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Clinical Results of Large Secundum Atrial Septal Defect Closure in Adult Using Percutaneous Transcatheter Cocoon™ Atrial Septal Occluder

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Abstract

Background: Atrial septal defect (ASD) is a common congenital heart disease in adults. Amplatzer septal occluder is one of the most common devices used for transcatheter closure due to its high success rate and ease to implant. Cocoon™ atrial septal occluder is a new nitinol-based device, its shape resembles Amplatzer septal occluder but coated with platinum to prevent nickel release. Little is known about clinical outcomes of large ASD closure using Cocoon™ atrial septal occluder.

Objective: To review our experience in closure of secundum ASD in adults by Cocoon™ septal occluder and to compare the clinical outcomes and results of the patients who had ASD closure with a device greater than or equal to 30 mm and less than 30 mm.

Material and Method: Between November 2005 and October 2008, 63 consecutive patients underwent transesophageal echocardiography (TEE) - guided transcatheter closure of secundum ASD. The patients were divided into two groups (Groups' 1 and 2) according to device diameter that is greater than or equal to 30 mm (n = 31) and less than 30 mm (n = 32), respectively. Clinical outcomes, complications, and transthoracic echocardiography (TTE) before hospital discharge, one to three months, and one-year were analyzed.

Results: Device implantations were successful in 27 patients (87.1%) in group 1 and 31 patients (96.9%) in group 2 (p = 0.196). The maximum size of secundum ASD in group 1 determined by TTE, TEE, and balloon sizing diameter (BSD) were 22.6±5.0 mm (range 15-32), 28.1±4.8 mm (range 19-39), and 31±3.5 mm (range 23-38) respectively. The maximum size of secundum ASD in group 2 determined by TTE, TEE, and BSD were 19.7±4.4 mm (range 12-31), 20.4±3.4 mm (range 13-26), and 23.1±2.9 mm (range 15-30) respectively. The mean device size in groups 1 and 2 were 33.5±3.1 mm and 24.6±3.3 mm, respectively. Four patients (12.9%) in group 1 had unsuccessful implantations. All of them were in the first 15 cases of using large device and two of them had device embolization requiring surgical removal. One patient (3.1%) in group 2 had an unsuccessful implantation and had device embolization requiring surgical removal. The patients in both groups gradually improved in clinical symptoms with decreased RV systolic pressure and decreased RV size with complete ASD closure at one year.

Conclusion: Transcatheter closure of large secundum ASD by Cocoon™ septal occluder is feasible with hemodynamic benefit. However, complication rates are higher with large ASD closure with device size greater than or equal to 30 mm especially during the early "learning curve" period. With experience, the complication rate declines and the success rate is no different from the group with smaller device size.

Keywords: Secundum atrial septal defect, Cocoon™ atrial septal occluder

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