



## Short-Term Outcomes of Transcatheter Closure of Secundum ASD in children and adolescence: An experience of two centers of Upper Egypt.

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- Atrial septal defects (ASD) have a reported prevalence of **10%** among congenital heart defects and if left untreated, although recognized as a benign disease, can contribute to significant morbidity and mortality .
- King and Mills, in **1974**, originally described and subsequently demonstrated feasibility of closing a secundum ASD using a device.
- In current era, many devices provide safe and effective alternatives to surgical closure of the secundum ASD .



- Souhag University has started device closure in 2011, while Assuit University has started it in 2013
- A retrospective cohort study including 135 children and adolescence that underwent ASD closure attempt between 04/2012 to 05/2016 .
- Median age 5 (IQR: 3-9)years.
- Median weight 17 ( IQR :13-30)Kg .
- 71% of patients under or equal 5 years .



• Noncardiac Comorbidities	9(6.7%)
• Down syndrome	4
• Noonan syndrome	1
• Kyphoscoliosis	1
• Thalassemia	1
• Renal failure and haemodialysis	1
• Cerebral Palsy	1



## Procedure

- Deployment of device was done as previously described in literatures under Fluroscopy (LAO) and TEE guidance (multiple veiws). Procedure was done under TTE only in 3 children
- In the presence of a very floppy and mobile rim, measurement of defect diameter was made between firm rims.
- The patients underwent to ASD closure but the procedure was aborted due to secundum ASDs that were considered unsuitable for transcatheter closure : too large an ASD in relation to the size of the patient, especially in small (10–15 kg) children in whom the ratio of device/body weight more than 1.5 ; ASDs with defecient contralateral rims .



- A device chosen was 20–25% larger than the largest diameter; 20% if all rims of ASD II were preserved except retroaortic rim and 25% chosen in case of presence of two defecient rim .
- In small children less than 5 years ; device used that equal or maximum 2mm larger than the largest measurement.
- LUPV technique was used in 14 patients
- RPV technique was used in 9 patients.
- Balloon assisted was used in two patients



## Results

- ❖ Mean defect size of single defects :15.24±5.16mm
- ❖ Mean IAS length : 38.13±6.3mm .
- ❖ Ratio of device to TEE size of ASD was 1.19±0.12 .
- ❖ Single defect 110(84%)
- ❖ Multiple defects 10(7%) with distance less than 7mm,4 closed by cribriform ASO,the remainder closed by single defect
- ❖ Multifenestrated IAS 13(10.%) that closed cribriform ASO
- ❖ Aneurysmal floppy septum 14(10.5%)
- ❖ Defecient retroaortic rim 71(53%)



- Two patients required change device by larger devices than initial selected devices ; ASD in first patient was closed by 28mm which replaced by 34mm and ASD in second patient was closed first by 20mm which replaced by 26mm .
- The explanation of wide discrepancy between the initial selected size of the first device and the replaced device was due to underestimation of ASD size and sometimes enlargement of the defect occurred due to the tear of the septum by repeated closure attempts
- The devices were implanted successfully 98.5% patients , 6 cases had concordant;3 PS, 2 PDA or 1VSD PM were treated with balloon dilation, PDA or PM VSD closure.



- The occluders used in our experience: Amplatzer septal occluder. Cribriform ASO,3 occlutech device and 9 cases with comed ASO.
- Low dose of aspirin (3–5 mg/kg/day) was given for 6 months . Aclopidogrel (2 mg/kg) was described for 2 months in adolescent patients .
- Discharge of patients was done 48 hours after procedure
- Follow-up clinical visits were obtained on one week ,1,3, 6 and 12 months, and annually thereafter .



### Major adverse Events

- The most frequent serious complications as reported in a recent analysis of the Food and Drug Administration (MAUDE) database are device dislodgement and cardiac perforation, erosion, or rupture . The rate of confirmed device erosion in this study was 0.7%.
- CHB occurred in one patient after immediately device deployment and recapture of device,surgical closure of ASD.
- Second degree heart block occurred in Down patient who had aneurysm of IAS with multiple fenestrations that was closed by Cribriform 25mm . The condition treated with oral steroid and resolved after 2 days

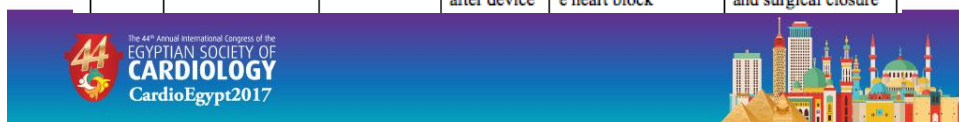


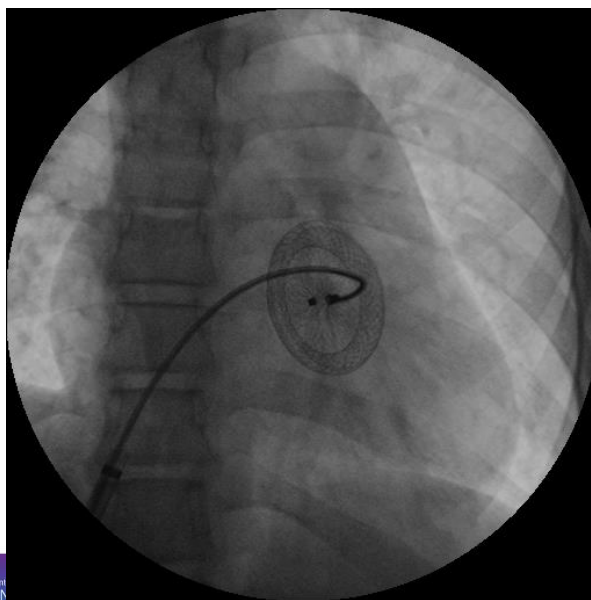
## Device perforation or erosion

- The first patient was a 6-old male child had 9mm defect that was closed by 10mm ASO . The cause of haemopericardium was not detected as no erosion was seen by TTE . The haemopericardium was treated by pericardiocentesis once without device removal.
- The second patient was 5-old female , had 12.5mm defect that was closed by 15mm ASO . Pericardiocentesis was performed with accumulation that indicated surgical removal of device. The erosion was confirmed at surgery, its location was anterosuperior (atrial wall-aorta)



Age	Defect Size	ASO Size	Time to Perforation	Initial Presentation	Management
6years	9mm	10mm	14 hours	Chest pain ,tachycardia diagnosed with pericardial effusion	Pericardiocentesis, no surgical device removal
5years	12.5mm	15mm	24hours	Collapse CPR,convulsion diagnosed with pericardial effusion	Pericardiocentesis followed by reaccumulation,surgical device removal
3years	aneurysm with multiple fenestration,largest one=12mm	Cribriform 25mm	Immediately after device depolyment	Bradycardia,2nd degree heart block	After 2 days of predinsolone ,normal heart rate regained
11years	18mm	32mm	18 hours	Chest pain and discomfort,diagnosed by device embolization	Transcatheter retrieval of device
4years	19mm	24mm	Immediately after device	Bradycardia,complete heart block	Recapture of device and surgical closure



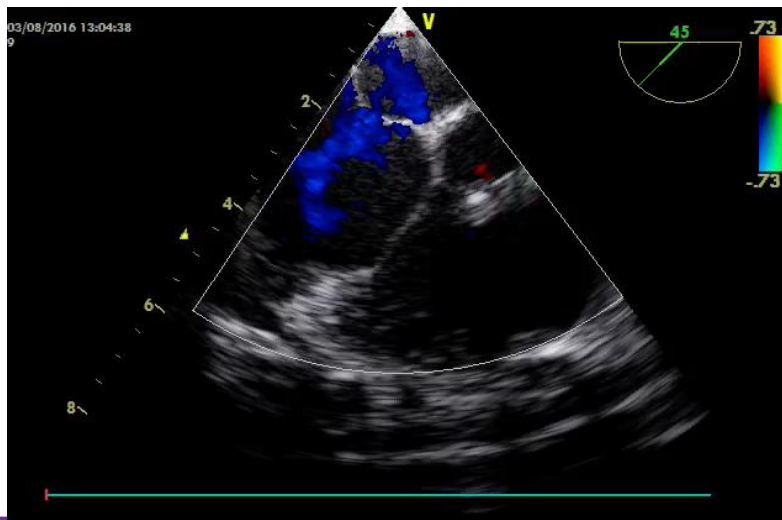


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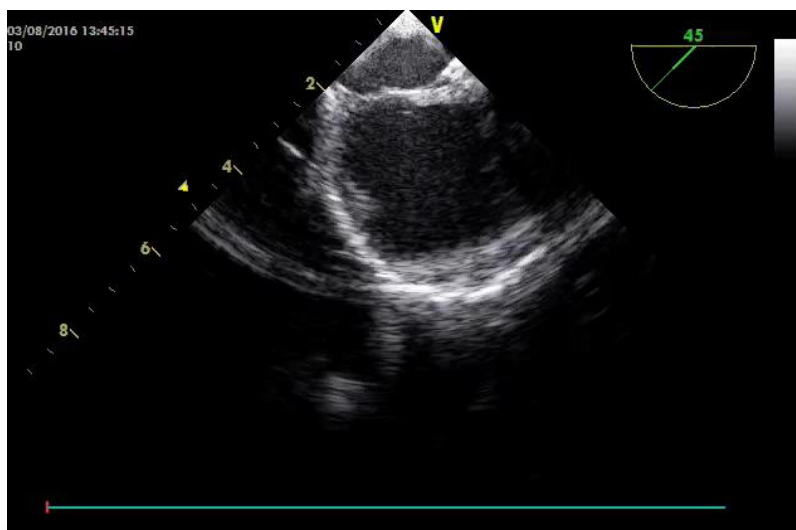


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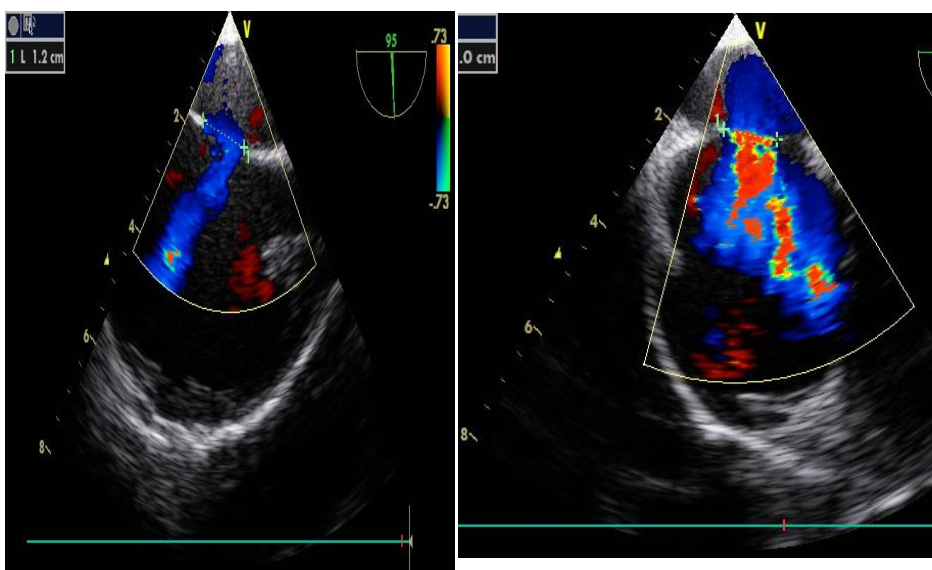
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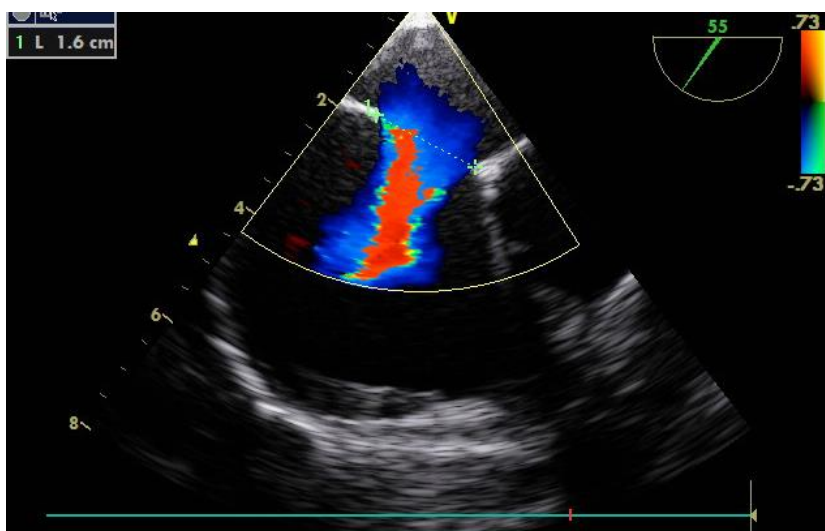


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## Conclusions

- Transcatheter closure of secundum ASD in children and adolescence is feasible and safe in the first four experience of our two centers with good short-term outcomes.
- Proper measurement of diameter and assessment of all rims of ASD II in multiple views is fundamental for proper choosing size of device and avoid device embolization.
- Balloon sizing is not necessary for transcatheter closure of ASD II.
- Multiple ASDs can be closed safety by a single device.



*Thank  
you*

A close-up illustration of a fountain pen nib, showing the gold-colored metal and the black barrel. The nib is positioned at the end of the word 'you' in the cursive text.