

ORIGINAL ARTICLE

DEVICE CLOSURE OF ATRIAL SEPTAL DEFECT WITH AMPLATZER SEPTAL OCCLUDER IN ADULTS- SAFETY AND OUTCOME

Zahoor Aslam Khan, Raja Adnan Arif, Maadullah, Mehboob Sultan

Armed Forces Institute of Cardiology/National Institute of Heart Diseases, Rawalpindi, Pakistan

Background: Secundum atrial septal defect is a common congenital heart disease. Amplatzer septal occluder has become the most commonly used device for its closure. This study was conducted to determine the safety and outcome of atrial septal defect closure with the Amplatzer septal occluder (ASO). **Methods:** This Case-series was conducted at Armed Forces Institute of Cardiology/National Institute of Heart Diseases Rawalpindi from July 2010–11, on a total of 41 patients, out of these 41 patients, 18 (44%) patients underwent general anaesthesia while 23 (56%) patients were given local anaesthesia for the procedure. Trans-esophageal echocardiogram was done in all patients before procedure. **Results:** In 37 patients, ASD device closure was successfully done and size of ASD devices were 14–36 mm. Trans-oesophageal echocardiography guided ASD Device closure was done in 16 patients and rest of them done under transthoracic echocardiography. Size of ASD ranged from 11–36 mm (mean 22 mm). Mean floro time was 10 minutes. Four (10%) patients did not undergo the procedure due to inadequate rim. **Conclusion:** Device closure of Atrial Septal Defect with amplatzer septal occluder is convenient and safe.

Keywords: Atrial septal defect, amplatzer septal occluder, patent foramen ovale

J Ayub Med Coll Abbottabad 2013;25(3-4):48–9

INTRODUCTION

Secundum atrial septal defect (ASD) is a common congenital heart disease and accounts for approximately 6–10% of all congenital cardiac defects.¹ First device closure of ASD in humans was attempted in 1976 by King and associates.² Device closure has evolved significantly. ASO has become the most commonly used device. Previous reports have shown that it is easy to use and has a high success rate.^{3–6} The alleged advantages of percutaneous closure over surgical closure as shown by some studies in older children and adults include avoidance of cardiopulmonary bypass, decreased complication rates, shorter hospital stays^{7,8} and greater cost-effectiveness.⁹ Device closure is now a widely acceptable alternative to surgery in most patients with secundum ASD. The aim of this study was to evaluate the feasibility, efficacy, and safety of device closure of secundum ASDs in adults more than 18 years of age.

MATERIAL AND METHODS

This case-series of intervention was conducted in the Armed Forces Institute of Cardiology, National Institute of Heart disease, Rawalpindi from July 2010–11, on a total of 41 patients subjected to ASD occluder device. Trans-esophageal Echocardiogram was performed in all cases in order to assess the rim for device placement. General anaesthesia was given to 18 patients due to their restlessness and anxiety, while 23 patients underwent local anaesthesia.

RESULTS

Percutaneous ASD device closure was attempted in 41 patients (11 (27%) males and 30 (73%) females) with mean age of 35±18.65 years). Out of 41

patients, in the case of 4 patients, procedure was abandoned as ASD was considered unsuitable for device closure before deployment of the device. In 37 patients, ASD device closure was successfully done and size of ASD devices were 14–36 mm. Transoesophageal echocardiography guided ASD Device closure was done in 16 patients and rest of them done under transthoracic echocardiography. Size of ASD ranged from 11–36 mm (mean 22 mm). Mean floro time was 10 minutes.

In two patients, ASD device was deployed with balloon assisted technique from contra-lateral femoral vein. In 3 cases, multiple attempts were required before successful deployment. One patient developed pulmonary oedema after the procedure, primarily due to uncontrolled hypertension and mitral regurgitation and was successfully managed medically. There was no mortality or any other major complication associated with the procedure. All patients were discharged home next day with satisfactory device position on echocardiography.

DISCUSSION

Atrial septal defect is the most common congenital lesion in adults after bicuspid aortic valve, while a patent foramen ovale (PFO) can be detected in approximately 30–40 percent of normal adult hearts. Closure of ASDs and PFOs in adults and children may be recommended in a variety of clinical circumstances.

Percutaneous device closure is an effective, safe, and commonly employed alternative to surgical closure in patients with PFOs or ostium secundum ASDs that have appropriate anatomic characteristics.

Patients with secundum ASD are usually asymptomatic during the first few years of life. Occasionally, however, those patients are seen in infancy with signs and symptoms of congestive heart failure,¹⁰ frequent respiratory infections,¹¹ and failure to thrive.¹² Most centres advocate elective closure of moderate-to-large ASDs between 4 and 6 years of age.^{13,14} Although surgical closure of ASD has a low perioperative mortality and morbidity, it is still associated with a cosmetic disadvantage and a longer hospital stay compared with device closure.⁷ In addition, although atrial septal defects may close spontaneously during the first few years of life,^{15,16} some have been shown to enlarge with time.¹⁷ Therefore, we elected to study the efficacy and safety of device closure in those adults.

CONCLUSION

Device closure of Atrial Septal Defect with amplatzer septal occluder is a very safe procedure and is a better alternate to surgery.

REFERENCES

- Dickinson DF, Arnold R, Wilkinson JL. Congenital heart disease among 160, 480 live-born children in Liverpool 1960–1969. Implications for surgical treatment. *Br Heart J* 1981;46:55–62.
- King TD, Thompson SL, Steiner C, Mills NL. Secundum atrial septal defect. Nonoperative closure during cardiac catheterization. *JAMA* 1976;235:2506–9.
- Masura J, Gavora P, Formanek A, Hijazi ZM. Transcatheter closure of secundum atrial septal defects using the new self-centering Amplatzer septal occluder: initial human experience. *Cathet Cardiovasc Diagn* 1997;42:388–93.
- Thanopoulos BD, Laskari CV, Tsaousis GS, Zarayelyan A, Vekiou A, Papadopoulos GS. Closure of atrial septal defects with the Amplatzer occlusion device: preliminary results. *J Am Coll Cardiol* 1998;31:1110–16.
- Hijazi ZM, Cao Q, Patel HT, Rhodes J, Hanlon KM. Transesophageal echocardiographic results of catheter closure of atrial septal defect in children and adults using the Amplatzer device. *Am J Cardiol* 2000;85:1387–90.
- Cao QL, Radtke W, Berger F, Zhu W, Hijazi ZM. Transcatheter closure of multiple atrial septal defects. Initial results and value of two- and three-dimensional transoesophageal echocardiography. *Eur Heart J* 2000;21:941–47.
- Du ZD, Hijazi ZM, Kleinman CS, Silverman NH, Larntz K; Amplatzer Investigators. Comparison between transcatheter and surgical closure of secundum atrial septal defect in children and adults: results of a multicenter nonrandomized trial. *J Am Coll Cardiol* 2002;39:1836–44.
- Berger F, Vogel M, Alexi-Meskishvili V, Lange PE. Comparison of results and complications of surgical and Amplatzer device closure of atrial septal defects. *J Thorac Cardiovasc Surg* 1999;118:674–8.
- Kim JJ, Hijazi ZM. Clinical outcomes and costs of Amplatzer transcatheter closure as compared with surgical closure of ostium secundum atrial septal defects. *Med Sci Monit* 2002;8:CR787–91.
- Phillips SJ, Okies JE, Henken D, Sunderland CO, Starr A. Complex of secundum atrial septal defect and congestive heart failure in infants. *J Thorac Cardiovasc Surg* 1975;70:696–700.
- Hunt CE, Lucas RV Jr. Symptomatic atrial septal defect in infancy. *Circulation* 1973;47:1042–48.
- Dimich I, Steinfeld L, Park SC. Symptomatic atrial septal defect in infants. *Am Heart J* 1973;85:601–4.
- Murphy JG, Gersh BJ, McGoon, MD, Mair DD, Porter CJ, Ilstrup DM, *et al.* Long-term outcome after surgical repair of isolated atrial septal defect. Follow-up at 27 to 32 years. *N Engl J Med* 1990;323:1645–50.
- Black MD, Freedom RM. Minimally invasive repair of atrial septal defects. *Ann Thorac Surg* 1998;65:765–7.
- Helgason H, Jonsdottir G. Spontaneous closure of atrial septal defects. *Pediatr Cardiol* 1999;20:195–9.
- Radzik D, Davignon A, van Doesburg N, Fournier A, Marchand T, Ducharme G. Predictive factors for spontaneous closure of atrial septal defects diagnosed in the first 3 months of life. *J Am Coll Cardiol* 1993;22:851–53.
- McMahon CJ, Feltes TF, Fraley JK, Bricker JT, Grifka RG, Tortoriello TA, *et al.* Natural history of growth of secundum atrial septal defects and implications for transcatheter closure. *Heart* 2002;87:256–5.

Address for Correspondence:

Lt. Col. Dr. Zahoor Aslam Khan, Cardiologist, AFIC/NIHD The Mall, Rawalpindi, Pakistan, **Cell:** +92-346-9346003.

Tel: +92-051-9271002 Ext: 3121.

Email: zakhankhattak@yahoo.com