Sun. Jul 9, 2017

E-Oral Presentation Area

JCK E-Oral Presentation

JCK E-Oral Presentation 2 (III-JCKEOP02)

Chair:Atsuko Kato(Division of Cardiology, The Labatt Family Heart Centre, Department of Pediatrics, The Hospital for Sick Children, University of Toronto, Toronto, Canada)
Chair:Takaya Hoashi(Department of Pediatric Cardiovascular Surgery, National Cerebral and Cardiovascular Center, Suita, Japan)
1:00 PM - 2:00 PM E-Oral Presentation Area (Exhibition and Event Hall)

[III-JCKEOP02-01] Transcatheter closure of doubly committed VSDs - a 5 year single centre experience

○Tran Cong Bao Phung, Do Nguyen Tin （Cardiology Department, Children Hospital 1, Ho Chi Minh City, VietNam）

1:00 PM - 2:00 PM

[III-JCKEOP02-02] Effect of fenestration on ventricular-vascular coupling chronically after Fontan operation - Cardiac magnetic resonance study

○Yoichi Iwamoto, Seiko Kuwata, Akiko Yana, Hirotaka Ishido, Satoshi Masutani, Hideaki Senzaki （Division of Pediatric Cardiology, MFN Center, Saitama Medical University Saitama Medical Center, Japan）

1:00 PM - 2:00 PM

[III-JCKEOP02-03] Development of a New and Rapid 3D Printing System for Manufacturing Super Flexible Replicas of Congenital Heart Disease

○Isao Shiraishi[1], Kennichi Kurosaki[1], Suzu Kanzaki[2], Takaya Hoashi[3], Hajime Ichikawa[3] （1.Department of Pediatric Cardiology National Cerebral and Cardiovascular, Japan, 2.Department of Radiology, National Cerebral and Cardiovascular Center, Japan, 3.Department of Pediatric Cardiac Surgery, National Cerebral and Cardiovascular Center, Japan）

1:00 PM - 2:00 PM

[III-JCKEOP02-04] Minimally invasive epicardial implantable cardioverter-defibrillator placement in a young child

○Wakana Maki[1], Hiroko Asakai[1], Kazuhiro Shiraga[1], Takahiro Shindo[1], Yoichiro Hirata[1], Ryo Inuzuka[1], Tomoyuki Iwase[2], Tetsuhiro Takaoka[2], Akihiro Masuzawa[2], Yasutaka Hirata[2], Akira Oka[1] （1.Department of Pediatrics The University of Tokyo Hospital, Japan 2.Department of Cardiac Surgery The University of Tokyo Hospital,Japan）

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[III-JCKEOP02-05] Fetal Echocardiography Characteristics in Vietnam Population

○Tran Cong Bao Phung, Vu Minh Phuc, Do Nguyen Tin, Nguyen Tri Hao, Phan Hoang Yen, Phan Tien Loi （Cardiology Department, Children Hospital 1, Ho Chi Minh City, VietNam）

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[III-JCKEOP02-06] Mitral valve replacement using stented bovine jugular vein graft (Melody valve) in infants and small children

○Atsuko Kato[1], Osami Honjo[2] （1.Division of Cardiology, The Labatt Family Heart Centre, Department of Pediatrics, The Hospital for Sick Children, University of Toronto, Toronto, Canada, 2.Department of Cardiovascular surgery, The Labatt Family Heart Centre, The Hospital for Sick Children, University of Toronto, Toronto, Canada）

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[III-JCKEOP02-07] Long-term Surgical Outcome of Transposition of the Great Arteries with Intact Ventricular Septum and Left Ventricular Outflow Tract Obstruction

○Akihisa Furuta, Mitsugi Nagashima, Takahiko Sakamoto, Goki Matsumura, Kentaro Umezu, Jin Ikarashi, Junko Katagiri, Hironori Murakami （Department of Cardiovascular Surgery,

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[III-JCKEOP02-08] Successful biventricular conversion late after primary one and one-half ventricle repair

○Takaya Hoashi[1], Masataka Kitano[2], Masatoshi Shimada[1], Kenichi Kurosaki[2], Hajime Ichikawa[1] （1.Department of Pediatric Cardiovascular Surgery, National Cerebral and Cardiovascular Center, Suita, Japan, 2.Department of Pediatric Cardiology, National Cerebral and Cardiovascular Center, Suita, Japan）

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[III-JCKEOP02-01] Transcatheter closure of doubly committed VSDs - a 5 year single centre experience

○Tran Cong Bao Phung, Do Nguyen Tin （Cardiology Department, Children Hospital 1, Ho Chi Minh City, VietNam）

Background: There remains international debate regarding efficacy and safety of transcatheter closure of doubly committed VSDs (DCVSD). This study reports a 5 year single centre experience.
Methods: Retrospective review, October 2009 to Jul 2014; 44 patients underwent device closure of DCVSD. Selection criteria: Weight >10kg, no severe/moderate AR or cusp prolapse, defect <7mm, no other intra-cardiac abnormalities, plus evidence of pulmonary hypertension, left heart volume loading, or trivial/mild AR or cusp prolapse. Technique: Anterograde approach and AV loop, angiographic re-evaluation, echocardiographic evaluation of AR and outflow.
Results: Median age 63 months (10-170), weight 18kg (8-32), defect 3.7mm (2-6). Associated abnormalities: trivial to mild AR; 1 (2.3%), left heart dilation; 10 (22.7%), MR; 3 (6.8%), coronary cusp prolapse: 11 (25.0%). Devices used: PFM Coil: 10 (22.7%), ADO II: 21 (47.7%), PFM Coil and ADOII 13 (29.5%). Post-procedure murmur in 20: residual shunt disappeared on echo <48 hours in 18 (56,2%) the remainder after 6 months. Complications: haemolysis: 1 (2.3%) referred for surgery, embolization: 1 (2.3%), residual shunt 1 (2.3%) referred for surgery, RV outflow obstruction: 5 (11.4%) all resolved <3 months, AR increased: 4 (9.0%) 3 recovered to baseline <1 month, one referred for surgery. Mild LV outflow obstruction: 1 (2.3%) resolved <2 months.
Conclusion: Device closure of DCVSD is a controversial but effective and safe option in selected patients. Coils are associated with a greater incidence of haemolysis than ADOII or Coil &ADOII.

1:00 PM - 2:00 PM (Sun. Jul 9, 2017 1:00 PM - 2:00 PM E-Oral Presentation Area)

[III-JCKEOP02-02] Effect of fenestration on ventricular-vascular coupling chronically after Fontan operation - Cardiac magnetic resonance study

○Yoichi Iwamoto, Seiko Kuwata, Akiko Yana, Hirotaka Ishido, Satoshi Masutani, Hideaki Senzaki （Division of Pediatric Cardiology, MFN Center, Saitama Medical University Saitama Medical Center, Japan）

[Background] We assessed how fenestration affects ventricular contractility and ventricular-vascular coupling (VVC) chronically after Fontan operation employing cardiac magnetic resonance imaging (cMRI).

[Methods] This study included consecutive 44 Fontan patients (8.8±4.2 years) with cMRI. EDVI, ESVI and stroke volume index (SVI) were measured by volumetry. Arterial effective elastance (Ea) was calculated as mean blood pressure (BP) divided by SVI. End-systolic elastance (Ees) was calculated by our developed single-beat method using BP, arm equilibrium pressure, and ESVI. We measured circulating blood volume by dye dilution method and calculated venous capacitance (VC) by blood volume and arm equilibrium pressure. We compared those in patent fenestration group (N=15, F group) with those in closed fenestration group (N= 29, non-F group).

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[Results] F group had significantly lower central venous pressure (CVP) and higher VC than non-F group (9.4 vs. 11.4 mmHg, 3.5 vs. 2.5 ml/mmHg, p<0.05). F group had significantly higher EDVI and ESVI than non-F group (111.5 vs. 96.0 ml/m2 : p=0.02, 62.5 vs. 50.5 ml/m2 : p<0.01). F group had tendencies toward higher SVI and lower Ea than non-F group. There was no significant difference between F group and non-F group in Ees (2.3 vs. 2.4 mmHg/ml/m2), or in biomarker levels on renin-angiotensin-aldosterone system, heart failure, and fibrosis.

[Conclusion] Fenestration may be protective in suppressing venous maladaptation, keeping lower CVP and contributing to keep preload reserve and VVC in those chronically after Fontan operation.

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[III-JCKEOP02-03] Development of a New and Rapid 3D Printing System for Manufacturing Super Flexible Replicas of Congenital Heart Disease

○Isao Shiraishi[1], Kennichi Kurosaki[1], Suzu Kanzaki[2], Takaya Hoashi[3], Hajime Ichikawa[3] (1.Department of Pediatric Cardiology National Cerebral and Cardiovascular, Japan, 2.Department of Radiology, National Cerebral and Cardiovascular Center, Japan, 3.Department of Pediatric Cardiac Surgery, National Cerebral and Cardiovascular Center, Japan)

[Backgrounds] Recently, 3D printing technology has been applied for diagnosis and surgical simulation of congenital heart disease. We have shown a unique technology that manufactures precise and super flexible polyurethane replicas of congenital heart disease by means of stereolithography followed by vacuum casting. To improve limitations in time and cost of this technique, we here developed a novel and rapid 3D printing system in collaboration with several Japanese chemical and mechanical companies. [Materials and Methods] The new 3D printing machine consists of 4 inkjet heads with 200x500mm size that can reproduce not only child but also adult heart and thoracic aorta. Inkjet materials with similar texture to the human heart were also developed. We preliminary manufactured several different types of heart replicas including ASD, VSD, TOF, and ccTGA. [Results] After printing conditions have been optimized, super flexible replicas of congenital heart disease were manufactured with precise external surface and detailed internal structure of the atria and ventricles. The replicas exhibited similar texture to the real heart and allow surgeons simulation surgery by cutting and suturing. Whole process takes approximately 48 hours including initial 3D image processing. [Conclusions] We have successfully developed a new 3D inkjet printing technology based on industry -academia collaboration. Further improvements of ink materials and printing technologies are necessary to reduce time and cost of the replicas to be used all over the world.

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[III-JCKEOP02-04] Minimally invasive epicardial implantable cardioverter-defibrillator placement in a young child

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○Wakana Maki[1], Hiroko Asakai[1], Kazuhiro Shiraga[1], Takahiro Shindo[1], Yoichiro Hirata[1], Ryo Inuzuka[1], Tomoyuki Iwase[2], Tetsuhiro Takaoka[2], Akihiro Masuzawa[2], Yasutaka Hirata[2], Akira Oka[1] (1.Department of Pediatrics The University of Tokyo Hospital, Japan 2.Department of Cardiac Surgery The University of Tokyo Hospital,Japan)

The use of implantable cardioverter-defibrillator (ICD) therapy for prevention of sudden cardiac death in the pediatric population has been increasing. However, the use of transvenous ICD lead systems is limited in younger children and in patients with congenital heart disease. Alternative techniques such as epicardial patch and subcutaneous systems require extensive surgery with often a full sternotomy or thoracotomy.
We report a case of successful minimally invasive pericardial ICD implantation in a 16kg child. The patient was a 6-year-old girl with left ventricular non-compaction. She had ventricular fibrillation (VF) arrest from which she was successfully resuscitated with an automated external defibrillator (AED). She recovered without any neurological consequences and ICD implantation was indicated for secondary prevention. Through a small subxiphoid incision, a transvenous ICD dual coil was advanced and screwed into the oblique sinus pericardium under fluoroscopic guidance. An additional sense-pace lead was sutured onto the RV apex, and the generator was placed in the upper abdominal wall through the same incision. Defibrillation threshold testing demonstrated successful defibrillation at 15J. Post implant, the patient had two episodes of appropriate shock due to VF. The ICD system continues to show stable impedance at 3 months follow-up. To our knowledge, this is the first case report in Asia of pericardial ICD placement with a minimally invasive subxiphoid approach.

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[III-JCKEOP02-05] Fetal Echocardiography Characteristics in Vietnam Population

○Tran Cong Bao Phung, Vu Minh Phuc, Do Nguyen Tin, Nguyen Tri Hao, Phan Hoang Yen, Phan Tien Loi (Cardiology Department, Children Hospital 1, Ho Chi Minh City, VietNam)

BACKGROUND:
To evaluate the incidence of fetal cardiac abnormalities and to establish normative reference ranges of fetal cardiac characteristics in Vietnamese population.
METHODS:
A cross_sectional study was undertaken on pregnancies examined at Thu Duc district hospital, Ho Chi Minh city from November 2012 to April 2013.
RESULTS:
Two hundred and twenty pregnant women were enrolled in this study.
1. Characteristics: mothers' mean age (years): 30.3 + 5.0 ; Mean gestational age (weeks) : 33.6 + 4.5 ; Population characteristics: intrauterine growth retardation (1.7%); diabetes (10.1%); genetic mutation (0.8%); abnormalities in routines echo scan (4.2%); twins (1.7%); previous child with congenital heart disease (0.8%); fetal tachycardia (0.8%); screening (78.2%).
2. Fetal cardiac characteristics: heart chest ratio (CTAR, %) = 31.4 + 4.8 . The mean cardiac dimension on 2D (mm): foramen oval = 4.9 + 1.4; mitral valve = 9.9 + 2.1; tricuspid valve = 10.4 + 2.4; aortic valve = 6.3 + 1.4; pulmonary valve annulus = 7.9 + 1.8; pulmonary trunk = 7.8+ 1.9; right pulmonary artery = 3.9 + 1.0 ; left pulmonary artery = 3.9 + 0.9 ; aortic isthmus = 4.9 + 1.0. The mean velocities : aortic

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valve = 0.66 + 0.15(0.35-1.00); pulmonary valve = 0.61 + 0.14); aortic arch = 0.74 + 0.21
3.one fetus with ventricular septal defect (0.45%), one fetus with supra ventricular tachycardia (0.45%), one with sinusbradycardia (0.45%) and one with coarctaion (0.45%).
CONCLUSIONS:
This is the first report on normal ranges of fetal cardiac dimensions especially in the third trimester in Vietnam.

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[III-JCKEOP02-06] Mitral valve replacement using stented bovine jugular vein graft (Melody valve) in infants and small children

○Atsuko Kato[1], Osami Honjo[2] (1.Division of Cardiology, The Labatt Family Heart Centre, Department of Pediatrics, The Hospital for Sick Children, University of Toronto, Toronto, Canada, 2.Department of Cardiovascular surgery, The Labatt Family Heart Centre, The Hospital for Sick Children, University of Toronto, Toronto, Canada)

BACKGROUND: Melody® valve (Medtronic, MN) implantation in the mitral position is a novel procedure for the small mitral valve (MV) annulus, which does not require anticoagulation. We sought to analyze our initial experience with mitral valve replacement (MVR) with Melody® valve.
METHOD: The records of patients who underwent MVR using Melody® from 2014 to 2016 were retrospectively reviewed. The Melody® (22 mm) valve was prepared by sewing a 3.5 mm Gore-Tex tube graft at the middle of the stent as a cuff and resecting one or three zigs to avoid left ventricular outflow tract (LVOT) obstruction.
RESULTS: Five patients (age, 11 months, 5 - 16 months; weight, 6.8 kg, 4.6 - 8.6 kg) were included. All patient had dysplastic MV, including severe mitral stenosis (n=3) and/or regurgitation (n=3). Three patients had Melody® valve MVR as a salvage procedure: mechanical valve thrombosis (n=2) and tissue valve dysfunction (n=1). The valve was inflated to 18 mm (n=2) or 20 mm (n=3). Intraoperative echocardiography revealed trivial or none regurgitation in all patients with mean pressure Doppler gradient across the valve of 2 mmHg (1 – 4 mmHg), and peak LVOT gradient of 5 mmHg (0 – 12 mmHg). All the patients but one were discharged home. There was one patient who had sudden death at 3 months after surgery.
CONCLUSIONS: Melody® valve MVR is a viable alternative to mechanical MVR in small children. Early functional outcome of this procedure is excellent, whereas long-term outcome is to be investigated.

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[III-JCKEOP02-07] Long-term Surgical Outcome of Transposition of the Great Arteries with Intact Ventricular Septum and Left Ventricular Outflow Tract Obstruction

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Objective
Left ventricular outflow tract obstruction (LVOTO) is sometimes combined with transposition of the great arteries (TGA) with intact ventricular septum (IVS). The purpose of this study is to evaluate the long-term surgical outcome of TGA with IVS and LVOTO.
Patients
Between 1980 and 2016, 13 patients who underwent the surgical repair for TGA with IVS and LVOTO (peak gradient on LVOT>30mmHg) were retrospectively reviewed. Type of LVOTO included subaortic in 7 and valvular in 6. Age at definitive repair was 37.5±42.5 month-old, and body weight was 6.8±3.8 kg. Definitive operation included Senning operation in 10, arterial switch operation in 1, truncal switch operation in 1 and modified Fontan operation in 1.
Results
Follow-up period was 19.6±7.4 years. There was no hospital death and 1 late death. The survival rate was 90.0% at 20 years. Re-intervention was performed in 4 patients. Freedom from re-intervention was 66.7 % at 20 years. Latest angiography revealed LVOT peak gradient of 8.2±8.4 mmHg, and systemic ventricular ejection fraction of 53.1±11.8 %. Latest echocardiography revealed moderate tricuspid valve regurgitation in 1, and LVOT flow of 1.7±0.4 m/s. Three patients showed atrioventricular rhythm disturbance in electrocardiogram.
Conclusions
Long-term surgical outcome of TGA with IVS and LVOTO was satisfactory in terms of the relief of LVOTO. However, the further careful observation is mandatory because some patients may present tricuspid valve regurgitation and rhythm disturbance associated with systemic ventricular dysfunction in the late period.

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[III-JCKEOP02-08] Successful biventricular conversion late after primary one and one-half ventricle repair

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（1.Department of Pediatric Cardiovascular Surgery, National Cerebral and Cardiovascular Center, Suita, Japan, 2.Department of Pediatric Cardiology, National Cerebral and Cardiovascular Center, Suita, Japan）

A six-year-old girl with unbalanced atrioventricular septal defect, hypoplastic right ventricle and severe common atrioventricular valve regurgitation developed patient-prosthetic mismatch. At six months old, she underwent primary one and one-half ventricle repair and replacement of left side atrioventricular valve. A catheter examination showed that her right ventricular end-diastolic volume increased from 39.4 ml/m^2 one year after the previous surgery, to 70 ml/m^2 at preoperative evaluation. Thus, at the timing of redo left side atrioventricular valve replacement, she was successfully converted to biventricular circulation. The postoperative course was uneventful, and the right atrial pressure was 7 mmHg before discharge.

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