## Thu. Jul 16, 2015

## 第2会場

AHA-AEPC-JSPCCS-TSPC Joint Symposium

### AHA-AEPC-JSPCCS-TSPC Joint Symposium
### Current Management of Severe CHF by Mechanical Support and Cardiac Transplant

座長:
安河内 聰 (長野県立こども病院)
小野 稔 (東京大学医学部)
Eero Jokinen (Department of Pediatrics, Division of Paediatricc, Helsinki University Children's Hospital, Finland)
3:00 PM - 4:30 PM 第2会場 (1F ペガサス B)

[AJS-01] The Management of Severe Heart Failure: Elective Implantation of Ventricular Assist Device versus Medical Management?

○Yuk Law （Seattle Children's Hospital / University of Washington School of Medicine , USA）

[AJS-02] Experience in Choice of Mechanical Support in Pediatric Group and the Result of Transplantation for Complex Congential Heart Disease

○Yih-Sharng Chen （Pediatric Cardiovascular Surgery, National Taiwan University Hospital, Taiwan）

[AJS-03] Eight Pediatric Heart Transplantation Experiences in a Single Pediatric Heart Transplantation Center in Japan - Fifteen Years Experiences -

○Takayoshi Ueno, Masaki Taira, Hideto Ozawa, Yuriko Matsunaga, Tomomitsu Kanaya, Toru Kuratani, Koichi Toda, Shigetoyo Kogaki, Yoshiki Sawa
（Osaka University graduate of medicine, department of Cardiovascular Surgery, Pediatrics）

[AJS-04] Transcoronary infusion of cardiac progenitor cells in hypoplastic left heart syndrome: 3-year follow-up of the TICAP trial

○Shunji Sano[1], Shuta Ishigami[1], Takuya Goto[1], Daiki Ousaka[1], Suguru Tarui[1], Michihiro Okuyama[1], Yosuke Kuroko[1], Yasuhiro Kotani[1], Sadahiko Arai[1], Kenji Baba[2], Shingo Kasahara[1], Shinichi Ohtsuki[2], Hidemasa Oh[3] （1.Departments of Cardiovascular Surgery, 2.and Pediatrics, 3.Okayama University Graduate School of Medicine, Dentistry, and Pharmaceutical Sciences; Department of Regenerative Medicine, Center for Innovative Clinical Medicine, Okayama University Hospital, Okayama, Japan）

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AJS-01～AJS-05
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## [AJS-01] The Management of Severe Heart Failure: Elective Implantation of Ventricular Assist Device versus Medical Management?

○Yuk Law （Seattle Children's Hospital / University of Washington School of Medicine , USA）

The field of pediatric heart failure has come a long way and it is now a burgeoning field. The impetus to its growth has to do with the strength of scientific and clinical evidence coming out of the adult heart failure literature; the strong interest among multiple cardiovascular subspecialties in pediatrics, from surgery to critical care to cardiology; the growing number of children with ventricular dysfunction from palliated congenital heart disease as well as cardiomyopathies; and the advent of improved and smaller durable ventricular assist devices. With these changes also come more questions on how best to apply various therapies to patients with severe heart failure. Specifically, for those who are hemodynamically stable on inotrope(s) while either listed for transplant, or not listed because they may recover over time (myocarditis) or are not candidates for transplant (destination therapy), is it better to go with ventricular assist device or medical therapy alone? Through the exercise of reviewing data available for ventricular assist device and for chronic and acute medical management in children as well as adults, it is hoped that we can come to a better understanding, if not what to do, with this clinical dilemma.

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## [AJS-02] Experience in Choice of Mechanical Support in Pediatric Group and the Result of Transplantation for Complex Congential Heart Disease

○Yih-Sharng Chen （Pediatric Cardiovascular Surgery, National Taiwan University Hospital, Taiwan）

Severe congestive heart failure (CHF) is a devastating situation in managing the patients with heart disease, especially for those with congenital heart problem. The condition is associated with a high rate of morbidity and mortality and places a significant burden on families of affected children and to society as a whole. Pharmacological therapy was limited for children or neonates with severe CHF. Heart transplantation is the treatment of choice, however, the in-time donor heart supply is most impossible. Mechanical support is the only way to keep CHF patients alive for further possibility for heart transplantation. The mechanical support for the pediatric group is not well developed because the coagulation issue and the size of the device. Extracorporeal membrane oxygenation seems to be the fast and simple device for short-term survival. It can be applied for the emergency setting, even under resuscitation. The predominant role of these devices has been as a bridge to heart transplantation, and excellent results are currently achieved for most children with cardiomyopathies. There is an ongoing investigation to improve outcomes in high-risk populations, such as small infants and those with complex congenital heart disease, including patients with functionally univentricular hearts.
Since 1989, we started our pediatric heart transplantation program (Mechanical support is mandatory for pediatric group patients requiring heart transplantation, especially they are under critical status. Donor shortage is till the key issue for better survival in those under mechanical support.

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Keywords: 小児心臓移植, VAD, 腎不全

Pediatric heart transplantation represents a small but very important part in the field of cardiac transplantation. In Japan, only after the revision of the Act in 2010, pediatric donation has been legitimated, hence very scarce number of limited pediatric heart transplantation. Despite this difficult situation, the numbers of pediatric patients referred to our hospital for the treatment of end stage heart failure were ever-increasing in recent years. In referred end-staged patients, we performed 8 pediatric heart transplantations from 1999. Among them, 4 donors were pediatric cases and 2 donors were under 6 years old, and their hearts were donated to under 10 years old patients. In their outcomes, one boy was deceased because of renal failure. Another 7 patients were good course. The waiting periods were 880 days in patients from adult donor hearts, and 362 days from pediatric donors. It was in short periods compared with the HTx from adult donors, because of the pediatric patients first policy from pediatric donor hearts and physical size of patients. However, many complications were occurred especially in patients supported with VAD. The renal dysfunction was occurred in many cases. The most recent mean creatinine level was 1.01, and BUN was 25.1. In early post heart transplantations, CHDF was needed in 3 patients. Moreover, there are still many problems to solve associated with not only donor medical treatment, such as mechanical circulation support and medicine, but also recipient and donor family support. Further enlightenment of pediatric organ donations is needed to increase pediatric heart transplantation in Japan

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**Backgrounds**- Hypoplastic left heart syndrome (HLHS) is one of the severe malformations in congenital heart diseases. Initial results of TICAP phase 1 study (NCT01273857) conducted in our hospital have shown that intracoronary infusion of cardiosphere-derived cells (CDCs) following staged palliation was feasible and safe to treat the patients with HLHS; however, the long-term safety and clinical outcomes remain elusive, as is the question whether any prognostic significance may provide independent information to predict the functional benefits in CDC recipients. **Methods and Design-** This trial is a

prospective controlled study. Fourteen consecutive patients with HLHS who are undergoing staged-2 or -3 surgical palliations were enrolled between January 2011, and January 2012. Seven patients assigned to receive intracoronary CDCs infusion 1 month after the cardiac surgery followed by 7 patients allocated to a control group with standard care alone. The primary endpoint was to assess the procedural feasibility and safety and the secondary endpoint was to evaluate the cardiac function and heart failure status from the baseline through long-term follow-up. **Results-** No complications were reported within 30 months after CDC infusion. Endpoint analysis was assessed by echocardiogram and showed that right ventricular ejection fraction (RVEF) in CDC-treated group increased markedly during the follow-up period (baseline: 46.9±4.6 % vs. 30 months: 54.1±2.3%, P=0.0006). Absolute changes in RVEF were greater in the CDC-treated group than in controls at 30 months (+7.2 ± 4.8% vs. +2.7 ± 2.2%, P=0.04). Similarly, fractional area change calculated by echocardiogram was higher in the CDCs than in controls (39.2 ± 2.2% vs. 33.9 ± 4.5%, P=0.02). These cardiac function improvements in long-term resulted in decrease in BNP levels (P=0.02) and lower incidence of unintended coil occlusion for collaterals (P=0.03) at 30 months after CDC transfer compared with controls. In addition, continuous somatic growth (weight-for-age z score: WAZ) was evident in CDC-treated group through 30 months observation rather than controls (P=0.00004). As independent predictors of treatment responsiveness, absolute changes in RVEF at 30 months were negatively correlated with age, WAZ, and RVEF at CDC infusion (age: r=-0.77, P=0.045; WAZ: r=-0.97, P=0.005; EF: r=-0.88, P=0.008). **Conclusion-** Intracoronary CDC infusion after staged procedure improves RVEF in patients with HLHS and that persists during 30 months of follow-up. This therapeutic strategy may merit somatic growth enhancement and reduce the incidence of heart failure as well as further collateral intervention after palliations. A randomized phase 2 trial (PERSEUS: NCT01829750) is ongoing in our hospital to verify the therapeutic efficacy as to determine the prognostic values and risk stratification in patients with single ventricle physiology.