Sat. Jul 10, 2021

Track6

International Symposium of Pediatric Heart and Lung Transplantation

Vice-chair Lecture

Living lobar lung transplantation

Chair:Masaaki Sato（Organ Transplantation Center, The University of Tokyo Hospital, Japan）
1:20 PM - 1:55 PM Track6 (現地会場)

[ISPHLT-VC] Living lobar lung transplantation

○Hiroshi Date （Department of Thoracic Surgery, Kyoto University, Japan）

International Symposium of Pediatric Heart and Lung Transplantation

Keynote Lecture 4

Current status of pediatric lung transplantation in the world

Chair:Hiroshi Date（Department of Thoracic Surgery, Kyoto Univeristy Graduate School of Medicine, Japan）
9:00 AM - 9:30 AM Track6 (現地会場)

[ISPHLT-KL4] Current status of pediatric lung transplantation in the world

○Stuart C Sweet （Department of Pediatrics, Washington University, USA）

International Symposium of Pediatric Heart and Lung Transplantation

Keynote Lecture 5

Current status and future aspect of pediatric mechanical circulatory support

Chair:Takeshi Shinkawa（Department of Cardiovascular Surgery, Tokyo Women's Medical University, Japan）
3:00 PM - 3:30 PM Track6 (現地会場)

[ISPHLT-KL5] Current status and future aspect of pediatric mechanical circulatory support

○Iki Adachi （Congenital Heart Surgery, Texas Children's Hospital / Baylor College of Medicine, United States of America）

International Symposium of Pediatric Heart and Lung Transplantation

Symposium 4

New era of pediatric lung transplantation in the world

Chair:Hiroshi Date（Department of Thoracic Surgery, Kyoto Univeristy Graduate School of Medicine, Japan）
Chair:Stuart Sweet（Department of Pediatrics , Washington University School of Medicine in St.Louis, USA）
9:40 AM - 11:10 AM Track6 (現地会場)

[ISPHLT-SY4-1] Management of pediatric lung transplant recipients and post-transplant outcome

○Christian Benden （Faculty of Medicine, University of Zurich, Switzerland）

[ISPHLT-SY4-2] Technical consideration of pediatric lung transplantation from deceased donors

○Shaf Keshavjee （Department of Surgery, University of Toronto, Canada）

[ISPHLT-SY4-3] The Changing face of pediatric lung transplant - new demographics， new challenges

○Marc G Schecter （Department of Pediatrics, Division of Pulmonary Medicine, University of Florida, USA）

[ISPHLT-SY4-4] Current status of pediatric lung transplantation in Japan

○Hiroshi Date （Department of Thoracic Surgery, Kyoto University, Japan）

[ISPHLT-SY4-5] Split lung transplantation for small children: Bilateral segmental lung transplantation using split adult living-donor lower lobe

○Seiichiro Sugimoto, Shinji Otani, Kentaroh Miyoshi, Shin Tanaka, Yasuaki Tomioka, Ken Suzawa, Hiromasa Yamamoto, Mikio Okazaki, Masaomi Yamane, Shinichi Toyooka （General Thoracic Surgery and Organ Transplant Center, Okayama University Hospital, Japan）

International Symposium of Pediatric Heart and Lung Transplantation

Symposium 5

Pediatric mechanical circulatory support in children and patients with congenital heart disease

Chair:Yasutaka Hirata（Department of Cardiac Surgery, The University of Tokyo Hospital, Japan）
Chair:Osami Honjo（Division of Cardiovascular Surgery, The Hospital for Sick Children, University of Toronto, Canada）
3:40 PM - 5:25 PM Track6 (現地会場)

[ISPHLT-SY5-1] Evolving strategies in mechanical circulatory support in children with congenital heart disease: SickKids experience

○Osami Honjo[1,2,3,4,5,6,7,8] （1.Department of Cardiovascular Surgery, The Hospital for

Sick Children, Canada, 2.Watson Family Chair, Cardiovascular Sciences, The Hospital for Sick Children, 3.Associate Professor, Department of Surgery, University of Toronto, 4.Senior Associate Scientist,）

[ISPHLT-SY5-2] Experiences of EXCOR pediatrics in Japan

○Hajime Ichikawa[1], Takaya Hoashi[1], Kenta Imai[1], Naoki Okuda[1], Motoki Komori[1], Heima Sakaguchi[3], Ken-ichi Kurosaki[3], Isao Shiraishi[3], Norihide Fukushima[2]（1.Department of Pediatric Cardiovascular Surgery, National Cerebral and Cardiovascular Center, Japan, 2.Department of Transplantation, National Cerebral and Cardiovascular Center, Japan, 3.Department of Pediatric Cardiology, National Cerebral and Cardiovasc）

[ISPHLT-SY5-3] The impact of HeartMate 3 left ventricular assist device in small BSA patients

○Tomoyuki Fujita, Satsuki Fukushima, Naoki Tadokoro, Kohei Tonai, Satoshi Kainuma, Naomori Kawamoto, Takashi Kakuta, Ayumi Ikuta（Department of Cardiovascular Surgery, National Cerebral and Cardiovascular Center, Japan）

[ISPHLT-SY5-4] Pediatric mechanical circulatory support in children and patients with congenital heart disease in Tokyo University

○Yasutaka Hirata, Minoru Ono（Department of Cardiac Surgery, The University of Tokyo Hospital, Japan）

[ISPHLT-SY5-5] Long term results of pediatric mechanical circulatory support as bridge to transplant in severe heart failure pediatric patients

○Masaki Taira[1], Takuji Watanabe[1], Yuji Tominaga[1], Moyu Hasegawa[1], Jun Narita[2], Hidekazu Ishida[2], Ryo Ishii[2], Takayoshi Ueno[1], Koichi Toda[1]（1.Department of Cardiovascular Surgery, Osaka University Graduate School of Medicine, Japan, 2.Department of Pediatrics, Osaka University Graduate School of Medicine, Japan）

International Symposium of Pediatric Heart and Lung Transplantation

Lunch Seminar 2

重症心不全における EXCORの現状

Chair:市川 肇（国立循環器病研究センター 小児心臓外科 部長）
12:20 PM - 1:10 PM Track6 (現地会場)

[ISPHLT-LS2-1]

○坂口 平馬（国立循環器病研究センター 小児循環器内科 医長）

[ISPHLT-LS2-2]

○小西 伸明（国立循環器病研究センター 看護部 レシピエント移植コーディネーター）

International Symposium of Pediatric Heart and Lung Transplantation

Oral Session 2

Pediatric lung treatment

Chair:Yasushi Shintani（General Thoracic Surgery, Osaka University Graduate School of Medicine, Japan）
11:20 AM - 12:00 PM Track6 (現地会場)

[ISPHLT-OS2-1] Living-donor single-lobe lung transplantation for pediatric pulmonary hypertension

○Daisuke Nakajima[1], Shiro Baba[2], Tadashi Ikeda[3], Satona Tanaka[1], Yoshito Yamada[1], Yojiro Yutaka[1], Akihiro Ohsumi[1], Masatsugu Hamaji[1], Hiroshi Date[1]（1.Department of Thoracic Surgery, Kyoto University, Japan, 2.Department of Pediatrics, Kyoto University, Japan, 3.Department of Cardiovascular Surgery, Kyoto University, Japan）

[ISPHLT-OS2-2] Post-transplant lymphoproliferative disorder after living-donor lung transplantation in pediatric patients

○Satona Tanaka[1], Daisuke Nakajima[1], Akihiro Ohsumi[1], Shiro Baba[2], Itaru Kato[2], Hidefumi Hiramatsu[2], Hiroshi Date[1]（1.Department of Thoracic Surgery, Kyoto University Hospital, Japan, 2.Department of Pediatrics, Kyoto University Hospital）

[ISPHLT-OS2-3] 25-year-old female patient with a severe case of COVID-19 pneumonia who has undergone bilateral lung transplantation at adolescent age

○Yuma Shibuya, Sadamitsu Yanagi, Yuta Mizuno, Takeshi Ikegawa, Shun Kawai, Yasuhiro Ichikawa, Shin Ono, Ki-sung Kim, Hideaki Ueda （Department of Cardiology, Kanagawa Children's Medical Center, Japan）

International Symposium of Pediatric Heart and Lung Transplantation

Oral Session 3

Mechanical circulatory support

Chair:Masaki Taira（Department of Cardiovascular Surgery, Osaka University Graduate School of Medicine, Japan）
2:05 PM - 2:50 PM Track6 (現地会場)

[ISPHLT-OS3-1] The ACTION quality improvement collaborative

○Angela Lorts, David Morales （Ventricular Assist Device Program, UC Dept. Pediatrics Director, Cincinnati Children's, USA）

[ISPHLT-OS3-2] Our experience of the use of implantable ventricular assist device

○Yuki Ito[1], Heima Sakaguchi[1], Hikari Miike[1], Hajime Ichikawa[2], Tomoyuki Fujita[3], Norihide Fukushima[4] （1.Department of Pediatric Cardiology, National Cerebral and Cardiovascular Center, Japan, 2.Department of Pediatric Cardiac Surgery, National Cerebral and Cardiovascular Center, Japan, 3.Department of Cardiac Surgery, National Cerebral and Cardiovascular Ce）

[ISPHLT-OS3-3] Long-term ventricular assist device support in children

○Motoki Komori[1], Takaya Hoashi[1], Kenta Imai[1], Naoki Okuda[1], Heima Sakaguhi[2], Kenichi Kurosaki[2], Norihide Fukushima[3], Hajime Ichikawa[1] （1.Department of Pediatric Cardiovascular Surgery, National Cerebral and Cardiovascular Center, Japan, 2.Pediatric Cardiology, 3.Transplant Medicine）

International Symposium of Pediatric Heart and Lung Transplantation

Vice-chair Lecture

Living lobar lung transplantation

Chair:Masaaki Sato（Organ Transplantation Center, The University of Tokyo Hospital, Japan）

Sat. Jul 10, 2021 1:20 PM - 1:55 PM Track6 (現地会場)

[ISPHLT-VC] Living lobar lung transplantation

○Hiroshi Date （Department of Thoracic Surgery, Kyoto University, Japan）

(Sat. Jul 10, 2021 1:20 PM - 1:55 PM Track6)

[ISPHLT-VC] Living lobar lung transplantation

○Hiroshi Date （Department of Thoracic Surgery, Kyoto University, Japan）

To deal with the brain-dead donor shortage, living-donor lobar lung transplantation (LDLLT) was first developed as an alternative modality for very sick patients who would not survive a waiting time for cadaveric lung transplantation (CLT). For the past several years, most of the reports on LDLLT have been from Japan, where the average waiting time for a cadaveric lung is exceeding 800 days.
Recipient candidates for LDLLT should be less than 65 years old and must meet the criteria for conventional cadaveric lung transplantation. Our policy has been to limit LDLLT to severely ill patients with rapidly progressive lung disease who would not survive the long waiting time for cadaveric lungs.
We have accepted only immediate family members (relatives within the third degree or a spouse) for living-donors. It is very important to confirm that potential donors are competent, willing to donate without psychologic pressure from the others.
Since only two lobes are implanted, LDLLT was initially indicated for children and small adults such as cystic fibrosis patients. However, we have accepted various lung diseases including restrictive, obstructive, infectious and vascular lung diseases for LDLLT candidate. Regarding size matching issue, functional size matching by measuring donor pulmonary function and anatomical size matching by 3D-CT volumetry are very useful.
In cases of oversize mismatch, single lobe transplant or downsizing transplant was performed. In cases of undersize mismatch, native upper lobe sparing transplant or right-left inverted transplant was performed.
As of April 2021, the author has performed 152 LDLLTs (47 at Okayama University and 105 at Kyoto University). The ages ranged from 3 to 64 years. Forty-three patients were children. The 5, 10 and 15-year survivals were 83%, 75% and 68%, respectively. For pediatric patients, they were 87%, 81% and 81%, respectively. All donors returned to their previous lifestyles without restriction.
LDLLT is a viable option for very ill pediatric and adult patients who would not survive a long waiting time for cadaveric lungs.

International Symposium of Pediatric Heart and Lung Transplantation

Keynote Lecture 4

Current status of pediatric lung transplantation in the world

Chair:Hiroshi Date（Department of Thoracic Surgery, Kyoto Univeristy Graduate School of Medicine, Japan）

Sat. Jul 10, 2021 9:00 AM - 9:30 AM Track6 (現地会場)

[ISPHLT-KL4] Current status of pediatric lung transplantation in the world

○Stuart C Sweet （Department of Pediatrics, Washington University, USA）

(Sat. Jul 10, 2021 9:00 AM - 9:30 AM Track6)

[ISPHLT-KL4] Current status of pediatric lung transplantation in the world

○Stuart C Sweet （Department of Pediatrics, Washington University, USA）

Pediatric lung transplantation has evolved significantly since the first isolated lung transplants were performed in children more than 30 years ago. Initially dominated by children and adolescents with Cystic Fibrosis, the diagnostic landscape now includes a full spectrum of lung and pulmonary vascular diseases and includes transplantation in infancy for surfactant protein related diseases and pulmonary vascular disorders. As therapies for Cystic Fibrosis and idiopathic pulmonary hypertension have evolved, these diseases are less prevalent indications for pediatric lung transplant. Urgency based allocation systems in the United States and elsewhere have led to increased adult lung transplant volumes and correspondingly greater competition for lungs in these areas. Therefore, pediatric candidates often have more advanced lung disease when lungs finally become available. Transplant programs are often challenged to bridge critically ill patients to transplant with extracorporeal support and extend criteria for donor organ acceptance. In Japan, limited availability of pediatric deceased donor organs has led to sustained and innovative use of living donor transplantation which has virtually disappeared in the United States. Although pediatric lung transplant outcomes are comparable to those of adults, adolescence and transition to adult care remains a particularly challenging journey for pediatric lung transplant recipients. Nonetheless pediatric lung transplantation remains a viable option for patients with end stage pulmonary parenchymal and vascular diseases when other therapies are unsuccessful and a fertile area for research and innovation to improve outcomes.

International Symposium of Pediatric Heart and Lung Transplantation

Keynote Lecture 5

Current status and future aspect of pediatric mechanical circulatory support

Chair:Takeshi Shinkawa（Department of Cardiovascular Surgery, Tokyo Women's Medical University, Japan）

Sat. Jul 10, 2021 3:00 PM - 3:30 PM Track6 (現地会場)

[ISPHLT-KL5] Current status and future aspect of pediatric mechanical circulatory support

○Iki Adachi （Congenital Heart Surgery, Texas Children's Hospital / Baylor College of Medicine, United States of America）

(Sat. Jul 10, 2021 3:00 PM - 3:30 PM Track6)

[ISPHLT-KL5] Current status and future aspect of pediatric mechanical circulatory support

○Iki Adachi （Congenital Heart Surgery, Texas Children's Hospital / Baylor College of Medicine, United States of America）

The last decade has witnessed substantial growth and maturation in the field of pediatric mechanical circulatory support, particularly with ventricular assist device (VAD). This presentation will describe the changes that have occurred over the last decade in North America. These would include introduction of implantable continuous-flow VADs in children and modern anticoagulation strategies, both of which have led to significant outcome improvement. The presentation will then be transitioned to discussion on the future direction of the field of pediatric mechanical circulatory support. The topic to be covered would include novel device strategies, new devices currently being tested or those on the horizon, such as the Infant Jarvik 2015.

International Symposium of Pediatric Heart and Lung Transplantation

Symposium 4

New era of pediatric lung transplantation in the world

Chair:Hiroshi Date（Department of Thoracic Surgery, Kyoto Univeristy Graduate School of Medicine, Japan）

Chair:Stuart Sweet（Department of Pediatrics , Washington University School of Medicine in St.Louis, USA）

Sat. Jul 10, 2021 9:40 AM - 11:10 AM Track6 (現地会場)

[ISPHLT-SY4-1] Management of pediatric lung transplant recipients and post-transplant outcome

○Christian Benden （Faculty of Medicine, University of Zurich, Switzerland）

[ISPHLT-SY4-2] Technical consideration of pediatric lung transplantation from deceased donors

○Shaf Keshavjee （Department of Surgery, University of Toronto, Canada）

[ISPHLT-SY4-3] The Changing face of pediatric lung transplant - new demographics, new challenges

○Marc G Schecter （Department of Pediatrics, Division of Pulmonary Medicine, University of Florida, USA）

[ISPHLT-SY4-4] Current status of pediatric lung transplantation in Japan

○Hiroshi Date （Department of Thoracic Surgery, Kyoto University, Japan）

[ISPHLT-SY4-5] Split lung transplantation for small children: Bilateral segmental lung transplantation using split adult living-donor lower lobe

○Seiichiro Sugimoto, Shinji Otani, Kentaroh Miyoshi, Shin Tanaka, Yasuaki Tomioka, Ken Suzawa, Hiromasa Yamamoto, Mikio Okazaki, Masaomi Yamane, Shinichi Toyooka （General Thoracic Surgery and Organ Transplant Center, Okayama University Hospital, Japan）

(Sat. Jul 10, 2021 9:40 AM - 11:10 AM Track6)

[ISPHLT-SY4-1] Management of pediatric lung transplant recipients and post-transplant outcome

○Christian Benden （Faculty of Medicine, University of Zurich, Switzerland）

Lung transplantation is the ultimate therapy option for infants, children, and adolescents with progressive advanced lung disease. Recently, outcomes after pediatric lung transplantation have improved, survival is nowadays now comparable to adult lung transplantation. In order to achieve maximal post-transplant outcomes, an interdisciplinary team effort is required. In the early post-operative period, intensive care physicians play a key role together with transplant surgeons and transplant pulmonologists. Post-transplant, immunosuppression is imperative for prevention of lung allograft rejection, but evidence-based data on immunosuppression are lacking. Drug-related side effects are very frequent; thus, close therapeutic drug monitoring is critical, an individually tailored patient approach is favorable rather than an one fits all attitude. In the first year post-transplant, infectious complications are the leading causes of morbidity and mortality. In general, community acquired viral infections in children are frequent following lung transplantation. In the long-term, chronic lung allograft dysfunction (CLAD) is the leading cause of morbidity and mortality, it remains the Achilles' heel of pediatric lung transplantation, Therapy options for CLAD are unfortunately still limited, management is based on extrapolated data in adult lung transplantation. The last option for worsening CLAD would be consideration for lung re-transplantation; however, numbers of pediatric lung re-transplants are very small, and its success depends highly on the optimal selection of the most suitable re-transplant candidate, ideally a non-invasively ventilated child with a good potential for rehabilitation well beyond the first year post primary lung transplantation.

(Sat. Jul 10, 2021 9:40 AM - 11:10 AM Track6)

[ISPHLT-SY4-2] Technical consideration of pediatric lung transplantation from deceased donors

○Shaf Keshavjee （Department of Surgery, University of Toronto, Canada）

(Sat. Jul 10, 2021 9:40 AM - 11:10 AM Track6)

[ISPHLT-SY4-3] The Changing face of pediatric lung transplant - new demographics, new challenges

○Marc G Schecter （Department of Pediatrics, Division of Pulmonary Medicine, University of Florida, USA）

Pediatric lung transplant has been an accepted treatment option for children with end-stage lung disease for over 30 years. Cystic fibrosis has been the primary indication for lung transplantation in children. Over the last decade, the treatment and outcomes of children with cystic fibrosis has improved dramatically with the availability of new drugs, specifically CFTR modulators. These advancements have lead to a shift in other diagnosis, such as pulmonary hypertension and childhood interstitial lung disease,

becoming more common indications for pediatric lung transplant. These changes are leading to children undergoing lung transplant that are younger and sicker at the time of transplant. These new demographics are creating new challenges for pediatric lung transplant programs.

(Sat. Jul 10, 2021 9:40 AM - 11:10 AM Track6)

[ISPHLT-SY4-4] Current status of pediatric lung transplantation in Japan

○Hiroshi Date （Department of Thoracic Surgery, Kyoto University, Japan）

Between 1998 and 2021, lung transplantation has been performed in 861 patients (108 children, 753 adults) at nine lung transplant centers in Japan. CLT was performed in 601 patients (69.8%), LDLLT was performed in 257 patients (29.8%) and Hybrid lung transplantation (LDLLT+CLT) in 3 patients.
Among 108 pediatric patients, only 26 children (24.1%) received CLT and 82 children (75.9%) received LDLLT. For pediatric patients younger than 10 years old, only 11 CLTs was performed due to shortage of pediatric cadaveric donors.
In 26 pediatric patients receiving CLT, the 5-year survival was 77.4%. In 82 pediatric patients receiving LDLLT, the 5 and 10-year survivals were 85.3% and 78.9%, respectively. Although the number of pediatric patients was small, pediatric lung transplant recipients showed a trend toward better long-term survival than adult patients.

(Sat. Jul 10, 2021 9:40 AM - 11:10 AM Track6)

[ISPHLT-SY4-5] Split lung transplantation for small children: Bilateral segmental lung transplantation using split adult living-donor lower lobe

○Seiichiro Sugimoto, Shinji Otani, Kentaroh Miyoshi, Shin Tanaka, Yasuaki Tomioka, Ken Suzawa, Hiromasa Yamamoto, Mikio Okazaki, Masaomi Yamane, Shinichi Toyooka （General Thoracic Surgery and Organ Transplant Center, Okayama University Hospital, Japan）

Donor shortage has been a persistent problem in pediatric lung transplantation. As a solution to donor shortage, living-donor lobar lung transplantation (LDLLT) has still been a realistic therapeutic option in Japan. However, because an adult lower lobe may be too large to fit into the chest cavity of small children, standard LDLLT using lower lobe graft may be difficult for small pediatric patients. To overcome this problem, split lung transplantation using adult living-donor lower lobe was performed on 3 children at our institution. In this study, we describe our experience of split lung transplantation for small children. Three children aged 1 to 4 years with idiopathic pulmonary fibrosis underwent split lung transplantation using adult living-donor lower lobe between August 2014 and December 2018. All 3 children were mechanically ventilated with 80 to 100% oxygen concentration before transplantation. The right or left lower lobe was donated from one recipient parent. In the donor operation, the lower lobe of the donor was split into the superior and basal segmental grafts in vivo. Cold flushing and graft preservation were performed ex vivo. In the recipient operation, the superior and basal segmental grafts

were implanted into the right and left chest cavities in place of the whole lungs of the recipient, respectively. The superior segment was transplanted without changing its direction, and the segmental vein was anastomosed to the recipient´s lower pulmonary vein. The basal segments were rotated 180 degrees horizontally and 90 degrees vertically, and then the segmental vein was attached to the recipient´s upper pulmonary vein. After split lung transplantation, two patients necessitated delayed chest closure due to size mismatch. One patient died due to legionellosis 66 days after transplantation, whereas two patients recovered without requiring oxygen inhalation in the acute phase. In the chronic phase, one patient required lung re-transplantation due to pulmonary hypertension 75 months after transplantation, whereas the other patient was still surviving 40 months after transplantation. Split lung transplantation using adult living-donor lower lobe might offer a bridge to lung re-transplantation for small children. Pediatric recipients who underwent split lung transplantation should be cautiously followed for future re-transplantation.

International Symposium of Pediatric Heart and Lung Transplantation

Symposium 5

Pediatric mechanical circulatory support in children and patients with congenital heart disease

Chair:Yasutaka Hirata（Department of Cardiac Surgery, The University of Tokyo Hospital, Japan）
Chair:Osami Honjo（Division of Cardiovascular Surgery, The Hospital for Sick Children, University of Toronto, Canada）
Sat. Jul 10, 2021 3:40 PM - 5:25 PM Track6 (現地会場)

[ISPHLT-SY5-1] Evolving strategies in mechanical circulatory support in children with congenital heart disease: SickKids experience

○Osami Honjo[1,2,3,4,5,6,7,8]（1.Department of Cardiovascular Surgery, The Hospital for Sick Children, Canada, 2.Watson Family Chair, Cardiovascular Sciences, The Hospital for Sick Children, 3.Associate Professor, Department of Surgery, University of Toronto, 4.Senior Associate Scientist,）

[ISPHLT-SY5-2] Experiences of EXCOR pediatrics in Japan

○Hajime Ichikawa[1], Takaya Hoashi[1], Kenta Imai[1], Naoki Okuda[1], Motoki Komori[1], Heima Sakaguchi[3], Ken-ichi Kurosaki[3], Isao Shiraishi[3], Norihide Fukushima[2]（1.Department of Pediatric Cardiovascular Surgery, National Cerebral and Cardiovascular Center, Japan, 2.Department of Transplantation, National Cerebral and Cardiovascular Center, Japan, 3.Department of Pediatric Cardiology, National Cerebral and Cardiovasc）

[ISPHLT-SY5-3] The impact of HeartMate 3 left ventricular assist device in small BSA patients

○Tomoyuki Fujita, Satsuki Fukushima, Naoki Tadokoro, Kohei Tonai, Satoshi Kainuma, Naomori Kawamoto, Takashi Kakuta, Ayumi Ikuta（Department of Cardiovascular Surgery, National Cerebral and Cardiovascular Center, Japan）

[ISPHLT-SY5-4] Pediatric mechanical circulatory support in children and patients with congenital heart disease in Tokyo University

○Yasutaka Hirata, Minoru Ono（Department of Cardiac Surgery, The University of Tokyo Hospital, Japan）

[ISPHLT-SY5-5] Long term results of pediatric mechanical circulatory support as bridge to transplant in severe heart failure pediatric patients

○Masaki Taira[1], Takuji Watanabe[1], Yuji Tominaga[1], Moyu Hasegawa[1], Jun Narita[2], Hidekazu Ishida[2], Ryo Ishii[2], Takayoshi Ueno[1], Koichi Toda[1]（1.Department of Cardiovascular Surgery, Osaka University Graduate School of Medicine, Japan, 2.Department of Pediatrics, Osaka University Graduate School of Medicine, Japan）

(Sat. Jul 10, 2021 3:40 PM - 5:25 PM Track6)

[ISPHLT-SY5-1] Evolving strategies in mechanical circulatory support in children with congenital heart disease: SickKids experience

○Osami Honjo[1,2,3,4,5,6,7,8] (1.Department of Cardiovascular Surgery, The Hospital for Sick Children, Canada, 2.Watson Family Chair, Cardiovascular Sciences, The Hospital for Sick Children, 3.Associate Professor, Department of Surgery, University of Toronto, 4.Senior Associate Scientist,)

Incremental improvement of management for infants and children who are supported by ventricular assist device (VAD) resulted in high rate of bridge to transplantation among those patients with less morbidities. Recent practice changes, introduction of direct thrombin inhibitor bivalriudin and the use of continuous flow VAD such as HeartWare and Heartmate III, further improved the clinical outcomes. Nonetheless the patients with congenital heart disease (CHD) carries much higher risk of morbidities and mortality during VAD support compared to non-CHD population and therefore histologically had much lower rate of successful bridge to transplantation. Patients with CHD and ventricular dysfunction who require VAD support has multiple challenges, such as history of previous sternotomy, various ventricular morphology and location, different physiologic and palliative status, and potential end organ dysfunction. Herein the current clinical practice, device selection, and special considerations of VAD for patients with CHD are discussed. In addition, technical challenges in some unique anatomic subgroups, such as corrected transposition of the great arteries and single ventricle physiology are discussed.

(Sat. Jul 10, 2021 3:40 PM - 5:25 PM Track6)

[ISPHLT-SY5-2] Experiences of EXCOR pediatrics in Japan

○Hajime Ichikawa[1], Takaya Hoashi[1], Kenta Imai[1], Naoki Okuda[1], Motoki Komori[1], Heima Sakaguchi[3], Ken-ichi Kurosaki[3], Isao Shiraishi[3], Norihide Fukushima[2] (1.Department of Pediatric Cardiovascular Surgery, National Cerebral and Cardiovascular Center, Japan, 2.Department of Transplantation, National Cerebral and Cardiovascular Center, Japan, 3.Department of Pediatric Cardiology, National Cerebral and Cardiovasc)

In Japan, the number of pediatric heart transplantation is far less than it is needed, because of the donor shortage. For the infant with profound heart failure, the only way to safely survive to be transplanted is to have Berlin Heart EXCOR. EXCOR was approved by Japanese government in Japan in 2015. The number of hospitals has been gradually increased to 12 with 44 IKUS. To date, 84 patients underwent circulatory support with EXCOR. The median age and the body weight at EXCOR implantation, were 461.5 days old and 7.1 kg, respectively. ECMO support was performed before the implantation of EXCOR in 29 patients. Although the number is limited, the outcome seems excellent. Thirty two patients (17 domestic and 15 abroad) underwent heart transplantation 366.2 days (mean) after the EXCOR was implanted. Weaning from EXCOR was achieved in 17 patients. Conversion to other mechanical assist device was done in 6 patients. Morbidity was observed in 4 patients. Currently, 25 patients are on EXCOR support. Unfortunately, because the number of IKUS is limited, it is impossible to implant EXCOR if a new patient needs one at this moment (2021/5/17). Adverse event includes membrane fracture in 27 pumps, thrombus formation which necessitate pump exchange in 54 pumps. Broken cannulae were seen in 3. Among the adverse events with EXCOR, drive line infection is the most annoying problem in the long term

support. No matter how the skin cannula site is initially placed in an ideal position, as the patient is recovering they move actively. Then the cannula exit site was damaged and contaminated with bacteria. Even without bacteria, the skin is somewhat damaged by the movement. There is also a problem related to the somatic growth of the patient. Since the support period is extremely long compared with the patients in North America or Europe, displacement of the cannula from left ventricle, broken aortic cannula or pseudoaneurysm formation at the aortic cannula were seen in Japan. In this paper, the problems in the long term support with EXCOR and our strategy to manage this situation will be presented

---

(Sat. Jul 10, 2021 3:40 PM - 5:25 PM Track6)

[ISPHLT-SY5-3] The impact of HeartMate 3 left ventricular assist device in small BSA patients

○Tomoyuki Fujita, Satsuki Fukushima, Naoki Tadokoro, Kohei Tonai, Satoshi Kainuma, Naomori Kawamoto, Takashi Kakuta, Ayumi Ikuta （Department of Cardiovascular Surgery, National Cerebral and Cardiovascular Center, Japan）

It is still challenging to implant left ventricular assist device (LVAD) designed for adult patients into small body surface area (BSA) patients or congenital patients. Methods: From April 2013 to February 2021, 171 patients received HeartMate II (HM II, n=120) or HeartMate 3 (HM3, n=51) in our institute. There were 41 patients (24%, small group), 30 patients with HM II and 11 patients with HM3, whose BSA was less than 1.5m2. Others (n=130) were classified in large group. Mid-term outcomes including survival, stroke and composite outcome of death, stroke and pump exchange were examined. Anticoagulation protocol was same in bath group.Results: The pump speed and BSA were linearly related, and therefore, pump speed was low in small BSA patients. The log-rank test revealed that there were no significant differences between small group and large group in survival, freedom from stroke and freedom from composite outcomes (p=0.683, 0.130, 0.905). The 3-year freedom from stroke was 86% in large group and 78% in small group. There were 9 patients (22%) in small group and 17 (13%) patients in large group among all observation periods. Patients with stroke more than modified Rankin scale 3 were 3 (7%) in small group and 5 (4%) in large group. To compare HM II and HM3, there was only 1 patient who had stroke in HM3 group and the freedom from stroke was significantly higher in HM3 group (p=0.031). Conclusion: Although surgical technique and post-operative management were more delicate in small BSA patients, the outcomes were not inferior. HM3 is a promising device for small BSA patients.

(Sat. Jul 10, 2021 3:40 PM - 5:25 PM Track6)

[ISPHLT-SY5-4] Pediatric mechanical circulatory support in children and patients with congenital heart disease in Tokyo University

○Yasutaka Hirata, Minoru Ono （Department of Cardiac Surgery, The University of Tokyo Hospital, Japan）

Since 2013, the Berlin Heart EXCOR has been increasingly used for ventricular support in Japan. It has been applied in end-stage heart failure of both structural/congenital and myopathic etiology. In our institution, 12 pediatric patients underwent the EXCOR implantation. The patients' age ranged from 2 months to 12 years-old and body weight ranged from 2.6kg to 25kg. Eight patients underwent heart transplantation, one patient died, and one patient recovered and explanted. Two patients are on support. Median support was about 400 days. Experience with the EXCOR as a bridge to cardiac transplantation for children of all ages and sizes points to the feasibility of this approach.

(Sat. Jul 10, 2021 3:40 PM - 5:25 PM Track6)

[ISPHLT-SY5-5] Long term results of pediatric mechanical circulatory support as bridge to transplant in severe heart failure pediatric patients

○Masaki Taira[1], Takuji Watanabe[1], Yuji Tominaga[1], Moyu Hasegawa[1], Jun Narita[2], Hidekazu Ishida[2], Ryo Ishii[2], Takayoshi Ueno[1], Koichi Toda[1] (1.Department of Cardiovascular Surgery, Osaka University Graduate School of Medicine, Japan, 2.Department of Pediatrics, Osaka University Graduate School of Medicine, Japan)

The number of pediatric patients who need mechanical circulatory support (MCS) as bridge to transplant(BTT) has been increasing. VAD implantation for pediatric heart failure patients has been standard strategies waiting for heart transplantation. However, the shortage of donor is still one of the most important issues, and it is still challenging patients can spend long term of waiting period with MCS safely. In this study, we report long term results of pediatric ventricular assist devices as BTT in Japan.Single center retrospective study includes 40 pediatric patients who were implanted with ventricular assist devices as BTT for end stage heart failure since 2012 to 2020. Etiology of heart failure includes DCM (54.5%), RCM (27.3%), dHCM (4.5%) and others (13.6%). 27 patients were implanted with EXCOR and the other 13 patients were implanted with implantable devices. Overall survival and successful rate for heart transplantation (HTx), device related complications were analyzed. Median support period was 685 (45-1145) days. 22 (55%) patients underwent HTx and only 3 patients died due to device related adverse event. Median support period during waiting for HTx with VAD was 541.5 (45-1085) days. Freedom from CV events in patients with implantable devices was 75% at 6 months and 60% at 1year. Freedom from diveline infection against which surgical intervention needed was 100% at 6 months and 75% at 1year. 1 of 13 implantable device-patients developed aortic insufficiency, and underwent surgical closure of aortic valve. All the implantable patients discharge home and went back to school activities with VAD. On the other hand, Freedom from CV event in patients with EXCOR was 70% at 6 months and 1 year respectively. 4 of EXCOR-patients had cannula site infection and surgical interventions were necessary in two of them. Left ventricular function of 9 EXCOR-patients recovered after implantation of LVAD and they could be successfully weaned off the devices without recurrence of heart failure. Waiting time for HTx with ventricular assist device is quite long in Japan, however long term results of pediatric mechanical circulatory support as BTT is satisfactory.

International Symposium of Pediatric Heart and Lung Transplantation

Lunch Seminar 2

重症心不全における EXCORの現状

Chair:市川 肇（国立循環器病研究センター 小児心臓外科 部長）

Sat. Jul 10, 2021 12:20 PM - 1:10 PM Track6 (現地会場)

[ISPHLT-LS2-1]

○坂口 平馬 （国立循環器病研究センター 小児循環器内科 医長）

[ISPHLT-LS2-2]

○小西 伸明 （国立循環器病研究センター 看護部 レシピエント移植コーディネーター）

(Sat. Jul 10, 2021 12:20 PM - 1:10 PM Track6)

[ISPHLT-LS2-1]

○坂口 平馬 （国立循環器病研究センター 小児循環器内科 医長）

(Sat. Jul 10, 2021 12:20 PM - 1:10 PM Track6)

[ISPHLT-LS2-2]

○小西 伸明 （国立循環器病研究センター 看護部 レシピエント移植コーディネーター）

International Symposium of Pediatric Heart and Lung Transplantation

Oral Session 2

Pediatric lung treatment

Chair:Yasushi Shintani（General Thoracic Surgery, Osaka University Graduate School of Medicine, Japan）

Sat. Jul 10, 2021 11:20 AM - 12:00 PM Track6 (現地会場)

[ISPHLT-OS2-1] Living-donor single-lobe lung transplantation for pediatric pulmonary hypertension

○Daisuke Nakajima[1], Shiro Baba[2], Tadashi Ikeda[3], Satona Tanaka[1], Yoshito Yamada[1], Yojiro Yutaka[1], Akihiro Ohsumi[1], Masatsugu Hamaji[1], Hiroshi Date[1]（1.Department of Thoracic Surgery, Kyoto University, Japan, 2.Department of Pediatrics, Kyoto University, Japan, 3.Department of Cardiovascular Surgery, Kyoto University, Japan）

[ISPHLT-OS2-2] Post-transplant lymphoproliferative disorder after living-donor lung transplantation in pediatric patients

○Satona Tanaka[1], Daisuke Nakajima[1], Akihiro Ohsumi[1], Shiro Baba[2], Itaru Kato[2], Hidefumi Hiramatsu[2], Hiroshi Date[1]（1.Department of Thoracic Surgery, Kyoto University Hospital, Japan, 2.Department of Pediatrics, Kyoto University Hospital）

[ISPHLT-OS2-3] 25-year-old female patient with a severe case of COVID-19 pneumonia who has undergone bilateral lung transplantation at adolescent age

○Yuma Shibuya, Sadamitsu Yanagi, Yuta Mizuno, Takeshi Ikegawa, Shun Kawai, Yasuhiro Ichikawa, Shin Ono, Ki-sung Kim, Hideaki Ueda（Department of Cardiology, Kanagawa Children's Medical Center, Japan）

(Sat. Jul 10, 2021 11:20 AM - 12:00 PM Track6)

[ISPHLT-OS2-1] Living-donor single-lobe lung transplantation for pediatric pulmonary hypertension

○Daisuke Nakajima[1], Shiro Baba[2], Tadashi Ikeda[3], Satona Tanaka[1], Yoshito Yamada[1], Yojiro Yutaka[1], Akihiro Ohsumi[1], Masatsugu Hamaji[1], Hiroshi Date[1] (1.Department of Thoracic Surgery, Kyoto University, Japan, 2.Department of Pediatrics, Kyoto University, Japan, 3.Department of Cardiovascular Surgery, Kyoto University, Japan)

Living donor lobar lung transplantation is an important life-saving option for dealing with the severe donor organ shortage, especially for small children. This is a case report of successful single-lobe lung transplantation for severe pulmonary hypertension in children. [Case 1] A 6-year-old boy suffered from pulmonary hypertension and hypoxia secondary to alveolar capillary dysplasia with misalignment of pulmonary veins. He underwent living-donor single-lobe transplantation with the right lower lobe from his 31-year-old mother. The pre-transplant graft size matching was acceptable: the estimated graft forced vital capacity (FVC) was 96.5% of the recipient's predicted FVC, and the graft size measured by computed tomography volumetry was 166% of the recipient's chest cavity volume. Right pneumonectomy followed by implantation was performed under cardiopulmonary bypass (CPB). The pulmonary arterial pressure (PAP) was significantly decreased to 31/12 mmHg immediately after transplantation, and the first PaO_2/FiO_2 in the intensive-care unit (ICU) was 422 mmHg. Lung perfusion scintigraphy showed 97.5% perfusion to the right implanted lung three months after transplantation. [Case 2] Living-donor single-lobe transplantation was performed for a four-year-old boy with idiopathic pulmonary arterial hypertension. The right lower lobe from his 26-year-old mother was transplanted under CPB. The graft FVC size matching was 87.9% of the recipient's predicted FVC, and the graft size was 204% of the recipient's chest cavity volume. PAP was decreased from 115/60 mmHg to 22/9 mmHg just after transplantation, and the first PaO_2/FiO_2 in the ICU was 462 mmHg. Lung perfusion scintigraphy demonstrated 94.5% perfusion to the right implanted lung a month after transplantation. This case report validated the functional capacity of living-donor single lobe transplanted to deal with pulmonary arterial hypertension in small children.

(Sat. Jul 10, 2021 11:20 AM - 12:00 PM Track6)

[ISPHLT-OS2-2] Post-transplant lymphoproliferative disorder after living-donor lung transplantation in pediatric patients

○Satona Tanaka[1], Daisuke Nakajima[1], Akihiro Ohsumi[1], Shiro Baba[2], Itaru Kato[2], Hidefumi Hiramatsu[2], Hiroshi Date[1] (1.Department of Thoracic Surgery, Kyoto University Hospital, Japan, 2.Department of Pediatrics, Kyoto University Hospital)

We report 3 cases of post - transplant lymphoproliferative disorder (PTLD) in pediatric recipients after living - donor lung transplantation (LDLT). In all cases, the increase in blood Epstein - Barr virus (EBV) - DNA copies and the involvement of EBV in tumor were observed. Immunosuppression was reduced after the diagnosis with or without additional therapy. PTLD was successfully managed in the short - term, although long - term follow - up was required. Case 1. Six - year - old male underwent right sided LDLT

for alveolar capillary dysplasia with misalignment of pulmonary veins. Six months after surgery, the huge left lung tumor 48 mm in size with high FDG uptake on PET - CT scan was observed and the transthoracic biopsy revealed PTLD. The tumor was positive for CD20 and chemotherapy with rituximab was given. The size of tumor and FDG uptake were remarkably decreased. Seven months after the diagnosis, native left upper lobectomy was performed with the pathological finding of no residual tumor. The patient is alive 2 years after the diagnosis. Case 2. Six - year - old male underwent right sided LDLT for interstitial pneumonia after the chemotherapy for bladder rhabdomyosarcoma. Five months after surgery, lymphadenopathy was developed with high FDG uptake on PET - CT scan. The biopsy of cervical lymph node revealed PTLD. The tumor was positive for CD20 and rituximab was administered, resulting in the improvement of lymphadenopathy. The patient is alive 4 months after the diagnosis. Case 3. Four - year - old male underwent bilateral LDLT for interstitial pneumonia after the chemotherapy for malignant lymphoma. EBV antibody profile showed previous infection pattern only in this case. Three months after surgery, the left lung nodule 14 mm in size with high FDG uptake on PET - CT scan was noticed, which was diagnosed as PTLD by the transthoracic biopsy. Although the tumor was positive for CD20, he was treated with reduced immunosuppression only due to hemorrhagic cystitis. FDG uptake in lung nodule was remarkably decreased and the patient is alive 2 months after the diagnosis.

(Sat. Jul 10, 2021 11:20 AM - 12:00 PM Track6)

[ISPHLT-OS2-3] 25-year-old female patient with a severe case of COVID-19 pneumonia who has undergone bilateral lung transplantation at adolescent age

○Yuma Shibuya, Sadamitsu Yanagi, Yuta Mizuno, Takeshi Ikegawa, Shun Kawai, Yasuhiro Ichikawa, Shin Ono, Ki-sung Kim, Hideaki Ueda （Department of Cardiology, Kanagawa Children's Medical Center, Japan）

[Introduction]COVID-19pneumonia is known to be severe in immunosuppressed organ transplant recipients. We report a severe clinical case in which a bilateral lung transplant recipient underwent tracheostomy and was receiving invasive mechanical ventilation due to COVID-19 pneumonia.[Case report]A 25-year-oldJapanese female bilateral lung transplant carrier at the 17 years old, came to the hospital with a fever and cough. She received a bilateral lung transplantation due to pulmonary arterial hypertension. She was taking tacrolimus and prednisone, and was also suffering from diabetes mellitus. She was hospitalized after testing COVID-19 positive undergoing nasopharyngeal PCR examination. On admission, she was in good general condition, had no respiratory distress and vital signs showed oxygen saturation 97% on room air. However, her respiratory condition gradually worsened, and was intubated and started invasive mechanical ventilation on the 7th day of admission. Anti-inflammatory and immunosuppressive therapy with intravenous methylprednisolone pulse and tocilizumab were administered, but it became difficult to discontinue the invasive mechanical ventilation due to serious lung damage. A tracheostomy was performed on the 49th day of admission. Although another lung transplantation is being considered, the patient is now aiming to wean off the mechanical ventilation while undergoing rehabilitation.[Summary]Although reports of COVID-19 pneumonia in organ transplant recipients are increasing, there are still only few reports on cases of lung transplantation recipients, especially lung transplant recipients at adolescent age. It is expected that more cases will accumulate in the future.

International Symposium of Pediatric Heart and Lung Transplantation

Oral Session 3

Mechanical circulatory support

Chair:Masaki Taira（Department of Cardiovascular Surgery, Osaka University Graduate School of Medicine, Japan）

Sat. Jul 10, 2021 2:05 PM - 2:50 PM Track6 (現地会場)

[ISPHLT-OS3-1] The ACTION quality improvement collaborative

○Angela Lorts, David Morales （Ventricular Assist Device Program, UC Dept. Pediatrics Director, Cincinnati Children's, USA）

[ISPHLT-OS3-2] Our experience of the use of implantable ventricular assist device

○Yuki Ito[1], Heima Sakaguchi[1], Hikari Miike[1], Hajime Ichikawa[2], Tomoyuki Fujita[3], Norihide Fukushima[4] （1.Department of Pediatric Cardiology, National Cerebral and Cardiovascular Center, Japan, 2.Department of Pediatric Cardiac Surgery, National Cerebral and Cardiovascular Center, Japan, 3.Department of Cardiac Surgery, National Cerebral and Cardiovascular Ce）

[ISPHLT-OS3-3] Long-term ventricular assist device support in children

○Motoki Komori[1], Takaya Hoashi[1], Kenta Imai[1], Naoki Okuda[1], Heima Sakaguhi[2], Kenichi Kurosaki[2], Norihide Fukushima[3], Hajime Ichikawa[1] （1.Department of Pediatric Cardiovascular Surgery, National Cerebral and Cardiovascular Center, Japan, 2.Pediatric Cardiology, 3.Transplant Medicine）

(Sat. Jul 10, 2021 2:05 PM - 2:50 PM Track6)

[ISPHLT-OS3-1] The ACTION quality improvement collaborative

○Angela Lorts, David Morales （Ventricular Assist Device Program, UC Dept. Pediatrics Director, Cincinnati Children's, USA）

Purpose: ACTION (Advanced Cardiac Therapies Improving Outcomes Network) is a multi-faceted quality improvement (QI) and research network with the goal of improving pediatric and congenital heart disease VAD and heart failure (HF) outcomes. This report describes ACTION initiatives.
Methods: ACTION includes QI, educational activities, and a data registry. Stakeholders include providers, patients and families, and industry partners. The core values of ACTION include collaboration and transparency. ACTION started in 2017, with data collection beginning in April 2018. This report utilizes ACTION data and describes selected completed and ongoing initiatives.
Results: The ACTION registry report is shared with sites as an interactive dashboard (refreshed monthly). A comprehensive data quality strategy includes data queries and adjudication of critical events. There are 50 US/Canadian sites in the network and 34 of the sites contribute data. There are additional international sites that participate in all activities except patient-level data collection. The registry includes 388 patients implanted with 511 devices and 51, 411 device days. DCM (203) and CHD (143) are the major underlying diagnoses. EXCOR (148), HVAD (97), and HM3 (70), are the most common end devices. Survival is 91% (including ongoing support, transplant and wean). AE rates are: stroke 11%, bleeding 21%, and infection 26%. The dashboard allows intuitive examination of subgroups, e.g., stroke/bleeding rate in patients less than 10 kg/on a specific device. Initial QI projects include an initiative (ABC of stroke), that used a bundle of interventions to reduce stroke during VAD support; a discharge planning project; a telehealth support project; and a harmonization initiative to reduce burden of protocol development for sites. Additionally, a patient-facing education website about VAD &HF care is being deployed and a HF project is collecting baseline data for acute decompensated HF. ACTION data have been used to support regulatory (FDA) approval of selected devices.
Conclusion: ACTION, a collaborative, multi-stakeholder network, has undertaken numerous approaches to improve outcomes for children with HF and VADs. In keeping with the values of transparency and collaboration, the ACTION annual reports will be made available in their entirety in a patient-facing version, via the ACTION website.

(Sat. Jul 10, 2021 2:05 PM - 2:50 PM Track6)

[ISPHLT-OS3-2] Our experience of the use of implantable ventricular assist device

○Yuki Ito[1], Heima Sakaguchi[1], Hikari Miike[1], Hajime Ichikawa[2], Tomoyuki Fujita[3], Norihide Fukushima[4]
（1.Department of Pediatric Cardiology, National Cerebral and Cardiovascular Center, Japan, 2.Department of Pediatric Cardiac Surgery, National Cerebral and Cardiovascular Center, Japan, 3.Department of Cardiac Surgery, National Cerebral and Cardiovascular Ce）

Background: Evolution and miniaturization have increased the use of ventricular assist device (VAD) in the pediatric and congenital heart disease (CHD) population. But we have few experiences of VAD implantation against such patients in Japan.
Methods: Data of all consecutive pediatric and ACHD patients with implantable VAD from 2016 to 2021

were retrospectively reviewed and we examined several factors associated with the prognosis.
Results: A total of 11 patients underwent VAD implantation. The etiology of heart failure was dilated cardiomyopathy in four patients, ischemic cardiomyopathy in one, and CHD in six. All cases of CHD were adults. The etiology of CHD was transposition of the great arteries (TGA) after Mustard operation in two, TGA after arterial switch operation in one, congenitally corrected TGA (ccTGA) after anatomical repair in two, and ccTGA after functional repair in one. Type of VAD were HeartMate3 in five, HeartMate2 in three, HVAD in two, and Jarvik 2000 in one. One patient underwent heart transplantation, eight patients have been waiting for transplantation, and two patients who had heart failure with severe diastolic dysfunction died.
Discussion:Cases with severe diastolic function had poor prognosis. Considering indication of VAD implantation is important and we should examine therapeutic strategy conforming to its etiology.

(Sat. Jul 10, 2021 2:05 PM - 2:50 PM Track6)

[ISPHLT-OS3-3] Long-term ventricular assist device support in children

○Motoki Komori[1], Takaya Hoashi[1], Kenta Imai[1], Naoki Okuda[1], Heima Sakaguhi[2], Kenichi Kurosaki[2], Norihide Fukushima[3], Hajime Ichikawa[1] (1.Department of Pediatric Cardiovascular Surgery, National Cerebral and Cardiovascular Center, Japan, 2.Pediatric Cardiology, 3.Transplant Medicine)

[Background] The shortage of donor organs in Japan is severe especially in children with end-stage heart failure awaiting heart transplantation (HT). Then, long-term ventricular assist device (VAD) support increases the risk of several complications. [Patients] 20 patients under 15 years old underwent mechanical circulatory support with EXCOR pediatric between 2015 and 2020 (18 LVAD, 2 BiVAD). Over all outcomes were evaluated. [Results] The median age, body surface area at VAD implantation, and VAD support periods were 64.5 months of age (range: 1.8-144.0), 0.66 m2 (0.19-1.18), and 13.3 months (2.0-30.1). The main diagnoses were dilated cardiomyopathy (DCM) for 17 patients and myocarditis for 3 patients. 7 patients (3 domestic and 4 abroad) underwent HT with the average support periods of 10 months. Morbidity was observed in 1 patient due to sepsis. Currently, 7 patients are on EXCOR support. 11 patients were on over 12 months support. (Recovery) Weaning from EXCOR was achieved in 5 patients with the average support periods of 9.1 months. One of them weaned from LVAD after 24 months support for DCM. Her histological findings showed the improvement of myocardial fibrosis in Masson's trichrome staining at mid-mural layer. (Long-term VAD-related complications) Infection free survival rates at 12 months and 24 months were 53 % and 18 %, respectively. Complications free survival rates at 12 months and 24 months were 55 % and 28 %, respectively. Complications include membrane fracture in 2 pumps, thrombus formation which necessitate pump exchange in 6 pumps, and cannula dislocation in 1 patient. (Cannula dislocation case) 18-month-old girl underwent LVAD implantation for DCM. Her height increased by 12 cm within 12 months. The inflow cannula was unexpectedly detached from apex and a pseudoaneurysm was formed around apex after 12 months support, then, emergent removal of the pseudoaneurysm and re-implantation of the inflow cannula were performed. [Conclusion] Complications of long-term VAD support, including incidence of cannula exit site infections and pump related adverse events increased by time. Recovery of left ventricular function was frequently seen, even long after VAD implantation.