Sun. Jul 9, 2017

Poster Presentation Area

JCK Poster

JCK Poster 3 (III-JCKP3)

Fetal and Neonatal Cardiology/Others

Chair:Han Zhang(Department of Cardiology, Shanghai Children's Hospital, Shanghai, China)
1:00 PM - 2:00 PM Poster Presentation Area (Exhibition and Event Hall)

[III-JCKP3-01] Experience of cases demonstrating the difficulties in fetal TAPVC diagnosis

○Yukiko Kawazu[1,2], Noboru Inamura[3]
（1.Department of Pediatrics, Toyonaka Municipal Hospital, Japan, 2.Department of Pediatric Cardiology, Osaka Medical Center for Maternal and Child Health, Japan, 3.Department of Pediatrics, Kindai University, Japan）

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[III-JCKP3-02] A neonatal refractory A neonatal respiratory distress associated with case presentation and literature review: pulmonary artery sling

○Han Zhang, Lijian Xie, Min Huang
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[III-JCKP3-04] Assessment of Longitudinal Systolic Ventricular Dysfunction and Asynchrony Using Velocity Vector Imaging in Children With a Single Right Ventricle

○Yurong Wu, Liqing Zhao （Pediatric Cardiology, Xin Hua Hospital Affiliated to Shanghai Jiao Tong University School of Medicine, Shanghai, China）

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[III-JCKP3-05] The study on diagnostic value of 4D echocardiogrphy in prenatal diagnosis of congenital heart diseases

○LiQing Zhao, YuRong Wu, Sun Chen, Qing Wang, Qian Ying, XianTing Jiao, Kun Sun
（Department of Pediatric Cardiology, Xin Hua Hospital Affiliated to Shanghai Jiao Tong University School of Medicine,Shanghai, China）

1:00 PM - 2:00 PM

[III-JCKP3-06] Evaluation of Referral Indications for Fetal Echocardiography, Prenatal Diagnosis, and Outcomes

○Lee Voon Chu[1], Wai Lin Ang[2], Ching Kit Chen[2] （1.Yong Loo Lin School of Medicine, National University of Singapore, Singapore, 2.Cardiology Service, Department of Paediatric Subspecialties, KK Women's and Children's Hospital, Singapore）

1:00 PM - 2:00 PM

[III-JCKP3-08] Cardiac Resynchronization Therapy in an Infant with Tetralogy of Fallot and Mechanical Dyssynchrony

○Geena Kim[1], Hyoung Doo Lee[1], Hoon Ko[1], Si Chan Sung[2], Hyungtae Kim[2], Kwang Ho Choi[2]
（1.Department of Pediatrics, Pusan National University Children's Hospital, Pusan National University School of Medicine, Yangsan, Korea, 2.Department of Cardiothoracic Surgery, Pusan National University School of Medicine, Yangsan, Korea）

1:00 PM - 2:00 PM

JCK Poster

JCK Poster 4 (III-JCKP4)

Cardiac Surgery

Chair:Khang Dang Cao(Department of Cardiovascular Surgery, University Medical Center, Vietnam)
1:00 PM - 2:00 PM Poster Presentation Area (Exhibition and Event Hall)

[III-JCKP4-01] Extracardiac total cavopulmonary connection for patients with "apicobicaval" juxtaposition

○Tomohiro Nakata[1], Tadashi Ikeda[1], Shiro Baba[2], Takuya Hirata[2], Kenji Minatoya[1]
（1.Department of Cardiovascular Surgery, Kyoto University Graduate School of Medicine, Kyoto, Japan, 2.Department of Pediatrics, Kyoto University Graduate School of Medicine, Kyoto, Japan）

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[III-JCKP4-02] Yasui operation after Norwood procedure for VSD with aortic atresia or interrupted aortic arch

○Shu-Chien Huang, Yih-Sharng Chen
（National Taiwan University Hospital, Taiwan）

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[III-JCKP4-03] Unusual association of systemic semilunar valve stenosis in double outlet right ventricle with pulmonary semilunar valve atresia: *a case report*

○Akio Inage[1], Naokazu Mizuno[2], Yukihiro Takahashi[3] (1.Division of Pediatric Cardiology, Sakakibara Heart Institute, Japan, 2.Department of Radiology, Sakakibara Heart Institute, Japan, 3.Division of Cardiovascular Surgery, Sakakibara Heart Institute, Japan)

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[III-JCKP4-04] Impact of Truncal valve stenoinsufficiency on the late outcomes after surgical interventions for Persistent Truncus Arteriosus

○Won Young Lee, Won Kyoun Park, Chun Soo Park, Tae-Jin Yun (Department of Thoracic and Cardiovascular Surgery, Asan Medical Center, University of Ulsan College of Medicine, Seoul, Republic of Korea)

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[III-JCKP4-05] Reconstruction of Pulmonary Arteries after Neonatal Ductus Arteriosus Stenting: Techniques and Results

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1:00 PM - 2:00 PM

[III-JCKP4-07] A case of successful resolution of protein-losing enteropathy after conversion to pulsatile bidirectional cavopulmonary shunt from Fontan procedure.

○Seulgi Cha[1], Mi Kyung Song[1], Gi Beom Kim[1], Eun Jung Bae[1], Chung Il Noh[1], Woong Han Kim[2] (1.Department of Pediatrics, Seoul National University Children's Hospital, Seoul, South Korea, 2.Thoracic and Cardiovascular Surgery, Seoul National University Children's Hospital, Seoul, South Korea)

1:00 PM - 2:00 PM

[III-JCKP4-08] The dynamic changes of mitral valve after surgical repair of mitral regurgitation in patients with atrial septal defect

○Yi-Seul Kim[1], Heirim Lee[1], June Huh[1], I-Seok Kang[1], Ji-Hyuk Yang[2], Tae-Gook Jun[2],Jinyoung Song[1], (1.Department of Pediatrics, Samsung Medical Center, Sungkyunkwan University School of Medicine, Seoul, Korea, 2.Department of Thoracic and Cardiovascular Surgery, Samsung Medical Center, Sungkyunkwan University School of Medicine, Seoul, Korea)

1:00 PM - 2:00 PM

[III-JCKP4-09] Early surgical occlusion of patent ductus arteriosus in preterm neonates

○Yoonjin Kang, Jae Gun Kwak, Eung Rae Kim, Jeong Ryul Lee, Woong-Han Kim (Department of Thoracic and Cardiovascular Surgery, Seoul National University Hospital, Korea)

1:00 PM - 2:00 PM

[III-JCKP4-10] Risk factors for systemic outflow relief operation in Double inlet left ventricle or tricuspid atresia with transposition of the great arteries

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[III-JCKP3-08] Cardiac Resynchronization Therapy in an Infant with Tetralogy of Fallot and Mechanical Dyssynchrony

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Introduction:
We published an article showing that post LA space index (PLAS index) is useful in fetal diagnoses of TAPVC (Ultrasound Obstet Gynecol. 2014).
We report details of two cases (shown below), illustrating how PLAS index can be useful in addressing the difficulties in fetal diagnosis of TAPVC.

Case 1:
At 25 gestational weeks (GW), we performed a detailed fetal echocardiography because of suspected hypoplastic left heart syndrome. However, we diagnosed her as normal. She was born with SpO2 90% and admitted to NICU for tachypnea. On the 19th day, we diagnosed TAPVC (3) with pulmonary hypertension (PH). She showed PH crisis and underwent TAPVC repair on the 36th day. Postoperative course is good.

Case 2
At 25 GW, STIC images were analyzed by us and diagnosed as no abnormality. She was born with low SpO2 of 80% and transferred to NICU. Then, we diagnosed TAPVC (3). One day after the birth, she underwent TAPVC repair. Since she developed pulmonary vein obstruction (PVO), PVO release surgery was performed 3 month later. Postoperative course is good.

Retrospective study:
Case 1: LA wall was smooth, PV flow was abnormal, PLAS index was 1.65 (> 1.27).
Case 2: PV flow of color doppler seemed to reflux to LA. There was abnormal blood flow going downwards behind LA. PLAS index was 1.48 (> 1.27).

Summary:
Case 1 developed PH crisis before surgery, and case 2 needed postoperative PVO release. Both cases may have been affected by ' postnatal' diagnosis. Retrospectively, since PLAS index was large in both cases, we believe that PLAS index is useful in fetal TAPVC screening.

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

[III-JCKP3-02] A neonatal refractory A neonatal respiratory distress associated with case presentation and literature review: pulmonary artery sling

○Han Zhang, Lijian Xie, Min Huang (Department of Cardiology, Shanghai Children's Hospital, Shanghai, China)

In October, 2016, a 11-day-old male was admitted in our neonatal intensive care unit(NICU) as neonatal pneumonia with a 3-hour history of polypnea. Septic screen and other clinical examination were unremarkable, while the symptoms worsened on day 3 after he received antibiotics and atomization inhalation treatment. His oxygen saturation as well as heart rate couldn't maintain.
Then we used noninvasive examinations as echocardiography and computed tomography angiography(CTA) of the chest. The results turned out to be pulmonary artery sling(PAL) with compression of the distal trachea. Surgical repair of the PAS by re-implatatin of the left pulmonary artery from the main pulmonary artery was performed under cardiopulmonary bypass(CPB),and he was faring well since. This case is as a reminder to pediatric colleagues who are on the front line of diagnosis, should stay vigilant, especially when appropriate generate self-questioned clinical pictures that simply do not fit the preliminary diagnosis. The development of noninvasive imaging modalities as echocardiography and CTA has led to increased utilization of the entity. Surgical repair is the only way to release the compression of the airway due to the sling.

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

[III-JCKP3-04] Assessment of Longitudinal Systolic Ventricular Dysfunction and Asynchrony Using Velocity Vector Imaging in Children With a Single Right Ventricle

○Yurong Wu, Liqing Zhao （Pediatric Cardiology, Xin Hua Hospital Affiliated to Shanghai Jiao Tong University School of Medicine, Shanghai, China）

Assessment of ventricular dysfunction and asynchrony is very important in predicting the outcome for children with a single right ventricle. However, the assessment is inaccurate and subjective because of the unusual ventricular shape. This study aimed to evaluate the feasibility and clinical value of velocity vector imaging for assessing longitudinal systolic ventricular dysfunction and intraventricular asynchrony in children with a single right ventricle. The study enrolled 36 children with a single right ventricle and 36 age-matched children with a normal heart. Peak systolic velocity, peak displacement, strain, strain rate, time to peak systolic velocity, and time to peak sys-tolic strain were measured via velocity vector imaging using the Siemens Sequoia C512 echocardiography instrument. The maximum positive rate of ventricular pressure change (Max [dp/dt]) was obtained by cardiac catheterization for all the children with a single right ventricle. In the children with a single right ventricle, the maximal temporal differences and the standard deviations of the times to peak systolic velocity and peak systolic strain were higher (P\0.01) than in the children with a normal heart. Moreover, the strain and strain rate values were significantly lower in all six segments (P\0.05). The strain rate of the basal segment adjacent to the rudi-mentary chamber correlated best with Max (dp/dt) (r = 0.86; P\0.01). Longitudinal systolic dysfunction and intraventricular asynchrony could be assessed accurately using velocity vector imaging in children with asingle right ventricle.

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

[III-JCKP3-05] The study on diagnostic value of 4D echocardiogrphy in prenatal diagnosis of congenital heart diseases

○LiQing Zhao, YuRong Wu, Sun Chen, Qing Wang, Qian Ying, XianTing Jiao, Kun Sun （Department of Pediatric Cardiology, Xin Hua Hospital Affiliated to Shanghai Jiao Tong University School of Medicine,Shanghai, China）

Objective: The aim of this study was to find the diagnostic value of spatiotemporal image correlation (STIC) technology in prenatal diagnosis of congenital heart diseases (CHDs).**Methods:** The study was a prospective and blind study. STIC images of pregnancies met the inclusion criteria were acquired during the examination of extend cardiac echography examination (ECEE) and offline analyzed by other specialists that blind to the characteristics of pregnancies and the results of ECEE. Multi-planer rendering mode (MPR) was used for STIC diagnosis during offline analysis. All cases were followed up. The sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) were analyzed for fetal echocardiography and STIC technology.**Results:** The proportion of termination of pregnancy (TOP) was 32.0% (54/169) in all cases and 56.8% (54/95) in the cases of CHDs. The diagnostic sensitivity and specificity of two-dimensional fetal echocardiography for prenatal diagnosis of CHDs were 100% (42/42) and 95.9% (71/74) respectively, the PPV was 93.3% (42/45) and the NPV was 100% (71/71). The sensitivity and specificity of STIC technology in prenatal diagnosis of CHDs were 92.6% (88/95) and 97.3% (72/74) respectively, the PPV was 97.8% (88/90) and the NPV was 91.1% (72/79). The area under receiver operating characteristic (ROC) curve were 0.98 and 0.95 respectively.
Conclusion: STIC technology had a high sensitivity and specificity in prenatal diagnosis of CHDs according to the present study.

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

[III-JCKP3-06] Evaluation of Referral Indications for Fetal Echocardiography, Prenatal Diagnosis, and Outcomes

○Lee Voon Chu[1], Wai Lin Ang[2], Ching Kit Chen[2] （1.Yong Loo Lin School of Medicine, National University of Singapore, Singapore, 2.Cardiology Service, Department of Paediatric Subspecialties, KK Women's and Children's Hospital, Singapore）

Objective This study evaluates referral indications for fetal echocardiography (FE) in a tertiary centre in Singapore, analyses which were significantly associated with detection of congenital heart disease (CHD), and generates trends between referral indications, diagnoses and fetal outcomes.
Method This was a retrospective, single-centre study reviewing medical records of 181 women over a 2-year period from July 2014 to June 2016.
Results The mean gestational age at first FE was 23±4 weeks. 156 out of 181 fetuses were diagnosed with CHD. The most common referral indications were abnormal cardiac ultrasound (104, 93% confirmed CHD) - most commonly ventricular septal defect (44, 28%), pulmonary stenosis (21, 13%) and Fallot' s tetralogy (16, 10%), abnormal cardiac rhythms (63% confirmed CHD) and intracardiac echogenic foci (71% confirmed CHD). 32 (18%) pregnancies were terminated, with the most common diagnoses being atrioventricular septal defect (10, 31%), double outlet right ventricle (4, 12.5%) and Fallot' s tetralogy (4, 12.5%). Out of 129 delivered fetuses, 112 were followed up and 87 (78%) had concordant prenatal

and postnatal diagnoses. 23 (26%) had cyanotic CHD. 30 underwent surgery (21 corrective, 9 palliative) after which 22 (73%) survived. Of 104 fetuses referred for abnormal cardiac views, 33 (32%) died. 96 (86%) out of all fetuses followed-up survived.
Conclusion Abnormal cardiac views on second-trimester ultrasound were significantly associated with postnatal diagnosis of CHD and mortality. Early detection via FE and subsequent intervention improves survival.

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[III-JCKP3-08] Cardiac Resynchronization Therapy in an Infant with Tetralogy of Fallot and Mechanical Dyssynchrony

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Cardiac resynchronization therapy is rarely used in young patients with heart failure showing poor ventricular ejection fraction, and wide QRS complex. We experienced the case of a 11-month-old infant with tetralogy of fallot, postsurgical atrioventricular block after total correction, and severe heart failure for mechanical dyssynchrony. She underwent tetralogy of fallot total correction and permanent pacemaker implantation in right ventricle at her age of 5.8 months and 6 months, respectively. She gradually deteriorated during follow- up, showing poor ventricular ejection fraction under 20%, and wide QRS complex over 130 milliseconds with significant left ventricular dyssynchrony. And she was admitted to the intensive care unit requiring respiratory and inotropic intravenous support at 11 months of age. So she underwent device upgrade to CRT-p. After 2months after the cardiac resynchronization therapy, the patient showed significant clinical improvement, improved left ventricular systolic function, and decreased QRS duration.

JCK Poster

JCK Poster 4 (III-JCKP4)

Cardiac Surgery

Chair:Khang Dang Cao(Department of Cardiovascular Surgery, University Medical Center, Vietnam)
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[III-JCKP4-02] Yasui operation after Norwood procedure for VSD with aortic atresia or interrupted aortic arch

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[III-JCKP4-03] Unusual association of systemic semilunar valve stenosis in double outlet right ventricle with pulmonary semilunar valve atresia: *a case report*

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[III-JCKP4-04] Impact of Truncal valve stenoinsufficiency on the late outcomes after surgical interventions for Persistent Truncus Arteriosus

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[III-JCKP4-05] Reconstruction of Pulmonary Arteries after Neonatal Ductus Arteriosus Stenting: Techniques and Results

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[III-JCKP4-07] A case of successful resolution of protein-losing enteropathy after conversion to pulsatile bidirectional cavopulmonary shunt from Fontan procedure.

○Seulgi Cha[1], Mi Kyung Song[1], Gi Beom Kim[1], Eun Jung Bae[1], Chung Il Noh[1], Woong Han Kim[2] （1.Department of Pediatrics, Seoul National University Children's Hospital, Seoul, South Korea, 2.Thoracic and Cardiovascular Surgery, Seoul National University Children’s Hospital, Seoul, South Korea）

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[III-JCKP4-08] The dynamic changes of mitral valve after surgical repair of mitral regurgitation in patients with atrial septal defect

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[III-JCKP4-09] Early surgical occlusion of patent ductus arteriosus in preterm neonates

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[III-JCKP4-10] Risk factors for systemic outflow relief operation in Double inlet left ventricle or tricuspid atresia with transposition of the great arteries

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[III-JCKP4-01] Extracardiac total cavopulmonary connection for patients with "apicobicaval" juxtaposition

○Tomohiro Nakata[1], Tadashi Ikeda[1], Shiro Baba[2], Takuya Hirata[2], Kenji Minatoya[1] (1.Department of Cardiovascular Surgery, Kyoto University Graduate School of Medicine, Kyoto, Japan, 2.Department of Pediatrics, Kyoto University Graduate School of Medicine, Kyoto, Japan)

Objective: The technical aspects of Fontan completion are complicated in certain situs anomalies such as both (superior and inferior) venae cavae and the apex are on the same side, which we call "apicobicaval juxtaposition" in the present study.

Methods: Three functional single ventricle patients with "apicobicaval juxtaposition" were retrospectively reviewed. The situs was inversus with both venae cavae and the apex on the same side (left) in all cases. The four pulmonary veins (PVs) normally drained into the right-sided left atrium. All patients underwent bidirectional Glenn procedure previously.

Results: All patients underwent total cavo-pulmonary connection (TCPC) at 2 years of age. During cardiopulmonary bypass, comprehensive dissection of the heart, especially between left-sided right atrium and the left PVs, reaching the Waterston groove, was performed. TCPC was completed with extracardiac conduit (16mm in size, without reinforced ring) on ipsilateral side in all patients. All patients' postoperative course was uneventful. Postoperative computed tomography and cardiac catherization demonstrated no obstruction or deformity of the conduit or the PVs. Right atrium became reduction in size and deformed to surround the straight conduit. There was no death and no reoperation.

Conclusions:
In patients with "apicobicaval" juxtaposition with normal PVs drainage, our technique makes it possible to place a short and straight extracardiac conduit between inferior vena cava to pulmonary artery without compressing the conduit or the PVs.

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

[III-JCKP4-02] Yasui operation after Norwood procedure for VSD with aortic atresia or interrupted aortic arch

○Shu-Chien Huang, Yih-Sharng Chen (National Taiwan University Hospital, Taiwan)

Introduction:
The Yasui operation could achieve bi-ventricular reconstruction for patients with adequate-sized ventricles and ventricular septal defect(VSD) associated with obstructions of the aortic arch and left ventricular outflow tract (LVOT). The experience of Yasui opertion following Norwood operation with RV-PA shunt were reviewed.
Material and Method:
Since 2014, 5 patients have undergone the Yasui operation at our institution. Interrupted aortic arch was present in 3 patients and coarctation of the aorta/hypoplastic arch was present in 2. Two patients had aortic stenosis, and 3 patients had aortic atresia. All patients had Norwood S1P with RV-PA shunt as

initial palliation. The mean age and body weight at the time of the Yasui operation was 17.4 ±14.2 months and 8.0 ± 2.3 kg, respectively. The ascending aorta and aortic arch requires graft interposition in 3. Right ventricle to pulmonary artery continuity was established with a valved Gortex conduit in 4 patients, and 19mm Tissue valve in one.
RESULTS: All five patients had successful Norwood palliation and survived Yasui operation. During the follow-up, there were no late death. One patient underwent re-operation for peripheral pulmonary artery stenosis and change the conduit. All the other patients had good functional outcome without LVOT obstruction.
CONCLUSIONS: The results of the Staged Norwood - Yasui operation were excellent. Low mortality and good midterm left ventricular function without outflow tract stenosis could be achieved. The long-tem follow-up is required for the patency of RVOT conduits.

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[III-JCKP4-03] Unusual association of systemic semilunar valve stenosis in double outlet right ventricle with pulmonary semilunar valve atresia: *a case report*

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Introduction: Systemic semilunar valve stenosis in cyanotic congenital heart disease is rare. It is difficult to plan optimal surgical strategy because there are right and left ventricular outflow tract obstructions. In this case, cardiovascular magnetic resonance was very useful for planning optimal surgical strategy.
Case: Three days old, 2,210 grams male baby was referred for evaluation of cyanotic congenital heart disease. Examination of the neonate showed mild central cyanosis, cardiomegaly, single 2nd heart sound and an ejection click followed by grade 3 ejection systolic murmur at left 2nd intercostal space. Trans-thoracic echocardiography showed situs solitus, levocardia, normal systemic and pulmonary venous connections and atrio-ventricular concordance. There was a large malaligned subarterial VSD with bidirectional shunt. One great artery was overlying VSD (50% rule) and was arising from the ventricular mass, and was continuing as the arch of aorta. The semilunar valve of this great vessel was tricuspid and markedly dysplastic with peak instantaneous gradient of 40 mmHg. The pulmonary arteries, which were confluent, arose from the undersurface of the aortic arch which is the typical location of PDA. We demonstrated the pulmonary annulus and the atretic pulmonary valve. We then diagnosed double outlet right ventricle**,** pulmonary atresia and aortic valve stenosis. We firstly performed Brock operation and PDA ligation at sixteen days, and secondly Rastelli operation and VSD closure without aortic valvuloplasty at seven months, with improvement of aortic valve stenosis.

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outcomes after surgical interventions for Persistent Truncus Arteriosus

○Won Young Lee, Won Kyoun Park, Chun Soo Park, Tae-Jin Yun （Department of Thoracic and Cardiovascular Surgery, Asan Medical Center, University of Ulsan College of Medicine, Seoul, Republic of Korea）

Objectives. We sought to determine whether truncal valve stenoinsufficiency (TVS, TVI) at initial presentation is a significant risk factor for adverse outcomes after various surgical interventions for persistent truncus arteriosus (PTA). **Methods.** Retrospective review was performed for 34 patients with PTA who underwent surgery between June 1989 and March 2017. There were 14 patients who had either significant TVI (³ II, n=3) or significant TVS (trans-valvar velocity ³ 3.0 m/s, n=9), or both (n=2). Initial surgical interventions were palliation in 13 and primary Rastelli-type repair (RTR) in 21. **Results.** Early mortality after initial operations occurred in 7 patients. Six patients underwent surgical interventions for TVI. Overall survival and freedom from death or surgical intervention for TVI at 5 years were 64.9 ± 8.8% and 48.4 ± 9.2%, respectively. On Cox proportional Hazards model, TVI at initial presentation (HR: 4.23, 95% CI: 1.22-14.88 P=0.023) was a significant risk factor for adverse outcomes. Median flow velocity across the truncal valve decreased after RTR in patients with initial TVS (3.4 m/s to 1.8 m/s, P=0.001). Among the patients with significant TVI or TVS, 5-year-survival rate seemed higher in patients with initial palliation (83%) compared to the patients with initial RTR (50%) without statistical significance (P= 0.228). **Conclusions**. While TVS regresses after RTR, TVI at initial presentation leads to adverse composite outcome. Patients with significant TVI or TVS at initial presentation may benefit from initial palliation.

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[III-JCKP4-05] Reconstruction of Pulmonary Arteries after Neonatal Ductus Arteriosus Stenting: Techniques and Results

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Background: The ductus arteriosus (DA) stenting in neonatal period has been progressively indicated in congenital heart disease group with duct – dependent pulmonary circulation. We reported our techniques in reconstruction of pulmonary arteries after neonatal DA stenting and evaluated the results of these surgical techniques.
Methods: This research included 36 patients who underwent cardiac surgeries with pulmonary artery reconstruction after PDA stenting from May 2015 to May 2017. We described our techniques to repair and analyzed the results including hospital mortality, morbidity, survival rate during follow-up.
Results: 100% of cases need a partial removal of stent at the distal part of the PDA stent. Luminal stenosis of pulmonary branches had been resulted in most patients. The debridement of fibrous tissue or/and neo-intimal proliferation had to be done in all patients. The removal of pulmonary end of stented DA and neo-intimal cause large damage of arterial wall and need to be enlarged by patching in all cases.
Conclusions
Stenting of DA in neonatal period is helpful neonatal palliative procedure but associates frequently with intimal proliferation of pulmonary arteries. Reconstruction of pulmonary branches after DA stent

implantation demands meticulous techniques and patching enlargement of one or both pulmonary branches is always indicated.

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[III-JCKP4-07] A case of successful resolution of protein-losing enteropathy after conversion to pulsatile bidirectional cavopulmonary shunt from Fontan procedure.

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We report a case of a 14-year-old boy who had resolution of medically uncontrolled protein-losing enteropathy (PLE) as a complication of Fontan circulation, after Fontan take-down and pulsatile bidirectional cavopulmonary shunt (BCPS). On 30th April 2014, an 11-year-old boy was admitted to our hospital due to swelling of both legs and scrotum. He underwent Fontan procedure on 27th October 2004 because of functional single ventricle with left isomerism, Fallot-type double outlets from right ventricle and complete atrioventricular septal defect. His laboratory finding at admission showed hypoalbuminemia and elevation of stool alpha-1-antitrypsin. Thus, he was diagnosed as PLE. After then, he had been treated with sildenafil, steroid and unfractionated heparin, but these treatments were not effective. Follow-up echocardiography showed that there was moderate atrioventricular valve regurgitation. After careful discussion, we decided to perform pulsatile BCPS after Fontan take-down to control PLE. He underwent this operation on 2nd February 2016. After the operation, he showed lower arterial oxygen saturation, but symptoms and laboratory findings were improved. He is now on steroid, sildenafil and diuretics. This case suggest that surgical correction of high central venous pressure such as pulsatile BCPS might be an considerable option to control symptoms and laboratory findings of PLE as a complication of Fontan circulation. However, Fontan take-down and pulsatile BCPS result in lower arterial oxygen saturation. Thus, long term follow-up for this patient would be necessary.

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[III-JCKP4-08] The dynamic changes of mitral valve after surgical repair of mitral regurgitation in patients with atrial septal defect

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Objective
Even though spontaneous regression of MR after isolated ASD closure has been accepted, surgical repair

of MV has been done in selected cases. We purposed to know the outcome of surgical repair and determine factors for good results
Methods
Sixty-one patients with ASD and MR who had surgical correction at our hospital from January 2005 to December 2014 were enrolled. The MV annular diameter, lengths of leaflets, angles of leaflets on systole and motion angle of both leaflets were measure on echo. MR was graded from 1 to 4. Surgical procedures used for MR repair were evaluated.
Results
The MR severity and MVP improved after surgery from 2.3 ± 0.7 to 1.7 ± 0.9 and from 41.8% to 16.4%, respectively. Angle of both leaflets on systole and motion angle of both leaflet were changes after surgery. In patients with postoperative MR lesser than grade 2, angle of both leaflets on systole and motion angle of posterior leaflet were significantly changed and underwent operation at earlier age (28.0 ± 18.9 vs 60.3 ± 10.1) and chordae repair (70.2% vs 25.0%). But more MAZE operation in patients with postoperative MR greater than grade 2 was found (21.3%vs 87.5%).
Conclusion
Surgical MR repair performed concomitantly with ASD closure was safe and effective. Not only prolapse but also angles of both leaflets on systole and motion angle of PML were significantly improved in patients with postoperative MR less than moderate degree. Operation at early age showed better results whereas MAZE operation showed worse results.

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[III-JCKP4-09] Early surgical occlusion of patent ductus arteriosus in preterm neonates

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Objectives
Surgical intervention of patent ductus arteriosus (PDA) is done when pharmacological treatment is contraindicated or fails; however, it remains unclear exactly when to perform surgery. We attempted to evaluate the optimal timing of surgical treatment for PDA in preterm neonates.
Methods We retrospectively evaluated 66 symptomatic preterm neonates without congenital intracardiac anomaly who underwent surgery for PDA from 2012 to 2016. The primary occlusion group underwent surgical occlusion without medical treatment. The secondary occlusion group received surgery following medical failure. We divided each group into two subgroups according to the timing of the surgery (the age at operation ≤10 days vs. >10 days). Surgical outcomes of each group were compared.
Results
The early occlusion group was associated with lower incidence of bronchopulmonary dysplasia (p=0.035) and pneumonia (p=0.036). The early occlusion was mainly performed in neonates with primary occlusion. The early primary occlusion group was significantly associated with fewer bronchopulmonary dysplasia (p=0.045) and pneumonia (p=0.004). However, morbidity rates did not differ significantly in secondary occlusion group according to the timing of the surgery. Bronchopulmonary dysplasia was one of the significant predictors of in-hospital survival (p=0.000).
Conclusion
Secondary occlusion of PDA in neonates is associated with higher incidence of bronchopulmonary

dysplasia, which is one of the predictors of survival. Early primary closure of PDA may improve respiratory outcomes of preterm neonates.

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[III-JCKP4-10] Risk factors for systemic outflow relief operation in Double inlet left ventricle or tricuspid atresia with transposition of the great arteries

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Objectives: In patients with double inlet left ventricle (DILV) or tricuspid atresia (TA) with transposition of the great arteries (TGA), arch obstruction (AO) has been known to be the risk factor for the development of subaortic stenosis. However, patients without AO may also develop SAS in the course of Fontan palliation. **Methods**: Between January 2000 and February 2017, 28 patients with DILV with TGA or TA (IIc) underwent various systemic outflow relief operations (SORO) in the course of Fontan palliation. AO was associated in 12 patients. SORO comprises Damus-Kaye-Stansel procedure (n=9), primary Norwood-type palliation (n=5), palliative arterial switch operation (n= 1), and VSD extension (n= 3). Left ventricle outflow tract area index (LVOTAI) was measured on initial postnatal echocardiography. Cox model was fitted to identify the risk factors for decreased time to SORO. **Results**: There was one early death after initial palliation. Median LVOTAI was 161 mm^2/m^2 (26-413 mm^2/m^2). Freedom from SORO at 12 months was 46 ± 9.4 % (0% in patients with AO, 81 ± 9.8 % in patients without AO, inter-group difference: P<0.001). On Cox model, AO (HR, 17.43, 95% CI 1.9 – 158.8, P=0.011) and smaller LVOTAI (HR, 1.13, 95% CI 1.02 – 1.24, 10 mm^2/m^2 decrease, P=0.017) were identified as predictors of the need for SORO. **Conclusion**: In patients with DILV with TGA or TA (IIc), SORO was required in the majority of the patients during the course of Fontan palliation, especially when AO was initially combined. LVOTAI can be a useful parameter for the prediction of subsequent need for SORO.