

Methods: We evaluated 2 years records of device closure. ASD >25 mm attempted for device closure were studied. They underwent transthoracic 2D Echocardiography (TTE), TEE to characterize defect. Size was determined angiographically/balloon sizing during procedure. Device was made up of Nitinol wires filled with polypropylene or polyester. Device was placed across ASD with/without balloon support. Defect in which, device could not be positioned even after balloon support, was deferred. ASD device was released under TEE to confirm proper position. Post-operatively, rhythm and position was monitored by ECG and TTE respectively. Those having displacement of the device were shifted for surgery. Patient was given aspirin and clopidogrel postop. Patients were followed up on OPD basis and TTE was done during each visit.

Results: 26 patients were attempted for device closure. 12 males and 14 females. Mean age-16.76 years. Mean ASD size-30.67 mm (range-25.2-36.2). Mean IAS size-45.36 mm. Mean size of rims-7.5 mm atrioventricular rim, 7.6 mm interatrial rim, 4.5 mm aortic rim, 5.5 mm of IVC rim and 6.3 mm of SVC rim. Mean device size-32.33 mm.

2(7.69%) defects could not be closed because of inability to position the device. 2(8.83%) devices displaced within mean 8 hours and patients were shifted for surgery.

During immediate postoperative period, 2(8.33%) had junctional rhythm and 1(3.84%) had AV dissociation. All disturbances normalized in mean 27.6 hrs. Mean hospital stay-86 hrs with device in situ and no significant valvular regurgitation

Mean follow up-21 months. All patients underwent TTE regularly. All had ASD device in situ, no shunt, regurgitation or rhythm disturbances

Conclusions: ASD device closure is highly successful procedure in large ASD also.

Complex TAPVC – Challenges and outcomes in our institute

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Background: Management of Total anomalous pulmonary venous connection becomes complex when it is associated with other intracardiac anomalies. Perioperative mortality and morbidity increases significantly. We present our modest experience with the management of complex TAPVC in our hospital.

Methods: Our study group includes eight patients with TAPVC associated with other intracardiac anomalies. There were 3 girls and 5 boys. Four of them were less than 5 kg in weight, and the other 5 were more than 5 kg in weight. Four patients had severe PAH and 4 patients had pulmonary stenosis. Five patients were of supracardiac type and one was cardiac type. Two patients had DORV, Two had TOF, one had dTGA, one had Truncus Arteriosus, two patients had atrioventricular canal defect. 2 patients had pulmonary vein obstruction.

Results: All patients underwent rerouting of pulmonary veins. Concomitant procedures included intraventricular tunnel repair of VSD and infundibular resection in DORV patient. Two patch technique AV canal repair was done for AVSD patient. SVC plasty, atrioventricular canal repair and PA banding were done in

unbalanced atrioventricular septal defect with DORV. Intracardiac repair through transatrial approach was done for tetralogy of Fallot. Right ventricle-pulmonary artery conduit was done for truncus arteriosus. Areterial switch was done for TGA patient. There were 2 hospital deaths.

Conclusion: Precise surgical techniques and attentive perioperative care will reduce the mortality and improve the outcome though the management of Complex TAPVC is technically challenging.

Evaluation of anomalous coronary origin and course on different imaging modalities

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Introduction: The coronary artery anomalies are rare congenital condition with an incidence ranging from 0.17% in autopsy cases to 1.2% in angiographically evaluated cases.

Methods: Retrospective review of 17,245 patients were done out of which echocardiography was used in 250 patients, Invasive coronary angiography (CAG) in 16828 patients and MDCT coronary angiography in 374 patients as primary detection modality. Indications for evaluation included angina, dyspnea and cyanosis. All patients were evaluated by transthoracic echocardiography. Invasive CAG was done in flat-panel cath-labs. MDCT CAG was done under 128 slice MDCT scan.

Results: A total of 17,245 coronary artery evaluations were done, of which 257 were found to have coronary artery anomalies at a prevalence rate of 1.49%. Most common anomaly detected in infantile period was ALCAPA (26.7%), coronary artery fistula (52%) in pediatric age group, anomalous high origin of coronary artery from same sinus, separate origin of LAD and LCX from left coronary sinus (29.7%) followed by anomalous origin of LCX from right coronary sinus (17.58%) in elderly population. 79.4% had benign anomalies while 20.6% had malignant coronary anomalies. Anomalous origin and course was detected in 202 patients (78.59%) and anomalous coronary termination in 35 (13.62%) patients.

Conclusions: Echocardiography adequately detected proximal coronary anomalies especially in pediatric patients. Invasive coronary angiography and MDCT coronary angiography were comparable for detection of most anomalies of coronary origin (except anomalous high origin near proper sinus). Invasive CAG was slightly better for distal anomalies like anomalous anastomosis.

Safety and efficacy of percutaneous device closure of large post-tricuspid shunts with severe pulmonary artery hypertension in pediatric patients

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Background: Transcatheter closure of large post-tricuspid shunts in patients with severe pulmonary arterial hypertension (PAH)

remains a challenging clinical problem. In neonates and infants, PAH is most often reversible, but in older patients the resolution of PAH is variable depending on the reversibility of pulmonary vascular resistance. The current study was done to assess the safety and efficacy of percutaneous device closure of large post-tricuspid shunts in pediatric patients with severe PAH at short term and midterm follow up.

Methods: A total of 42 pediatric patients underwent transcatheter closure of large post-tricuspid shunts with severe PAH. All subjects underwent clinical examination, electrocardiography, chest X-rays and echocardiography before discharge and at 1, -6 and -12 months and yearly thereafter for 5 years.

Results: Type of defect was ventricular septal defect in 8 patients (19%), patent ductus arteriosus in 27 patients (64%), aorto pulmonary window in 5 patients (12%) and coronary cameral fistula in 2 patients (5%). Cardi-O-Fix VSD Occluder was the most commonly used device (45%) followed by Cardi-O-Fix PDA occluder (21%) and Amplatzer duct occluder-ADO (17%). Pre procedural Pulmonary artery systolic pressure decreased significantly from mean 81.12 mmHg to mean 43.17 mmHg post procedure over a mean follow up 18.15 months. No residual shunt was found in 38 patients (90.47%). Only two major complications viz; severe aortic obstruction and symptomatic complete heart block were noticed.

Conclusion: Our study showed that the transcatheter closure of large post-tricuspid shunts in pediatric patients with severe PAH was safe, feasible and efficacious alternative to surgery.

Changes in cardiac form and function before and after transcatheter closure of secundum atrial septal defects

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Objectives: To study the effect of transcatheter closure of atrial septal defect (ASD) on right ventricular (RV) and left ventricular (LV) function, as well as left atrial (LA) volumes and the influence of preload alterations on systolic right ventricular (RV) velocities and deformation indices in patients with atrial septal defect (ASD).

Methods: During a 12 month period from July 2013 through June 2014, 25 patients scheduled for percutaneous closure of an ASD were prospectively enrolled in the study. Pre and post-ASD device closure at 1wk echocardiograms of 25 consecutive patients were done. Measurements of RV and LV MPI and LA volumes were taken. Longitudinal peak systolic velocities, peak systolic strain rate (SR), and endsystolic strain (ϵ) were calculated in the mid-segment of the RV free wall and the septum.

Results: 25 patients with an average age of 32.5 ± 16.3 years underwent transcatheter closure of ASD. There was statistically significant improvement in RV MPI (0.33 to 0.29, p 0.003), LV MPI (0.35 to 0.30, p 0.03), and LA volume index (27.1 to 22.3 ml/m², p 0.001) after closure of ASD.

After ASD closure Indexed measurements of RV long-axis dimension was significantly reduced (69.8 ± 18.6 to 67.3 ± 3 , p 0.0005) and of RV inlet (45.9 ± 15.3 to 42.5 ± 13.5 , NS), tricuspid valve annulus (29.9 ± 8.3 to 27.9 ± 8.1 , NS) and RV short axis (30.1 ± 6.9 to 28.2 ± 8.3 , NS) are insignificantly decreased.

Peak systolic velocities recorded from the RV free wall returned to normal physiologic values which are initially higher (9.9 ± 2.3 to 7.4 ± 3.8 , p <0.001) and at the interventricular septum, they tended

to be higher in patients with ASD compared with control subjects showed a significant decline to subnormal values (4.1 ± 1.2 to 3.2 ± 1.3 , p 0.002) after closure of the defect

Peak systolic SR (RV mid. -3.6 ± 1 . to -3.4 ± 1.7 and septal -2.1 ± 0.6 to -1.7 ± 0.6) and endsystolic ϵ (RV mid. -48.3 ± 14.2 to -45.13 ± 11.6 and septal -31.2 ± 14.1 to 27.3 ± 8.3) which are slightly higher compared with normal physiological values, showed a diminishing tendency after closure of ASD, however, the difference was not significant.

Conclusions: In congenital ASD, RV adaptation to a longstanding volume overload causes slightly increased (not significantly) systolic longitudinal deformation suggests an adequate structural and physiologic adaptation of the RV to chronic volume overload. After relief of volume overload, RV longitudinal systolic deformation indices tended to decrease, but not significantly, in contrast, peak systolic velocities decreased significantly suggesting that myocardial velocities are clearly load dependent whereas deformation indices are relatively preload stable measures of ventricular contractility.

Assessment of right ventricle remodelling with conventional and newer echocardiographic indices of RV function before and after ASD closure surgery

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Background: To study the impact of surgical closure of Atrial septal defect (ASD) on right ventricular (RV) remodeling using conventional and newer echocardiographic indices and to study the additional utility of the later over the former.

Methods: A prospective observational study of 100 consecutive patients who underwent ASD closure surgery between 2012 and 2014. Conventional parameters studied were right ventricular end diastolic diameter (RVEDd), right ventricular systolic pressure (RVSP) and fractional area change (FAC). Newer parameters studied were Tricuspid annular plane systolic excursion (TAPSE), Myocardial performance index by pulse wave and tissue Doppler (MPI) and Systolic tissue Doppler signal of the tricuspid annulus(s').

Results: Post ASD surgery there was decrease in RV size, shown by progressive decrease in mean RVEDd. Improvement in RV systolic function shown by an increase in FAC, alongwith decrease in RVSP indicating functional, symptomatic and hemodynamic improvement. Patients less than 25 years had better RV function as shown by improvement in RVMPI. 3 months post surgery 4% had persistent RV dysfunction. Patients aged more than 25 years had higher chances of persistent RV dysfunction ($p=0.053$). RVMPI by TDI and RVSP has better accuracy for prediction of RV dysfunction at 7 days and 3 months post surgery while s' has better accuracy at 3 months after surgery.

Conclusion: Surgical closure of ASD leads to significant improvement in RV remodeling. Patient's age and degree of RV dilatation at the time of surgery were predictors of RV remodeling. Improvements in the cardiac function and hemodynamics corresponded to the associated functional improvement and symptomatic benefits gained in surgical closure of ASD. Conventional and novel echo parameters have shown improvement in RV function after ASD closure surgery. RVMPI by TDI and s' have better accuracy for prediction of RV dysfunction after surgery.