the complications may become irreversible. Timely closure of ASD may prevent such complications. Percutaneous closure is an alternative treatment method to the conventional open heart surgical closure. If anatomically suitable, in selected cases, percutaneous closure is successful in over 90% of cases. Patients who refuse this method can select either surgical closure or medical therapy.

Pre-Procedure Preparation

- An echocardiogram (ultrasound imaging of your heart including trans-esophageal echocardiogram) will be performed to assess and confirm the location, size and functional significance of the ASD. Special attention will be taken on the feasibility of the percutaneous approach.
- You will be invited to a ward or a clinic for some preliminary tests including electrocardiogram, chest X-ray, and blood tests. We will also check your allergy history.
- Our medical staff will explain to you and your relatives the procedure and its risks, and present to you this information leaflet. You have to sign an informed consent.
- Blood thinning drugs or metformin (for diabetes) may have to be stopped several days before the procedure. Steroid will be given if there is history of allergy. Antibiotic may be given as prophylaxis for the procedure
- Fasting of 4-6 hours is required prior to the procedure. An intravenous drip will be set up. Shaving may be required over the puncture site.
- 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 is an invasive procedure that is performed in a cardiac catheterization centre, usually under local anesthesia. Sometimes, it is performed under general anesthesia, depend on your condition.

- 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.
- A small wound is made at the groin for access to arteries or veins.
- Catheters are advanced to the heart. Pressures within the heart are measured. The degree of blood shunting is calculated.
- The size of the ASD is then measured with a special sizing balloon.
- The appropriate type and size of closure device will be deployed.
- Both X-ray and echocardiogram are used for procedure monitoring. Special types of echocardiogram can be used, such as trans-esophageal (ultrasound probe placed in esophagus) or intra-cardiac (ultrasound probe placed in heart chambers).

Post-Procedure Care

- After the procedure, catheters will be removed. The wound site will be compressed or sutured to stop bleeding.
- Nursing staff will check your blood pressure, pulse and wound regularly.
- Bed rest may be necessary for 4 hours. 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 have any discomfort in particularly chest discomfort or find blood oozing from the wound site.
- Diet can usually be resumed.
- Chest X-ray and echocardiogram are performed to confirm the closure device position and assess for any residual shunting.
- Please follow instruction for the use of medications. Drug to prevent blood clot formation is prescribed for the first few months after the procedure.

Post-Procedure Follow Up

- Usually, you can be discharged 1-3 days 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.
- Antibiotics prophylaxis to prevent infective endocarditis is necessary before dental procedure after the first 6 months. Please inform your dentist of your surgical history and consult your case doctor before dental procedure.

Risks and Complications

- The procedure is safe and effective in the majority of cases. Total major complications occur in less than 2% of cases and include death, perforation of the heart chamber, pericardial effusion, thrombus formation, heart block, arrhythmias, vascular injury, stroke, air embolism and aortic erosion.
- Minor complications (6%) include allergy to contrast reaction, nausea and groin complications. Bruising around the wound site is common.
- Device lesion may occur early or late after percutaneous ASD closure (0.1-0.3 %), symptoms include chest pain, shortness of breath, syncope, pericardial effusion and sudden death.
- Open heart surgery may be necessary if complications arise which failed to manage percutaneously
- 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.

Fees and Charges

- This procedure involves the use of consumables which are 'Privately Purchased Medical Items'. Please make financial arrangement before the procedure.
- You need to pay an estimated deposit. The final charge, however, depends on the complexity of the procedure and range of consumables required.
- After the procedure, you may need to pay the balance to or collect refund from the account office.
- Please note that the procedure may need to be staged or repeated for various reasons. Separate charging is required for each procedure.
- If you have financial difficulty, you can apply for assistance through our medical social worker.
- Rarely, the procedure may be unsuccessful. The consumable used during the operation may still be charged.

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.
- 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. DuZD, Hijazi ZM, Kleinman CS, Silverman NH, Larntz K. Comparison Between Transcatheter and Surgical Closure of Secundrm Atrial Septal Defect in Children And Adults. JACC 2002; 39: 1836-44.
2. Chessa M, Carminati M, Butera G, et.al. Early and late complications associated with transcatheter occlusion of secundum atrial septal defect. JACC. 2002 Mar 20;39(6):1061-5.
3. Butera G, Biondi-Zoccai G, Sangiorgi G, et al. Percutaneous versus surgical closure of secundum atrial septal defects: a systematic review and meta-analysis of currently available clinical evidence EuroIntervention. 2011 Jul;7(3):377-854. EI-Said H, Hegde S, Foerster S, et al. Device therapy for atrial septal defects in a multicenter cohort: acute outcomes and adverse events. Catheter Cardiovasc Interv 2015; 85: 227.