

Ostium secundum atrial septal defect percutaneous closure in children: is it always a simple procedure?

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Introduction. Percutaneous closure of atrial septal defect (ASD) has become the first line therapeutic option. We aimed to investigate the influence of anatomic parameters on the procedure progress and the outcome as well as the impact of echocardiographic guidance.

Methods. We retrospectively included 91 consecutive children aged 8.1 y.o [6.4-11.9, min 9 months] weighting 26 kgs [21-39; min. 6] who underwent percutaneous closure of ASD in a single children center. 2D-TEE guidance and balloon calibration were performed in all-cases and 3D-TEE in 71 patients > 15 kg. Complex ASD (n=73.6%) were defined in cases of multiple holes (n=14, 15.4%), large defect with ASD diameter >15 mm/m² Body Surface Area (n=62, 68.1%) and deficient rims other than the retro-aortic one (n=4, 4.4%).

Results Disagreement between balloon diameter and ASD diameter assessed by 3D (n=71) or 2D (n=15) echocardiography was higher in complex ASD. An absolute difference above 2 mm was observed in 61.2% versus 20.3% (p=0.001). Percutaneous closure was more difficult to achieve in complex ASD. In these cases, multiple repositioning and device change were required in 46.3% versus 8.3% (p=0.001) and 20.9% versus 4.2% (p=0.049) respectively. In 2 cases, 2 devices were implanted under 3D-TEE guidance to close multiple defects. Overall, procedural success remained high (96.7%). Failures (2 large ASD > 28 mm and 1 ASD with deficient inferior rim) and complications (1 transiently pericardial effusion and 1 day-one surgically managed device embolization) were observed only in complex ASD (4.5% and 3.0%).

Conclusion Complex ASD is observed in around 2/3 children referred for percutaneous closure. Despite a harder procedure, success rate remains high and complications rare. Discrepancies between sizing technique are higher in complex ASD. 3D-TEE may be more useful in these cases to describe precisely the anatomy as well as facilitating the device positioning.