Results: The AV conduction time increased over the time in all groups (Z-score: from 0.9±1.1 to 1.3±0.9 in G1, 0.9±1.2 to 1.7±1.6 in G2 and 0.7±0.7 to 1.4±1.3 in G3). One G2 patient and two G3 patients had increased PQ duration >200 msec at late follow-up. The QRS duration increased during the follow-up at a rate of 1.78 msec/year in G1, 2.34 msec/year in G2 despite pulmonary valve replacement in 10 patients, and 1.81 msec/year in G3 despite conduit replacement in 9. At the later follow-up, the QRS duration was significantly increased (Z-score: 4.5±3.6 in G1, 5.7±1.4 in G2 and 4.6±1.9 in G3). One patient in each group had QRS duration of 170 msec or longer and the one in G3 had a history of serious ventricular arrhythmia. Three patients had a QTC duration above 460 msec.

Conclusions: Conduction disorders are noted at late follow-up in Fallot patients who received transannular patch but also in those who received no patch or a pulmonary homograft. It suggests that volume overloading related to the transannular patch but also chronic pressure overloading and myocardial injury related to surgery also contribute to the development of conduction disorders. We suggest that all Fallot patients should undergo regular ECG follow-up and that, in those with signs of conduction disorders, further diagnostic procedures should be considered.

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Percutaneous closure of atrial septal defects in children: what are the predictive factors of success?

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Introduction: Percutaneous atrial septal defect (ASD) closure is now a safe and efficient alternative to surgery in adults. In paediatric population, its feasibility is still uncertain and limited in young children with large defect. Our aim was to determine predictive factors of success of percutaneous ASD closure in this population.

Methods: All patients less than 12 years-old who underwent an attempt of a percutaneous ASD closure using Amplatzer septal occluder device were retrospectively reviewed. We analysed echocardiography ASD diameter, length of rims surrounding, length of atrial septum, and during catheterization balloon-stretched diameter. ASD area was calculated and normalized to the body surface area of patients. The procedure was abandoned when the device placement failed after three attempts.

Results: 140 patients (age 7±4.5 years, weight 25.3±9 kg) were included. Echocardiographic ASD diameter was 15.4±4.1 mm, balloon-stretched diameter 19.8±6.4 mm, length of aortic annulus 34.8±5.9 mm, length of implanted device 18.6±4.3 mm. All rims surrounded ASD measuring at least 3 mm. Pericardial injury related to surgery also contribute to the development of conduction disorders. We suggest that all Fallot patients should undergo regular ECG follow-up and that, in those with signs of conduction disorders, further diagnostic procedures should be considered.

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Palliative Potts anastomosis for primary pulmonary hypertension in children: mid-term results.

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Despite permanent progress in medical treatments, primary pulmonary hypertension in children (PPHTC) remains a not curable disease with a severe prognosis. Moreover, continuous intravenous treatment is particularly unacceptable for the quality of survival at this age.

Background: Eisenmenger syndrome with large patent ductus arteriosus carries a relatively good prognosis with long-term survival. This prompted us to try a Potts anastomosis as surgical palliative treatment for PPHTC: direct anastomosis between the descending aorta and the left pulmonary artery without cardiopulmonary bypass.

Aim: To assess the risks and benefits of that surgery and the mid-term results in the first cases.

Material and methods: From 06/05/2004 to 23/03/2007, six children underwent Potts anastomosis for PPHTC. Age was 2.4 to 11 years, weight 14 to 23 Kg. All were NYHA IV and experienced syncoques. All received Bosentan, associated with continuous intravenous prostacyclin in 4 and Sildenafil in 1. Bosentan was used in monotherapy in 1.

Immediate results: No death occurred during surgery.

One child died at day 12 with staphylococcus infection and major cyanosis. This child received Bosentan monotherapy.

Mid term results: No death occurred during a mean follow-up of 4 years and 2 months. For the 5 surviving patients, functional status increased from NYHA IV to NYHA I (3 pts) and NYHA II (2 pts). No syncoque occurred. Intravenous prostacyclin therapy was stopped for 3/4 pts who received it before. Oral treatment was continued. Potts anastomosis remained large with right to left shunt and same pressure in pulmonary arteries and aorta. Percutaneous oxygen saturation in inferior limbs is stable, from 88 to 72 %, and normal in right upper limb. All have mild to moderate polycythaemia.

Conclusion: Surgical Potts anastomosis is a palliative solution for PPHTC with an acceptable perioperative risk and good mid-term results. It avoids sudden death and allows a better quality of life in these children.

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Endothelial function and arterial mechanical properties in children after Kawasaki disease.

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Introduction: Kawasaki disease is the leading cause of acquired heart disease in children. Increased cardiovascular risk can be assessed by intima-media thickness (IMT), a strong independent predictive factor for coronary heart disease, as could be the flow-mediated vasodilation (FMD). However, controversy exists about these parameters if altered in children with Kawasaki disease.

Objective: The aim of our study was to study the mechanical arterial properties and to analyze endothelial function by measuring the flow-mediated dilatation proving its alteration in Kawasaki disease patients evolving with moderate or without coronary artery lesions.

Population and methods: A study design of 29 patients who had Kawasaki disease with or no or transient or coronary artery involvement less than 4 mm of dilatation (group I), mean age 7.6 years, was compared to 30 healthy age-matched children (group II), mean age of 8.3 years. The carotid IMT, incremental elastic modulus, cross sectional compliance, distensibility and FMD were determined non-invasively one year following the disease.

Results: No significant difference was found with Flow-Mediated Dilatation between either group, for group I (9.16 %, Standard Deviation: SD = 5.05) and group II (8.8 %, SD = 4.56). As it was for mechanical arterial properties, like incremental elastic modulus, vascular compliance, distensibility and FMD, for group I (Mean IMT = 0.44 mm, SD = 0.028) vs (0.46 mm, SD = 0.060) for group II.

Conclusions: Early evaluation of mechanical properties and endothelial function of the arteries in patients with Kawasaki disease, who have no or little dilatation less than 4 mm in coronary arteries, don’t show any alteration as compared with healthy population.

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However, this non-invasive test could be performed to a larger population of Kawasaki patients described above, in a prospective study with repeated measurements and follow up at different ages to confirm the absence of cardiovascular risk.

301 Clinical outcome and echographic features of patients with repaired tetralogy of Fallot and biventricular pacing.

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Introduction: Right heart failure is a common feature in patients with repaired tetralogy of Fallot (TOF), right ventricular (RV) dysfunction and right bundle branch block (RBBB). Biventricular pacing (BVP) has been described as a potentially useful therapeutic in some cases. We aimed to investigate the clinical outcome and dysynchrony echocardiographic characteristics of patients with repaired TOF and BVP.

Methods: A systematic retrospective study of all of the patients of CHU de Bordeaux with repaired TOF and BVP was realized. Clinical NYHA status and exercise test performance were retrieved before and 6 months after BVP. All patients benefited from an echocardiography with dyssynchrony measures in spontaneous rhythm, RV pacing and BVP.

Results: 10 patients (7 male, 36.6 ± 13 years old) were retrieved from our database. Surgical repair had occurred at the age of 7.4 ± 5.8 years. BVP was effective since 18 ± 10 months. After 6 months of BVP were noted a significant improvement in NYHA class (1.3 ± 0.4 vs 1.8 ± 0.6, p<0.05) and exercise test capacity (93 ± 22 W vs 78 ± 14 W, p<0.05). In spontaneous rhythm, a significant inter-ventricular dyssynchrony was found (41 ± 13 ms, p<0.01) as well as late activation of RV lateral wall (electrocardiographic delay: 42 ± 23 ms vs lateral LV wall and 44 ± 30 ms vs interventricular septum; p<0.01 for both). This dysynchrony is corrected in biventricular pacing (m. interventricular delay 5.6 ± 4.6 ms electrocardiographic delays respectively 25.5 ± 13 ms and 12 ± 9 ms, p<0.01 vs SR). RV pacing is responsible for late activation of LV lateral wall (36.5 ± 30 ms)

Conclusion: BVP pacing in selected patients with repaired TOF, BVP significantly improves dysynchrony parameters. This is associated with significant improvement of clinical status.

302 Transcatheter closure of the majority of ostium secundum atrial septal defects is feasible with the adjunction of the sizing balloon-assisted technique in difficult cases.

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Introduction: In our centre, device closure is the first-intention therapy for secundum atrial septal defect (ASD). In difficult cases we use a Meditech sizing balloon to optimize the position of the device. We sought to determine (1) the efficacy of this sizing balloon-assisted technique (SBT) and (2) the percentage of ASDs that can be percutaneously closed.

Patients: In 2009, 65 patients (37 female) were referred for secundum ASD closure, at a median age and weight of 41 (13 to 88) years and 41 (13 to 88) kg, respectively. Six had pulmonary hypertension.

Results: Eight patients had surgical closure because of referral cardiologist’s choice and/or patient’s choice. Among the 57 remaining patients, 4 were unsuitable by echocardiography and surgically closed. Transcatheter closure was attempted in 53 cases, including 28 children (53%), and was successful in 50 cases, including 10 with SBT (20%). Amplatzer devices were used in all the patients with a median Amplatzer septal occluder (ASO) size of 20 (10 to 40)mm. A 12 mm ASO could not be positioned in a 5.6 kg infant. Surgical closure was contraindicated for poor general condition (former 26 weeks premature baby with severe bronchopulmonary dysplasia). Transcatheter closure failed in 2 cases, despite SBT. No major complication occurred. Five patients (10%) had a trivial residual shunt. By univariate analysis, the deficiency of superior rim (<5mm from the defect) and a large ASD size were associated with the use of SBT (p= 0.04 and 0.002, respectively). The deficiency of superior rim and pulmonary hypertension (mean > 25mmHg) were associated with failure to percutaneously close the ASD (p= 0.02 and 0.03, respectively). Out of 57 patients candidates for transcatheter closure, 50 were successfully closed percutaneously (87%).

Conclusion: Transcatheter closure of ASD is successfully accomplished in the majority of the cases. The SBT is safe and useful for device positioning and delivery in patients with large ASDs and deficient superior rim.

303 Interventional catheterization in the management of diffuse congenital pulmonary vein stenosis (PVS) in the infants and small children.

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Introduction: Diffuse pulmonary vein stenosis (PVS) is a profoundly debilitating disease, leading to right ventricular failure and death. We sought to determine whether transcatheter interventional approach may improve patient’s survival.

Patients: Since 2005, 4 children presented with PVS, congenital in 3 cases, including one associated with single ventricle (SV). One patient had acquired PVS after repair of total anomalous pulmonary venous connection. Surgical repair of the PVS was performed in 3 patients, who underwent 2, 3 and 4 operations, respectively. All of them developed restenosis within 3 to 10 weeks (median: 3.5 weeks). In one patient, former 26 weeks premature baby with severe bronchopulmonary dysplasia, surgery was contraindicated and transcatheter therapy considered first.

Results: Six catheterizations were performed in the 4 patients at a median age and weight of 18 (6 to 28) months and 7.7(4.6 to 9.3)kg, respectively. Eleven interventions were performed, including high pressure balloon dilation (n=5), bare stent implantation (n=3) and drug-eluting stent implantation (n=3). One patient had bare stent implantation with coated-balloo dilution as a hybrid procedure. High pressure balloon dilation failed in all cases. Stent implantations were successful in all cases. One patient with right ventricular failure died. The remaining patients improved their functional status. The patient with SV had heart-lung transplantation 6 months after drug-eluting stent implantation. She subsequently died from postoperative infection. Two patients are alive and being well, 4 and 16 months after stent implantation.

Conclusion: Transcatheter management may prolong survival or can be successful as a bridge to heart-lung transplantation. This should be considered as an interesting alternative of surgery.

304 Agenesia of the ductus arteriosus : combination with pulmonary artery hypertension

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Agenesis of the ductus venosus is a rare anomaly that may be responsible of cardiomegaly and hydrops in fetuses. We report 2 cases in combination with pulmonary artery hypertension (PAH).

Agenesis of ductus venosus was diagnosed in 2 boys at the second term of pregnancy. None had associated hydrops. Chromosomal karyotyping was...