



**Case No.: 016**

**Case Title: Complex Atrial Septal Defect Closure in A Small Child**

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### Background

**History and physical:** A 3 year-old-girl was diagnosed atrial septal defect. She was failure to thrive with body weight was 11 kg. Physical examination indicated a 2/6 systolic murmur and a fixed split S2 at the left 2<sup>nd</sup> intercostal.

**Imaging:** The chest X-ray showed cardiomegaly. Transthoracic echocardiography showed a secundum ASD with diameter was 14\*16 mm, left to right shunt, aortic rim deficiency. Right ventricle was dilated and tricuspid regurgitation was 2/4 in grade.

### Description of procedure

In the cath lab, TEE was done to confirm the morphology of ASD. There was two holes on the atrial septum. The first hole tend to superior and anterior with 14 mm in diameter with aortic rim deficiency. The other hole which was smaller seemed to be closed to IVC with IVC rim deficiency. We decided to use an oversized device to cover all the holes. Step-by-step was done to approach the bigger hole. An 18 mm Amplatzer™ Septal Occluder was deployed. All rims were good adherence. However, a residual shunt near IVC was still patent. A 4F JR catheter and 0.035'' Terumo guidewire was used to cross through the residual shunt to LUPV. And then an 18 mm Amplatzer™ Sizing balloon was used to estimate the diameter of this hole. A 12 mm Amplatzer™ Septal Occluder was deployed fully to close this smaller hole. TEE was done to check the residual shunt which was closed completely. And then the right disk of the bigger device was deployed to create a "sandwich" technique. TEE confirmed again the devices which were good position without residual shunt. The ECG showed sinus rhythm. At three-month follow up, the echocardiography and ECG were good result.

### Learning Points

Multiple holes ASD with deficient IVC rim are complex cases. Step-by-step procedure with TEE guidance and sandwich technique may be helpful to resolve the difficult issues. Single device or multiple devices is alternative option but the stability of IVC rim is very important. Should we close all residual shunt closed to IVC?