years) having congenital heart disease with left-to-right shunt who underwent surgical correction were studied. Intra-operative mean pulmonary arterial pressures were measured before and after surgical correction. Lung biopsy was taken from the medial aspect of the upper lobe to study the histopathological changes of lung parenchyma and vasculature.

Results: All patients, irrespective of age at the time of surgical repair and the type and size of the cardiac defect had raised mean pulmonary arterial pressures. Mean pulmonary arterial pressure dropped significantly from mean of 38.8 mm Hg to 19.9 mm Hg immediately after surgical correction of left-to-right shunt. Pulmonary parenchymal changes were noted in 18 patients. Alveolar septal lymphocytosis was the most common parenchymal change and was found in 50% of cases. Alveolar septal fibrosis, hemorrhage and hemosiderosis were found in 25%, 40%, and 30% cases respectively. Pleural lymphocytosis and fibrosis were found in 40% and 15% cases respectively. Heath-Edwards Grade I vascular change was observed in 8 patients (40%). Grade II vascular change was noted in 1 patient who underwent VSD closure. In rest of the 11 patients, pulmonary vasculature showed no hypertensive changes. Medial wall thickness varied from 7 to 20% (average 11.65  3.86%).

Conclusions: The mean pulmonary arterial pressure decreased significantly immediately after surgical correction of the shunt. The pulmonary vascular changes including Heath-Edwards grading and Medial wall thickness were significantly correlated with the mean pulmonary arterial pressures. The pulmonary parenchymal changes were a very consistent finding; though these were not significantly correlated with the mean pulmonary arterial pressures. We suggest a similar study on long-term follow up of these patients to know the reversibility of pulmonary histopathological changes and its correlation with the pulmonary arterial pressures. But the limitation is subjecting these patients for lung biopsy again.

Total anomalous pulmonary venous connection: Our ten year experience

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Objective: To study the diagnostic methods, operative findings and outcome of patients undergoing surgical correction for Total Anomalous Pulmonary Venous Connection (TAPVC) in a tertiary referral Centre.

Methods: Retrospective analysis of all patients (n=20) who underwent surgical correction for TAPVC between March 1996 to October 2005. Age ranged from 54 days to 39 years (median 1.5 years). Weight ranged from 2.5 Kg to. 49.5 Kg (median 5.5 Kg). Twelve (60%) weighed ≤ 6 Kg. Echocardiography alone was diagnostic in thirteen (65%) patients. Cardiac catheterisation was done in seven (35%). Fourteen (70%) were Supracardiac, three each (15% each) were Intracardiac and Mixed types. Cardiopulmonary Bypass times were 55 to 319 minutes (median 99 minutes). Aortic Cross Clamp times were 30 to 112 minutes (median. 63 minutes). Four (20%) needed Total Circulatory arrest of 11 to 48 minutes (median 16 minutes). Two children (2.5 Kg & 6 Kg) whose left atrium was considered too small, had the ascending vertical vein left patent.

Results: Eighteen (90%) survived the surgical procedure. One died of pulmonary hypertensive crisis. One died of intra-operative bleeding (10% mortality). Three needed re-intubation for pulmonary complications post-operatively. Follow-up of 15 of 18 survivors (83% complete) ranging from 1 month to 3 months shows all 15 in NYHA Class I. None needed re-intervention.

Conclusions: TAPVC is relatively rare. Some survive even till fourth decade without surgery. Echocardiography is diagnostic in the majority. Surgical results are excellent. Ascending vertical vein may be left open in selected infants.

Rare presentation of adult Tetralogy of Fallot's with calcific valvular lesions- 2 case reports

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Introduction: Tetralogy of Fallot associated calcific aortic valve stenosis is unusual. Even though there are reported series of pulmonary valve incompetence after TOF repair, presentation of TOF associated with calcific pulmonary valve stenosis is uncommon. Here we are reporting two cases of adult TOF, one with calcific aortic stenosis and the other with calcific pulmonary valve stenosis.

Methods: A 47- year old male patient presented with Tetralogy of Fallot underwent cardiac catheterization study with coronary angiogram, which revealed TOF with good pulmonary anatomy and severe calcific aortic stenosis. Another 49-year old female with NYHA class III symptoms was found to have TOF with severe calcific valvular pulmonary stenosis on echo and cardiac catheterization. Both patients underwent intracardiac repair of TOF with prosthetic valve replacement. Both patients had an uneventful postoperative recovery.

Conclusions: Dilatation of aorta and aortic valve regurgitation & pulmonary valve regurgitation has been reported in patients with Tetralogy of Fallot. To our knowledge calcific aortic and Calcific pulmonary valve stenoses in patients with TOF is not reported so far.

A case of large patent ductus with pulmonary artery aneurysm and ventricular septal defect: Surgical management

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Introduction: Patent ductus with mycotic aneurysm of pulmonary artery is a reported entity. But true aneurysm of pulmonary artery along with patent ductus arteriosus and VSD is a rare combination.

Methods: A 24-year old female patient presented with NYHA class III dyspnoea and palpitations of 5 years duration. She was found to have large PDA, VSD and large pulmonary artery aneurysm measuring about 10 cm in diameter. Her cardiac catheterization study revealed L- R shunt >2.1 with near systemic PA pressure and severely elevated PVR. She underwent transpulmonary Dacron patch closure of ductus, transatrial Dacron patch VSD closure and pulmonary artery aneurysmectomy and reconstruction of pulmonary artery under cardiopulmonary bypass with profound hypothermia. Her postoperative recovery was uneventful.

Conclusions: Successful surgical management of true aneurysm of pulmonary artery with PDA and VSD closure is presented in view of its rarity.

ALCAPA Repair- 4 year single institute experience

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Background: Anomalous left coronary artery from pulmonary artery (ALCAPA) is a rare congenital heart disease. Mortality during the first year of life is very high if left untreated. The surgical

management has evolved from coronary ligation to Takeuchi intrapulmonary artery tunnel to anatomical repair with coronary transfer. We report our experience with surgical repair of ALCAPA since 2001.

Methods: It is a retrospective study involving 18 patients operated for ALCAPA at our institute between 2001 & 2005, age of presentation 2 months to 11 years. Takeuchi repair was done in 5 patients, coronary transfer was done in 12 patients and coronary ligation was done in 1 patient. Left ventricular ejection fraction (LVEF) ranged from 10-40%. Associated mitral valve incompetence was present in 11 patients. Mitral valve repair was carried out in 5 patients. One patient underwent mitral valve replacement.

Results: There was no early or late mortality. Cardiopulmonary bypass (CPB) times and ischemic times were 115.6 and 61 min respectively in the Takeuchi group and 198.5 and 100.5 min in the coronary transfer group weaning from CPB was uneventful in all and there has been no requirement of prolonged extracorporeal support so far. Mean intensive care unit (ICU) stay was 17.4 days (range 3-18 days). Delayed Sternal closure was undertaken in 13 patients. Three patients needed tracheostomy for weaning from ventilator. LVEF after surgery ranged from 20-60% at discharge .Residual mitral incompetence was present in 8 patients and one of these one patients had undergone mitral valve (MV) repair. One patient (the last to undergo Takeuchi repair in this experience) underwent transannular patching of the pulmonary annulus because of severe right ventricular outflow(RVOT) obstruction caused by the Takeuchi tunnel. Follow up ranges from 3 months to 4 yrs (mean 2 yrs). LVEF on follow up ranged from 40-70%. Mitral incompetence that was present preoperatively has not altered despite improvement in EF in those who did not undergo concomitant mitral valve repair. There has been no late mortality.

Conclusions: ALCAPA repair has been accomplished with a high success rate. The left ventricle retains the capacity to recover even when the operation is performed late and in the presence of severe left ventricular dysfunction. Coronary transfer is our preferred approach due to risk of producing iatrogenic right ventricular obstruction. Mitral valve intervention at time of ALCAPA repair is probably indicated for significant preoperative mitral regurgitation.

Extending the limits of the primary arterial switch operation for TGA

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Introduction: The single stage arterial switch operation (ASO) has now become the treatment of choice for D-TGA. Late presenation for sugery, is common in developing countries like India and Sri Lanka. The purpose of this study is to asess the results of a treatment protocol offering a primary ASO to all patients presenting with D-TGA irrespective of the age at presentation.

Methods: A retrospective review was performed for all 70 children who underwent a primary ASO from 7/2002-7/2005. Forty of them had TGA with intact ventricular septum and 30 had TGA/DORV with VSD. All patients underwent a single stage primary ASO±VSD closure/aortic arch repair irrespective of their age at presentation, status of the LV, coronary artery anatomy. There were 9 children with TGA/IVS, older than 6 weeks, upto 2 years age who underwent primary ASO, with controlled LV loading, despite having a regresed LV at presentation.

Results: There were 4 hospital deaths. There were no reoperation for residual defect. All children had primary sternal closure. Only one of the nine children with regressed LV's died. All 8 survivors with regessed LV's recovered normal LV function in 7-10 days and continue to have a normal LV function on follow-up. One 6 month old patient with TGA, VSD died from advanced pulmonary vascular obstructive disease (PVOD) Survival and functional class are excellent beyond the early hazard phase soon after the operation in all groups of patients having the ASO.

Conclusions: This study over a period of 3 years has shown than primary ASO can be successfully performed in a broad spectrum of patients with TGA, irrespective of their age at presentation, status of the LV, coronary artery anatomy and aortic coarctation. Pesence of a bicuspid pulmonary valve or mild LVOTO is not a contraindication for ASO. Primary sternal closure is possible in almost all cases after the ASO. Patients with TGA/VSD, often develop early severe pulmonary vascular obstructive disease with 3-6 months of life.

Double switch operation: Narayana Hrudayalaya Experience

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Introduction: The long term results with conventional repair for congenitally corrected transposition of the great arteries (CCTGA) are known to be extremely poor. Our center's policy is to perform anatomic repair for this lesion. Early and intermediate term result of our experience is presented.

Methods: All patients admitted with the diagnosis of CCTGA and who underwent anatomic repair between 2001 & 2005 was included in this study. These patients were divided into two groups. Group I → Sennings + Rastelli procedure for CCTGA with ventricular septal defect (VSD) and pulmonic stenosis (PS), Group II → Sennings + Atrial switch for CCTGA with or without VSD and no PS.

Results: Total no of case operated were 27: Sennings + Rastelli (group I) seven. There was no early or late mortality. The mean age in group I was 5.17 years. One patient required permanent pace maker implantation and one patient has an RVOT gradient exceeding 40 mm of Hg on follow up. All are Class 1 symptomatic. Twenty Patients underwent Sennings + ASO i.e Group II of which there were three early deaths. Three (15%) patients required tracheostomy for weaning from the ventilator and three needed permanent pace maker insertion.. Incremental risk factors for early demise were uncorrected severe tricuspid regurgitation and persistant pulmonary hypertension. There was one late death secondary to severe postoperative left ventricular (LV) dysfunction. Postoperative follow-up echocardiography ranging from 2 months to 4 years (mean of 3 years) showed that two patients had moderate left ventricular dysfunction, six patients had moderate aortic regurgitation and one patient had mild right ventricular outflow obstruction. All the surviving patients are asymtomatic. One needs to be on diuretics for right sided failure secondary to tricuspid valve stenosis.

Conclusions: 1) Uncorrected significant Tricuspid incompetence increases the chances of early mortality in arterial switch + Senning for CCTGA, 2) Aortic incompetence (AI) is not uncommon following the arterial switch + Senning procedure, 3) Left ventricular dysfunction has been noticed in some early survivors. Cause of both AI & LV dysfuntion is unclear. Longer followup and greater experience are required to describe the precise role of DSO for different CTGA categories.

Fontan failure in the current era

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Objective: To review predisposing factors of Fontan failure at our institution.

Methods: It is a retrospective study from May 2001 to October