The Association of Silent Cerebral Emboli Following Percutaneous Atrial Septal Defect Closure in Pediatric Patients: A Diffusion Weighted Magnetic Resonance Imaging Study


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Objectives: The aim of this prospective study was to investigate the incidence of silent cerebrovascular embolic events associated with percutaneous closure of atrial septal defect (ASD) in pediatric patients.

Material and Methods: 23 consecutive pediatric patients (12 male and 11 female) admitted for transcatheter closure of ASD with the mean age of 10.4±3.8 years (range 4-17 years) were recruited for the study. The patients were scanned with a 1.5 Tesla clinical magnetic resonance imaging (MRI) system (Magnetom, Aera, Siemens Healthcare, Erlangen, Germany). Patients underwent first cranial MRI on the day before the procedure and a control MRI was acquired within 24 hours following the heart catheterization. MR examinations included turbo spin echo fluid-attenuated inversion recovery sequence and diffusion weighted imaging technique done with single shot echo planar spin echo sequence. The transcatheter closure of ASD procedures were performed by 3 expert interventional cardiologists. Amplatzer Septal Occluder (ASO) device was implemented for the closure of the defect. No iodinated contrast medium was administrated in course of procedure.

Results: Preprocedural MRI of 2 patients revealed nonspecific hyperintense white matter lesions on FLAIR images with increased diffusion, which were considered to be older ischemic lesions associated with previously occurred paradoxical embolism. None of the patients had diffusion restricted cerebral lesions resembling micro embolic infarctions.

Conclusion: The current study suggests that percutaneous closure of the ASD when performed by experienced hands without administration of iodinated contrast medium, may be free of cerebral micro embolization in pediatric patients. However, due to our relatively small patient group, further studies with larger patient groups and wider age range are needed for further investigation of the incidence of heart catheterization and its risk factors.