Oral/Video abstract session 1

March 26, 2022 09:50-10:50 / Track 1

P-Ab1-1 A Public-Private Business Model for Sustaining a Quality Pediatric Cardiac Surgery Program in Low- and Middle-Income Countries

Stephany Kim[1], Sreemathi Seshadrinathan[2], Kathy J Jenkins[3,4], John S Murala[5]

1) Medical School, University of Texas Southwestern Medical Center, 2) Department of Cardiovascular and Thoracic Surgery, Public Health Centre, Chennai, India, 3) Department of Cardiology, Boston Children's Hospital, 4) Department of Pediatrics, Harvard Medical School, 5) Department of Cardiovascular and Thoracic Surgery, University of Texas Southwestern Medical Center

Over 90% of the world's children with congenital heart disease do not have access to cardiac care. While there are many models providing pediatric cardiac surgery in Low-and Middle-Income countries (LMICs), sustainability pose a large barrier. Here we explore one possible model providing care for the underserved in Chennai, India. This model came into existence through trial and error over three phases. Phase 1 was a Tamilnadu state government-sponsored program; however, it was not sustainable for one center and source alone to meet the demands. Phase 2 utilized a grassroots foundation of a public-private partnership (PPP) with few donors and a hospital with suboptimal infrastructure. Phase 3 (current phase) is the fine-tuning of the PPP model, gradually upgrading the infrastructure and forming a well-trained and dedicated team.Through safe measures and indigenization, an average cardiac surgery costs Rs 1,80,000 ($2471.95) in this model. The government funds about Rs 60,000-80,000 ($802.13-$1069.51) and the rest is funded through the fund pool. The goal is to perform 100 surgeries per year, which is possible if there is a minimum rotating fund pool of 50 lakh rupees ($66,726.26) for 30-40 operations. This target, though not yet a reality, will ensure there is equitable distribution of funds with no compromise on resources (disposables, single-use cannulas, implants, etc) to ensure the dignity of the patient and guarantees fair compensation for healthcare workers. This ensures quality even if the quantity stays low. More resources will ensure larger volume (multiples of 100). Thus far, this model provided cardiac surgery for 357 children with an overall mortality of 2.73% (less than 1% mortality in simple lesions).We believe this is a sustainable model for pediatric cardiac surgery. The pre-requisites are a dedicated surgical team, sustainable partnership with a hospital with state-of-the-art infrastructure, and a steady maintenance of fund pool.

P-Ab1-2 Neoaortic root dimensions and aortic regurgitation in children after Ross operation

Yuta Kuwahara, Naoki Wada, Yuya Komori, Yukihiro Takahashi
Congenital cardiac surgery, Sakakibara Heart Institute

Background
Ross operation has been performed mainly as autologous pulmonary autograft transplantation surgery for aortic valve disease in children.This study assessed the progression of autograft root diameters, aortic regurgitation(AR).
M ethods
The Ross operations were performed for the 50 patients between December 1996 and October 2021, the age at the time of surgery was under 2 years in 22(group 1) and over 2 years in 28(group 2).
Results
The mean age at surgery was 8.0 ± 6.1 months in group 1 and 7.8 ± 5.0 years in group 2. E arly death was 1 in group 2 . M ean Z values(1/2) of the preoperative aortic valve annulus is 0.5 ± 2.8 (0.4 ± 2.6 / 0.6 ± 3.0) and autograft annulus is 0 ± 1.5 (0.3 ± 1.2 / -0.3 ± 1.8). N o remote death was observed in 9.5 ± 7.0 years. M ean Z values the remote aortic root morphology is aortic valve annulus 3.0 ± 3.1 (2.4 ± 3.2 / 3.7 ± 2.8, p = 0.03), sinus 5.0 ± 3.0 (3.7 ± 3.1 / 6.4 ± 2.2, p = 0.03), sinotubular junction 1.1 ± 3.0 (0.5 ± 2.8 / 1.6 ± 3.2, p = 0.02), ascending aorta 0.8 ± 2.7 (0.2 ± 2.4 / 1.5 ± 2.9, p = 0.03). M oderate or higher AR at the final follow-up was 2cases.The cumulative survival rate was 98% for 5 years, 98% for 10 years, and 98% for 20 years.
Conclusion
In both groups, the survival rate and reoperation free rate at were good.In the remote period, aortic annulus and sinus tended to increase. In group 1, there was an increase compared to the normal value.This may suggests that in group 1, neoaortic root tend to adapt as the growth, and that there may be differences in the timing of dilatation.

Oral/Video abstract session 1

March 26, 2022 09:50-10:50 / Track 1

P-Ab1-3 Main pulmonary artery translocation for juxta-ductal and peripheral pulmonary artery stenosis

Ryo Kawabata, Shunsuke Matsushima, Hironori Matsuhisa, Yuson Wada, Tomonori Higuma, Yoshihiro Oshima

Cardiovascular surgery, Kobe Children's Hospital, Hyogo, Japan

Background. Juxta-ductal pulmonary artery stenosis and peripheral pulmonary hypoplasia can cause impaired hemodynamics in either biventricular or univentricular hearts. To augment their insufficient arterial wall, we have translocated the main pulmonary artery to the stenotic site in patients requiring subsequent Rastelli-type operation or univentricular palliation with pulmonary valve closure. This study reviewed our experience with this procedure.*Method.* All neonates and infants who underwent the main pulmonary artery translocation between 2003 and 2020 were evaluated. The main pulmonary artery was transected just above the sinotubular junction and anastomosed in a sliding fashion to the hypoplastic pulmonary artery, which was incised longitudinally on the undersurface beyond the hilar bifurcation.*Results.* There were 31 consecutive patients (biventricle, 14; univentricle, 17). The median age, weight, and pulmonary artery index were 1 [1-11] months, 4.2 [3.3-8.6] kg, and 113 [51-396] mm^2/m^2, respectively. Systemic-to-pulmonary shunt, bidirectional cavopulmonary anastomosis, right ventricle-to-pulmonary artery shunt, and Rastelli-type operation were concomitantly performed for pulmonary blood source in 23, 5, 2, and 1 patient, respectively. There were no early and 2 late deaths. Rastelli or Fontan completion was performed in all survivors except one without available follow-up. At the latest examination, the median pulmonary artery index was 205 [106-430] mm^2/m^2, and the median mean pulmonary arterial pressure and 13 [11-22] mmHg and 11 [10-14] mmHg in biventricular and univentricular physiologies, respectively.*Conclusion.* The main pulmonary artery translocation promotes pulmonary artery growth and contributes to establishment of satisfactory pulmonary circulation by forming central and peripheral pulmonary arteries with autologous arterial tissue.

P-Ab1-4 Truncus Arteriosus: Address to Truncal Valve Insufficiency

Motonori Ishidou, Akio Ikai, Keiichi Hirose, Maiko Tachi, Hiroki Ito, Daisuke Toritsuka, Yuji Nakamura, Kisaburo Sakamoto
Cardiovascular surgery, Mt.Fuji Shizuoka Children's hospital

BackgroundIn truncus arteriosus, truncal valve (TV) insufficiency (regurgitation [TvR] and stenosis [TvS]) is one of the most important factors influencing the prognosis. Neonatal cases with severely dysplastic leaflets may still result in death. Here, we focus on our result of TV repair.MethodsThe data of 10 patients who underwent TV repair for TV insufficiency in our hospital between January 2000 and March 2021 were retrospectively investigated.ResultsTV repair at primary total repair (TR) in neonate was performed in 7 patients (age, 2.0-12 days [median: 6]; weight, 2.1-3.6 kg [median: 2.5]). Three patients (1 with PAPVC and 2 with low body weight) underwent bilateral pulmonary banding; all patients received TV repair at TR (age, 4-17.0 months [median: 16]; body weight, 7.2-8.3 kg [median: 7.7])., Quadricuspid was in 7, tricuspid in 2 and bicuspid in 1. The reason for the intervention was TvR in 6 patients, TvS in 1 patient, and TvR/TvS in 3 patients. Sever TV insufficiency with circulatory failure was observed in 7 cases (neonate: 6). The surgical technique used for valvuloplasty was: tricuspidization; 7 (Mee; 2, leaflet extension; 2, commissuroplasty/annulus reduction; 1, commissurotomy; 1, homograft replacement; 1) and bicuspidizition; 1. Three leaflets reconstruction with autologous pericardium was performed for two neonates with sever dysplastic leaflets. The length of follow-up after TV repair was 0.2-116 months (median: 9). Two patients died perioperatively. Nine patients had moderate to severe TvR. Reintervention on TV was performed in 6 patients. The time from TV repair to the reintervention was 0.2-42 months (median: 7). A second TV repair was performed in all of the reintervention cases, but two of them later required mechanical valve replacement.ConclusionAdvanced TV repair in neonate yielded favorable outcomes as a lifesaving approach. Three leaflets reconstruction for neonates might be effective as a life-saving procedure.

Targeted session

March 26, 2022 11:00-12:30 / Track 1

P-T1-1 Midterm outcome of valve-sparing surgery for patients with tetralogy of Fallot and small pulmonary valve annulus

Hiroki Ito, Akio Ikai, Keiichi Hirose, Maiko Tachi, Motonori Ishidou, Daisuke Toritsuka, Yuji Nakamura, Kisaburo Sakamoto

Cardiovascular surgery, Mt.Fuji Shizuoka Children's Hospital

ObjectiveThe introduction of the transarterial-transpulmonary approach for total correction of tetralogy of Fallot (TOF) led to high expectations for long-term survival. Attention is directed towards their long-term morbidity including reoperation especially in patients with TOF and small pulmonary valve (PV) annulus. The purpose of this study was to evaluate our single-center experience for postoperative patients with TOF and small PV annulus in terms of mortality and morbidity.MethodsWe reviewed 33 patients with TOF and small PV annulus (Z-score < -4) since 2004and divided them into 2 groups (preserving PV with valve-sparing technique [group V, n=14] or using enlargement with transannular patch [TAP] [group T, n=19]). There was no significantly difference in Z-score of PV annulus (-5.20 ± 0.88 vs -5.65 ± 1.17, p=0.2430), RVOTO (m/s) (4.22 ± 0.38 vs 3.79 ± 0.80, p=0.0827), PR (trivial1 vs trivial2, p=0.7354). PV valve-sparing techniques were as follows; commissurotomy, release of tethering, cusp slicing, skeltonization. TAP indications were follows; monocusp, abnormality, very small annulus(Z<-7.0), etc.ResultsAverage follow-up period was 10.4 years (maximum 16.7 years). There was one mortality in Group T (a case of TOF repair and sliding tracheoplasty simultaneously). There were 4 reoperation cases in Group T, however, there was no significantly difference in free from reoperation (p=0.0715). NYHA classification was I in all patients and there was no significant difference between 2 groups in RV function (RVFAC, TAPSE). There was also no significantly difference between 2 groups in z-score of PV annulus, PR, RVOT velosity at latest echocardiography. Meanwhile, PV annulus grew up in group V.ConclusionsMid-term outcomes after TOF total correction for patients with small PV annulus was satisfactory in mortality and morbidity. PV annulus grew up after valve-sparing repair.

P-T1-2 Blalock-Taussig Shunt versus Ductal Stenting as Palliation for Duct-Dependent Pulmonary Circulation

Hamood Al Kindi[1], Hasina Al Harthi[3,4], Asim Al Balushi[5], Ahlam Atiq[5], Samiuddin Shaikh[3,4], Khalid Al Alawi[5], Abdullah Al-Farqani[5]

1) Cardiothoracic Unit , Department of Surgery, Sultan Qaboos University Hospital, 2) Cardiothoracic surgery department, National Heart Center , The Royal Hospital, 3) Paediatric Cardiac Intensive care Unit, Department of Paediatrics, Royal Hospital, 4) Training and studies department, The Royal Hospital, 5) Department of Pediatric Cardiology, National Heart Center , The Royal Hospital

Introduction: There is limited data published from outside North America and Europe comparing the outcomes of a modified Blalock-Taussig shunt and ductal stenting as the first palliative procedure for infants with duct-dependent pulmonary circulation. This study will report our center's experience in comparing the outcomes of these two interventions.Materials and Methods: We reviewed all infants with duct-dependent pulmonary circulation who received either a modified Blalock-Taussig shunt or ductal stenting from 2016 to 2019. The primary outcomes were death or re-interventions. Secondary outcomes included death, subsequent re-interventions, survival to subsequent surgical intervention, survival to hospital discharge, post-procedural mechanical ventilation, and duration of intensive care unit stay.Results: Seventy-one patients were included in the study, 33 (46%) of whom received ductal stenting. The prevalence of the primary outcome (death or re-intervention) in the patent ductus arteriosus (PDA) stent group was 54.5% vs. 31.6% in the modified Blalock-Taussig shunt group but it was not statistically significant ($p = 0.06$). There was no difference between the two groups in terms of time to next surgical intervention ($p = 0.233$). The PDA stent group had shorter post-procedural, mechanical ventilation, and intensive care unit stay durations ($p < 0.05$). Syndromic patients were at higher risk of mortality compared to non-syndromic patients.Conclusion: Modified Blalock-Taussig shunt and ductal stenting are both acceptable modalities as a palliative intervention for infants with duct-dependent pulmonary circulation. Syndromic patients are at higher risk of mortality. This can be considered an important factor for patient selection.

Targeted session

March 26, 2022 11:00-12:30 / Track 1

P-T1-3 Surgical strategy and anatomic factors to achieve pulmonary valve-sparing repair in patients with tetralogy of Fallot

Yasuhiro Kotani, Yasuyuki Kobayashi, Tatsuya Ogawa, Yusuke Yamauchi, Yoshimasa Kishi, Hiroyuki Suzuki, Eiri Kisamori, Daichi Edaki, Hiroaki Komatsu, Tatsunori Tsuji, Yutaka Yokota, Naoya Sakoda, Genya Muraoka, Michihiro Okuyama, Kouki Eto, Junko Kobayashi, Takuya Kawabata, Yosuke Kuroko, Masanori Hirota, Shingo Kasahara

Cardiovascular Surgery, Okayama University

Objectives: We sought to evaluate the impact of surgical strategy and anatomic factors on the rate of pulmonary valve-sparing repair (VSR).Methods: A retrospective review was performed in 336 patients with TOF who underwent ICR between November 1990 and July 2019, including 62 patients received Blalock-Taussig shunt (BTS). Indication of ICR included pulmonary artery (PA) index greater than 150 mm2/m2, left ventricular end-diastolic volume (LVEDV) greater than 80% of normalized value, and body weight of greater than 5 kg, otherwise BTS was performed as first palliation for symptomatic patients.Results: Median age and body weight in patients having BTS were 104 (36-299) days, and 4.2 (3.3-6.8) kg, respectively. The Z-score of the pulmonary valve annulus (PVA [Z]) before BTS in palliated patients was significantly smaller than that in patients undergoing primary ICR (-3.7 [-5.0 ~ -2.8] vs. -2.1 [-3.2 ~ -1.2], $P < 0.01$). The PVA in patients with BTS showed a significant growth after BTS (from -3.7 [-5.0 ~ -2.8] to -3.0 [-4.0 ~ -2.2], $P < 0.01$). In 26 patients with a small PVA of less than -4 of Z-score before BTS, 11 (42%) patients obtained PVA growth toward favorable size for PVA preservation and PVA preserved repair was achieved in 27 of 62 (43%) palliated patients. In contrast, 183 of 274 (66%) had a PVA preserved repair in primary ICR patients. Multivariate analysis showed that PVA(Z) greater than -5 (P=0.009), VSD index greater than 30 (P=0.026), and RVOT index greater than 10 (P=0.036) were anatomic factors associated with recruitment.Conclusions: A staged surgical strategy incorporating BTS recruited approximately half of symptomatic patients for PVA preservation at the time of ICR. Larger VSD and RVOT appeared to be anatomic factors associated with PVA growth.

P-T1-4 Pulmonary Annulus Growth Pattern In Patients With Tetralogy Of Fallot Prior To Surgical Repair

Hamood Al Kindi[1,2], Shamsa Al Kaabi[2], Hasina Al Harthia[3], Thuraya Al Harthia[3], Pranav Kandachar[2]

1) Cardiothoracic Unit , Department of Surgery, Sultan Qaboos University Hospital, 2) Department of Cardiac Surgery, National Heart Center , The Royal Hospital, 3) The Royal Hospital, The Royal Hospital

Purpose:The size of the pulmonary valve annulus often determines the feasibility of pulmonary valve preservation at the time of intracardiac repair of Tetralogy of Fallot. Currently, there is limited available data regarding the growth pattern and the determining factors that contribute towards pulmonary valve annulus growth.Methods:This retrospective study was conducted at a single tertiary cardiac center. Patients who underwent repair of Tetralogy of Fallot with or without prior palliation were included. These patients had an echocardiogram at the time of initial diagnosis and a second echocardiogram prior to intracardiac repair. The sizes of the pulmonary annulus, the right and left pulmonary arteries with z scores were recorded. Patients with improvement in pulmonary annulus z scores [> zero] between the 2 echocardiographic examinations were allocated in Group I [n=46] and Group II [n=68] were those with no improvement [z score &le zero].ResultsOut of a total of 173 operated patients, only 114 patients had complete data. The right and left pulmonary arteries size and z scores improved significantly between the 2 echocardiograms. Although the median size of the pulmonary annulus increased between the 2 echocardiograms (6 and 7.9 mm, $p < 0.001$), there was no significant change in the z score (-2.2, -2.34, p=0.185). 48% of the patients in Group I underwent valve sparing surgery as against 31% in Group II (p= 0.162). Multivariate logistic regression analysis showed that gender, blood group, presence of collaterals and palliation with Blalock-Taussig shunt had no impact on the improvement in pulmonary annulus Z score.Conclusion:In Tetralogy of Fallot, the pulmonary annulus z score may not change significantly with time prior the intracardiac repair. Although in certain subgroups there may be an improvement, there was no specific factor that could be identified and had an influence on this improvement.

Targeted session

March 26, 2022 11:00-12:30 / Track 1

P-T1-5 Unifocalization for MAPCA in PAVSD

Akio Ikai, Daisuke Toritsuka, Yuji Nakamura, Motonori Ishidou, Hiroki Ito, Maiko Tachi, Keiichi Hirose, Kisaburo Sakamoto

Department of Cardiovascular Srugery, Mt. Fuji Shizuoka Chidlren's Hospital

[Background] Surgical treatment of pulmonary atresia (PA) ventricular septal defect (VSD) with major aortopulmonary collateral arteries (MAPCA) is challenging and controversial because of the diverse morphology of MAPCAs and the unknown unique properties of MAPCAs, especially their growth potential. Two surgical strategies for PAVSD with MAPCA are common: rehabilitation or single-stage unifocalization.[Methods]We use single-stage unifocalization strategy with intraoperative pulmonary flow study to determine VSD closure. IF mean PA pressure during flow study is less than 25 mm Hg at 3.0 L/min/m^2, we close the VSD simultaneously. We also plan catheter intervention early after unifocalization for maintenance of anastomosis site of the PA to reduce right ventricular pressure.[Results]In this study, 23 consecutive patients were enrolled. Two cases of nonconfluent PA were included. Average number of MAPCA was 3.2. Mean PA pressure of intraoperative PA flow study (N = 21) was 24 mmHg (18 ~ 40). In 4 cases, the VSD was not closed primarily. Hospital deaths was 2 cases (cerebral hemorrhage, pulmonary hemorrhage).Finally, 19 patients achieved complete repair (83%). Intraoperative RV/Ao ratio (n = 18) was 0.48 ± 0.11 (0.28~0.6)[Conclusions] Single stage unifocalization in infancy is technically feasible. Intraoperative PA flow study facilitates the determination of VSD closure. Pulmonary artery maintenance by catheter intervention in the early postoperative period is effective in maintaining low right ventricular pressure.

AS-1 Effect of three-dimensional-printed hearts used in left ventricular outflow tract obstruction: A multicenter study

Dianyuan Li[1,2,3], Xianzhi Wang[2], Jixiang Liang[4], Cunfu Mu[2], Wenlin Zhang[2], Chunzhu Xue[2], Yang He[2], Gen Zhang[5]

1) Department of Cardiovascular Surgery, The Affiliated Suzhou Hospital of Nanjing Medical University, Suzhou Municipal Hospital, Gusu School, Nanjing Medical University, 2) Department of Thoracic and Cardiac Surgery, The First People's Hospital of Guangyuan, 3) Department of Cardiovascular Surgery, Peking University International Hospital, 4) The State Key Laboratory for Manufacturing Systems Engineering, Xi'an Jiaotong University, 5) Department of Cardiovascular Surgery, The Affiliated Traditional Chinese Medicine Hospital of Southwest Medical University

Abstract: Objective:The purpose of this research was to explore the application value of a three-dimensional (3D)-printed heart in the operation for left ventricular outflow tract (LVOT) obstruction. Methods: From January 2014 to May 2021, 46 patients with LVOT obstruction underwent surgical treatment at Peking University International Hospital, Southwest Medical University Affiliated Hospital of Traditional Chinese Medicine and Guangyuan First People's Hospital. According to the treatment method, 22 cases were allocated to the experimental group and 24 cases to the control group . The operation time, cardiopulmonary bypass time, intraoperative blood loss, hospitalization time, postoperative ejection fraction (EF), left ventricular flow velocity (LVFV), LVOT pressure difference (LVP), postoperative interventricular septal thickness (IST), inner diameter of the left ventricular outflow tract (IDLV), systolic anterior motion (SAM), atrioventricular block rate, aortic regurgitation (AR) rate and surgical complication rate of the two groups were compared. Results: The operation time, cardiopulmonary bypass time, intraoperative blood loss, hospitalization time, LVP, postoperative IST, AR, SAM, and postoperative LVFV of the experimental group were significantly lower than those of the control group ($P < 0.05$). The IDLV was larger than that of the control group ($P < 0.05$). There was no significant difference in the postoperative EF, atrioventricular block rate or complication rate between the two groups ($P > 0.05$). Conclusion: A 3D-printed heart model for in vitro simulation surgery is conducive to formulating a more reasonable surgical plan and reducing surgical trauma and operation time, thereby promoting the recovery and maintenance of the heart.

Award session

March 26, 2022 13:50-15:20 / Track 1

AS-2 Virtual Reality Simulation for Minimally Invasive Coronary Artery Bypass Grafting with Aortic No-touch and Total Arterial Grafting Technique

Kazutoshi Tachibana[1)], Yu Iwashiro[1)], Shingo Tsushima[1)], Ayaka Saito[1)], Keita Kikuchi[2)]
1) Cardiovascular Surgery, Hakodate Goryoukaku Hospital, 2) Cardiovascular Surgery, Yuai Medical Center

Background. Advancing of the virtual reality (VR) technologies have enabled useful therapeutic guiding in clinical practice. However, it has been controversial how to use VR system in cardiac surgery. We describe the novel simulation system for minimally invasive coronary artery bypass grafting (MICS CABG) with aortic no-touch and total arterial grafting technique.Methods. Preoperative stereolithographic files in total 42 arterial grafts of MICS CABG were converted by using 320-slice computed tomography. Our strategy of MICS CABG is directed toward obtaining complete myocardial revascularization using Aortic No-touch and Total Arterial Grafting Technique.Results. There are three main points in using VR simulation system. At first, the simulation of graft designs was performed precisely. We can confirm the accurate length and direction of each graft through the 3-dimentional VR glasses, therefore can use in-situ BITA and GEA grafts for MICS CABG appropriately. The maximum length of in-situ LITA (n=22),in-situ RITA (n=13) and GEA (n=7) grafts measured by VR simulation were 20.5cm, 21.3cm and 26.5cm. The required length of these predicted by VR simulation were 15.2mm, 16.8mm and 18.5mm respectively. The actual length of these required practically were 14.9cm, 14.8cm and 17.3cm. Secondly, the anatomical form of BITA was confirmed via MICS surgical view. The obstruction of sternum and meandering of BITA grafts were obtained actuality. Therefore, these have enabled harvesting BITA grafts via small left thoracotomy securely. Finally, the perspective sensation of native coronary arteries is verified intuitively, and the best intercostal approach site was detected easily. The graft patency rate was 100%. The early mortality rate was 0%. Perioperative stroke, respiratory insufficiency and mediastinitis were not observed. The median postoperative length of stay was 7.1 days.Conclusions. VR simulation can further improve the advantage of MICS CABG with skeletonized in-situ arterial grafts lower invasively and more safely.

AS-3 Predicting early and long-term outcomes by the GERAADA risk score in Japanese patients with acute type A aortic dissection

Shingo Hirao, Tastsuhiko Komiya, Jota Nakano, Shogo Niizaki, Kazuhiro Ueno, Atsuyuki Yano, Yasuyuki Fujimoto, Atsushi Sugaya, Go Yamashita
Department of Cardiovascular Surgery, Kurashiki Central Hospital

OBJECTIVES: The German Registry of Acute Aortic Dissection Type A (GERAADA) score, first web-based score to predicting 30-day mortality in acute type A aortic dissection (AADA) was recently introduced. The aim of this study was to evaluate if the GERAADA score's prediction corresponds with the clinical outcomes in Japanese patients. **METHODS:** From 2010 to 2020, 319 AADA patients with emergent aortic surgeries were studied retrospectively. The patients were divided into three groups, low-risk group (group L, n = 82), intermediate-risk group (group M, n = 158), and high-risk group (group H, n = 79) according to their GERAADA score. The baseline characteristics and the early- and mid-term clinical outcomes among different risk groups were compared. **RESULTS:** The mean age was 68.4 ± 14.1 years and 151 (47.3%) were males. Prediction of 30-day mortality was not accurate for our study cohort (actual vs GERAADA score: 6.9% vs 17.8%). Group H showed a significantly higher proportion of preoperative organ malperfusion, resuscitation before surgery and primary tear within aortic arch. Thirty days mortality was higher in Group H with no significant difference in procedural selections (L: M: H 3.7% vs. 2.5% vs. 19.0%, $p < 0.001$). Three- and five-year survival in each group was 90.9% vs. 94.0% vs. 66.1%, 85.6% vs. 90.7% vs. 59.9%, respectively (median follow-up 3.5 years). Kaplan-Meier Curve with log-rank test displayed significant differences of cumulative survival and freedom from aortic death rate ($p < 0.001$ and $p < 0.001$, respectively). **CONCLUSION:** The GERAADA score is not accurate for Japanese AADA patients in the single center cohort. Classification by the GERAADA score must be useful for predicting early and long-term outcomes in the emergency setting of AADA.

Award session

March 26, 2022 13:50-15:20 / Track 1

AS-4 Long-term outcome of Fontan completion and the factors associated with interstage mortality in the patients with right isomerism

Junko Kobayashi[1,2], Yasuhiro Kotani[1,2], Takuya Kawabata[1,2], Koki Eto[1,2], Masanori Hirota[1,2], Yosuke Kuroko[1,2], Shingo Kasahara[1,2]

1) Department of Cardiovascular Surgery, Okayama University Hospital, 2) Department of Cardiovascular Surgery, Okayama University Graduate School of Medicine, Dentistry, and Pharmaceutical Sciences

Objective: Right isomerism (RI) is known to increase pre-Fontan mortality and/or Fontan failure. We sought to analyze the outcomes of the patients with RI and the predictors for interstage mortality.

Methods: The patients who underwent cardiac surgery from 1993 to 2015 were reviewed retrospectively, and 138 patients with RI were identified. Patient characteristics, surgical procedures, death, and predictors for mortality were analyzed.

Results: Total anomalous pulmonary venous connection (TAPVC) and severe atrioventricular valve (CAVV) regurgitation requiring repair were seen in 40.5% and 30.6%. 1-, 5-, and 10-year survival was 86.1%, 77.3%, and 73.1%, respectively. Multivariate Cox regression demonstrated infracardiac TAPVC (p=0.018) and necessity of TAPVC repair before 5-day-old (p=0.014) as the factors associated with pre-Fontan mortality. Fontan operation was completed in 68.6%. The patients who died before Fontan or who were alive but no Fontan candidate had significantly more TAPVC (p=0.002), TAPVC repair at earlier age (p=0.002), pulmonary vein obstruction (PVO) release (p<0.001), and CAVV repair (p=0.014) compared with those completed Fontan. Then 74 patients with RI and 270 patients without RI who underwent Fontan between 1993 and 2015 were analyzed. The patients with RI showed significantly more CAVV repair at Fontan (p=0.023) and longer chest tube insertion duration after Fontan (p=0.004) compared to those without RI. 10- and 20-year survival after Fontan of the patients with RI was relatively lower than those without RI (10-year: RI: 88.5% vs. non-RI: 94.4%, 20-year: RI: 80.5% vs. non-RI: 91.3%, p=0.09), and 10- and 20-year cummulative incidence of cardiac re-intervention after Fontan was comparable (p=0.946).

Conclusions: The patients with RI showed high interstage mortality by obstructive TAPVC, CAVV regurgitation, and PVO. However, survival and re-intervention after Fontan was comparable to those without RI. The data highlights that satisfactory long-term outcome can be expected in the patients with RI if they can complete Fontan.

AS-5 New staging and advices for lung cancer

Ismail Sarbay[1], Burcu Kilic[1], Sebnem Batur[2], Kamil Kaynak[1], Akif Turna[1]
1) Department of Thoracic Surgery, Istanbul University Cerrahpasa Medical Faculty, 2) Department of Pathology, Istanbul University Cerrahpasa Medical Faculty

Lung cancer is still one of the most common and deadly cancer types. Correct staging helps choosing the right treatment modality. Today studies on updating the current TNM staging system continue. There are debates on whether new prognostic findings should be involved in the TNM system. Many institutions around the globe participate in these efforts. We analyzed our 804 patients who were operated on for non-small cell lung cancer. We used Kaplan-Meier, Cox regression and chi-square tests for analysis. According to our research, compared to PL0, PL1-2 level invasion is related to significantly lower survival in patients with T2 tumors, based on the current 8th TNM staging edition. We found the PL1-2 invasion was associated with poor survival independently in multivariate analysis (p=0.02). T4 patients with tumor smaller than 7-cm-diameter showing mediastinal and great vessel invasion and ipsilateral lung metastasis, had a significantly higher overall survival compared to those with a tumor greater than 7-cm-diameter. Lymphovascular invasion (LVI) was found to be an independent prognostic factor in a multivariate analysis within N0M0 patients ($p<0.001$), while STAS and perineural invasion were borderline significant. Increased tumor size and T score was related to higher incidence of N1 positivity. In light of these results we suggest that there is a need for new subgroups such as T2c and T3b. We also recommend that LVI should be considered as a prognostic factor in T descriptor in the upcoming staging studies. We also strongly advise patients with tumors greater than certain size should not be considered as N0 without being pathologically verified.

Award session

March 26, 2022 13:50-15:20 / Track 1

AS-6 Various Recurrence Dynamics for Non-small Cell Lung Cancer Depending on Pathological Stage and Histology after Surgical Resection

Hyeong Ryul Kim, Jae Kwang Yun, Geun Dong Lee, Sehoon Choi, Yong-Hee Kim, Dong Kwan Kim, Seung-Il Park

Thoracic and cardiovascular surgery, Seoul Asan Medical Center

Purpose : Although there are numerous postoperative surveillance guidelines for non-small cell lung cancer (NSCLC), most guidelines recommend the same protocol for patients with different recurrence dynamics. In this study, we investigated the recurrence dynamics of NSCLC patients according to their clinical factors.Methods : We retrospectively reviewed the data from NSCLC patients who underwent complete resection between 2007 and 2017. Recurrence dynamics were estimated using the hazard rate and displayed with kernel smoothing method according to tumor stage, sex, and histology.Results : During the period, a total of 6012 patients were enrolled: 3687 (61.3%) in stage I, 1194 (19.9%) in stage II, and 1131 (18.8%) in stage III. The highest recurrence hazard rate was shown at about 12 months, regardless of tumor stage, but the maximum of hazard rate for stage III was 7 times higher than that in stage I. Depending on tumor histology, the highest peak of hazard curve was observed at different periods, 9 months in squamous cell carcinoma and 15 months in adenocarcinoma. These trends were similar when analyzed based on sex, 9 months in male patients and 15 months in female patients. In stage I adenocarcinoma, recurrence hazard rates were significantly different depending on histologic subtypes and tumor differentiation grade.Conclusion : Adopting the same follow-up strategy may be undesirable in NSCLC patients who have different clinical and pathological characteristics. Adequate consideration of these factors will help clinicians develop detailed follow-up strategy in lung cancer patients with different recurrence dynamics

AS-7 The first successful living-donor lobar lung transplantation for a patient with COVID-19 associated lung failure

Itsuki Yuasa[1)], Itsuki Yuasa[1)], Akihiro Ohsumi[1)], Kazuhiro Yamazaki[2)], Hiroshi Date[1)]
1) Thoracic Surgery, Kyoto University, 2) Cardiovascular Surgery, Kyoto University

We report the first case of COVID-19-associated respiratory failure requiring urgent living-donor lung lobar transplantation (LDLLTx). A 57-year-old woman with a positive viral status had severe hypoxia requiring veno-venous extracorporeal membrane oxygenation (vv-ECMO). Her respiratory function deteriorated, with almost totally collapsed lungs. All of her other organs functioned well. After 89 days on vv-ECMO, she received urgent LDLLTx using the right lower lobe of her son and the left lower lobe of her husband.The lungs were exposed through the clamshell incision, and they were almost completely shrunken and collapsed. Cardiopulmonary bypass (CPB) was established after full heparinization; a dual-stage cannula was inserted into the right atrium, an arterial cannula was inserted into the ascending aorta, and a vent was placed into the pulmonary trunk. Then, the preexisting ECMO circuit was removed. The patient son's right lower lobe and her husband's left lower lobe were procured, and both grafts were flushed with ET-Kyoto solution under ventilation on the back table. Both pneumonectomies were performed, and her son's right lower lobe and her husband's left lower lobe were implanted, both of which were ventilated and reperfused. She was smoothly weaned off CPB, and the circuit was removed. The chest was tentatively closed using a Gore-Tex soft tissue patch because the tidal volume could have dropped by direct closure. The PaO2/FiO2 ratio on ICU admission was 441 mmHg with 100% oxygen inhalation.The postoperative recovery was slow due to poor preoperative condition of the patient. However, she gradually recovered and is alive without requiring oxygen inhalation at 7 months after the transplantation. Both donors have returned to their normal lives.

Adult Cardiac mini Oral 1

March 26, 2022 15:40-16:30 / Track 1

C-mO1-1 How to start MICS-CABG safely

Akitoshi Yamada, Kunio Gan, Masanobu Sato, Naoto Izawa, Yoshihisa Morimoto, Tatsuro Asada

Department of Cardiovascular Surgery, Kita Harima Medical Center

The MICS-CABG is obviously less invasive compared with conventional CABG. However, it has not be widely spread due to many procedural pitfalls. We will discuss how to start MICS CABG safely and smoothly using high-resolution video.From May 2016 to November 2021, 19 patients underwent MICS-CABG through left small-thoracotomy. Seventeen patients underwent off pump CABG and two on pump beating. Sixteen patients underwent one-vessel bypass, two patients underwent two-vessel bypass, and one patient underwent three-vessel bypass. Two patients underwent additional left atrial appendage closure.The indications for MICS were LAD 1-vessel disease in 4 patients, stent restenosis after PCI in 2 patients, preoperative revascularization for other surgery in 4 patients, hybrid coronary revascularization in 4 patients, and contraindication of DAPT in 2 patients.Medtronic Thoratorak was used for thoracotomy, and intercostal nerve block using cryoablation was done for pain prevention.The operative time for patients who completed a single LAD bypass was 231 ± 79 minutes. Conversion to a median sternotomy was experienced in 2 of the first 4 cases due to LITA injuries. 2 proctoring were done after 2 conversions, and there have been no conversion in consecutive 15 cases.Graft patency rate was 96% (ITA-LAD: 100%). ICU stay and postoperative hospital stay of patients without conversions were 1 day and 6.0 ± 2.6 days, respectively. Postoperative pain was minimal in all cases. There were no morbidity and mortality.In order to avoid conversion, it is important to expose a good surgical view and to harvest a reliable LITA. In addition, the advice of an experienced surgeon is useful when exposing the target vessel.. In summary, MICS CABG (LITA-LAD) is not difficult to perform in selected cases. However, proctoring in initial 5cases is desirable to start MICS-CABG safely.

C-mO1-2 Comparison between CABG and PCI for patients with severe coronary artery disease and reduced ejection fraction

Yuwen Chen[1], Wei-Chieh Lee[2,3], Hsiu-Yu Fang[3], Cheuk-Kwan Sun[4,5], Jiunn-Jye Sheu[1]

1) Division of Thoracic and Cardiovascular Surgery, Department of Surgery, Kaohsiung Chang Gung Memorial Hospital and Chang Gung University College of Medicine, Kaohsiung, Taiwan, 2) Institute of Clinical Medicine, College of Medicine, National Cheng Kung University, Tainan, Taiwan, 3) Division of Cardiology, Department of Internal Medicine, Kaohsiung Chang Gung Memorial Hospital, Chang Gung University College of Medicine, Kaohsiung, Taiwan, 4) Department of Emergency Medicine, E-Da Hospital, Kaohsiung, Taiwan, 5) School of Medicine for International Students, College of Medicine, I-Shou University, Kaohsiung, Taiwan

Background

We aimed at comparing the outcomes between percutaneous coronary intervention (PCI) and coronary artery bypass graft surgery (CABG) for revascularization in patients with reduced ejection fraction (EF) and severe coronary artery disease (CAD).

Methods

Between February 2006 and February 2020, a total of 797 patients received coronary angiograms due to left ventricular EF ≤ 40% at our hospital. After excluding diagnoses of dilated cardiomyopathy, valvular heart disease, prior CABG, acute ST-segment myocardial infarction, and CAD with low SYNTAX score (≤22), 181 patients with severe coronary artery disease (CAD) with SYNTAX score >22 underwent CABG or PCI for revascularization. Clinical and vascular characteristics as well as echocardiographic data were compared between CABG (N=58) and PCI (N=123) groups.

Results

A younger age (62 ± 9.0 vs. 66 ± 12.1; p=0.016), higher new EuroSCORE II (8.6 ± 7.3 vs. 3.2 ± 2.0; p<0.001), and higher SYNTAX score (40.5 ± 9.8 vs. 35.4 ± 8.3; p<0.001) were noted in the CABG group compared to those in the PCI group. The CABG group had a significantly higher cardiovascular mortality rate at 1-year (19.6% vs. 5.0%, p=0.005) and 3-year (25.0% vs. 11.4%, p=0.027) follow-ups but a lower incidence of heart failure (HF) hospitalization at 1-year (11.1% vs. 28.2%, p=0.023) and 3-year (3.6% vs. 42.5%, p=0.001) follow-ups compared to those of the PCI group.

Conclusion

Compared with PCI, revascularization with CABG was related to a lower incidence of HF hospitalization but a worse survival outcome in patients with severe CAD and reduced EF. CABG-associated reduction in HF hospitalization was more notable when SYNTAX score >33.

C-mO1-3 Mid-term Outcome of Off-pump Coronary Artery Bypass Grafting in Octogenarians

Shizuya Shintomi, Azumi Hamasaki, Kozo Morita, Masahiro Ikeda, Masashi Hattori, Yuki Ichihara, Satoru Domoto, Satoshi Saito, Hiroshi Niinami
Department of Cardiovascular Surgery, Tokyo Women's Medical University

OBJECTIVE: With consistently improving life expectancy, the number of octogenarians requiring coronary artery bypass grafting (CABG) is increasing. Because these patients are likely to present with many comorbidities, off-pump CABG (OPCAB) is preferred. The aim of this study was to evaluate the mid-term outcome of OPCAB in octogenarians.METHODS: We enrolled 24 patients underwent OPCAB in octogenarians between July 2017 and June 2021. The primary endpoints were mid-term overall survival, freedom from major adverse cardiac and cerebrovascular events (MACCE). The follow up period was 1.7 ± 1.1 (maximum 3.9) years. RESULTS: Mean age, left ventricular ejection fraction, and JapanSCORE (30 days operative mortality) were 82.8 ± 2.1 years, 53.7 ± 8.2%, and 3.0 ± 3.1%, respectively. The number of distal anastomoses and the rate of complete revascularization were 3.3 ± 0.9 and 100%, respectively. Postoperative angiography was performed in 15 patients (63%). The patency rate of the grafts was 100%. Both mid-term overall survival and freedom from MACCE were 100%.CONCLUSIONS: The mid-term overall survival and freedom from MACCE of OPCAB in octogenarians were excellent. OPCAB in octogenarians was reasonable.

C-mO1-4 Early-term Results of Second Redo Minimally Invasive OPCAB Surgery

Doosang Kim[1,2], Hyuk Ahn[1], Ju Hee Yoon[2], Suk Won Choi[2], Chang Hoon Lee[2], Jong Sun Park[2], Hoon Ki Park[2], Keun Lee[2]

1) Thoracic and Cardio-vascular Surgery, Veterans Health Service Medical Center, Seoul Veterans Hospital,
2) Cardiology, Veterans Health Service Medical Center, Seoul Veterans Hospital

Objective: Redo CABG is still remained as a major concern to cardiac surgeons. 2nd redo CABG is extremely rare and remained as very challenging field. Off-pump technique and minimally invasive sternotomy-sparing approach could be safe combination modality to treat repeated coronary artery atherosclerosis. We report the early-term results of this approach. Methods: From April 1998 to November 2021, 821 patients underwent CABG procedure. Among them, we conducted OPCAB in 376 patients (46%), redo CABG in 71 cases (9%) and 2nd redo OPCAB in 6 cases (0.7%). These 6 patients are the subjects of this study. Median age is 74 years old (range: 67-76) and all of them are male. LVEF is 38% and STS PROM is 5.8%. Coronary revascularizations were all thru Lt thoracotomy access, using Lt subclavian artery as inflow feeder, with saphenous vein as conduits. Graft patency was evaluated with coronary CT angiography during follow-up period.Results: Median op time is 382 minutes (285-600), and there was no on-pump conversion during OPCAB surgery, intraoperative IABP support in 2 case (33%). Transfusion amounts were RBC 1 unit (0-7). Postop ICU-stay and hospital-stay are 2.5 days and 18.5 days, respectively. There was no 30-day operative mortality, one hospital death (due to sepsis, which IABP-related acute thromboembolism at previous abdominal aorto-bi-femoral graft at postoperative days 47), one follow-up death (due to idiopathic pulmonary fibrosis during concurrent chemo-radiation therapy against prostate cancer at postoperative days 1,101). Median survival times are 3.020 years and 3-year survival rates are 83%. Graft patency rate were 100% at median 1.2-year follow-up CT exam.Conclusions: Conducting 2nd redo sternotomy-sparing minimally invasive off-pump CABG surgery is feasible and its early results are acceptable.

Adult Cardiac mini Oral 1

March 26, 2022 15:40-16:30 / Track 1

C-mO1-5 Collateral robustness-stratified short and long-term outcomes of surgical revascularization using epicardial echoimaging for CTO in LAD.

Kenji Iino, Yoshitaka Yamamoto, Hiroki Nakabori, Junko Katagiri, Naoki Saito, Hideyasu Ueda, Akira Murata, Keiichi Kimura, Hirofumi Takemura
Department of Cardiovascular Surgery, Kanazawa University

Objective: The impact of ITA to LAD bypass on clinical outcomes in patients with CTO with poor distal flow remains controversial.We evaluated preoperative collateral robustness -stratified early and long-term outcomes after surgical revascularization with the intraoperative use of high-frequency epicardial echocardiographic (HFEE) imaging for CTO of the LAD. Methods: We recruited 43 patients with CTO in the LAD, categorized as having poor (grades 0, 1, Group P, n = 16) or abundant collaterals (grades 2, 3, Group A, n = 27) based on Rentrop grade. HFEE was used to evaluate the presence and diameter of a patent lumen in the distal LAD and the extent of the CTO lesion, and the findings determined anastomosis site and procedure. TTFM and HFEE were used to verify morphology and function of the ITA-LAD bypass and postoperative angiography for early graft patency. Patient characteristics, intraoperative data, and early and long - term outcomes were analyzed.Results: All patients in Group A and 14 patients in Group P underwent standard ITA-LAD anastomosis based on HFEE findings of a patent distal LAD; two patients in Group P underwent on-lay grafting because of an occluded lumen. TTFM showed mean graft flow (MGF) and pulsatility index (PI) of standard ITA-LAD anastomosis did not differ significantly between the two groups (MGF: 46 ± 44 vs. 54 ± 37 mL/min, p = 0.566, PI: 2.4 ± 1.0 vs. 2.3 ± 1.1, p = 0.731). Postoperative angiography showed a patent ITA-LAD graft in all patients. The overall survival did not differ significantly between the two groups at 3.5 years (83.3% vs. 79.0, p = 0.648).Conclusions: Our study suggests successful ITA-LAD revascularization offered LAD-CTO patients clinical benefits irrespective of collateral robustness. Intraoperative HFEE imaging may be useful to accomplish surgical revascularization, especially in patients with CTO.

C-mO1-6 The back approach technique of endoscopic saphenous vein harvesting in coronary artery bypass grafting

KIYOSHI TAMURA, Toshiyuki Maruyama, Syogo Sakurai
Cardiovascular Surgery, Soka Municipal Hospital

Purpose: We have developed a novel back-approach technique using a C-ring to divide the side branches of the saphenous vein during endoscopic saphenous vein harvesting (EVH) in coronary artery bypass grafting (CABG). Aim of the study was to describe the technique and assess early outcomes of EVH using this technique. The back-approach technique is (A) inserted C-ring near the target branch, (B) push C-ring over the proximal aspect of the target branch, (C) twist C-ring forward the target branch side to catch the target branch, and (D) cut the target branch by bipolar electrocautery.Methods: We investigated 169 patients including 35 women (mean age 70.1 ± 8.9 years) who underwent CABG at our hospital, using a novel EVH technique. Patients were categorized as those who underwent EVH (EVH group, n=44) or open vein harvesting (OVH) (OVH group, n=125). This method involves the creation of a small incision (2cm), sufficient saphenous vein dissection near the skin incision, adequate dissection to separate the vein from surrounding tissue, and the back-approach technique with C-ring to divide the side branch of the saphenous vein. The primary endpoint was the graft patency rate, and the secondary endpoints were leg wound complications and length of hospitalization. Results: No significant intergroup difference was observed in early patency of saphenous vein graft patency (OVH vs. EVH=94.7 vs. 95.6%, p=0.763). The incidence of lower extremity wound lymphorrhea was significantly lesser (OVH: EVH=16.0: 0.0 %, p=0.005) and the length of hospitalization was also significantly shorter in the EVH group (OVH vs. EVH=24.2 ± 9.8 vs. 19.0 ± 5.3 days, p=0.001).Conclusions: EVH using the back-approach technique showed satisfactory short-term results; therefore, this technique performed with C-ring might be effective for vein harvesting during EVH.

Adult Cardiac mini Oral 1

March 26, 2022 15:40-16:30 / Track 1

C-mO1-7 Effect of Nicorandil, Diltiazem, or Isosorbide Mononitrate for Antispastic Therapy after CABG Using Radial-artery Grafts: A Protocol for Pilot Trial

Yunpeng Zhu[2], Kaijie Qing[1], Yun Liu[1], Haoyi Yao[1], Wei Zhang[2], Qiang Zhao[1]

1) Department of Cardiovascular Surgery, Ruijin Hospital Shanghai Jiao Tong University School of Medicine,
2) Department of Biostatistics, School of Public Health Fudan University

Background
The radial-artery (RA) is recommended as the second choice of artery grafts for CABG. Compared with vein grafts, CABG using RA grafts (RA-CABG) results in a lower incidence of major adverse cardiac events (MACE) and graft failure in the long term after surgery. However, due to the thick vascular smooth muscular wall, RA grafts are prone to spasm, which may lead to graft failure in the early term. Several pharmacologic vasodilator drugs, such as calcium channel blockers (CCBs), nitrates, and nicorandil, were used for antispastic therapy after RA-CABG in previous observational studies. However, few randomized controlled trials have compared the effects of these drugs.
Methods
This single-centre, randomized, open-label, active-controlled, pilot trial will enrol 150 patients 1-3 days post successful RA-CABG. All eligible patients will be 1:1:1 randomized to receive oral antispastic therapies of nicorandil (5 mg three times daily), diltiazem (180 mg once daily), or isosorbide mononitrate (50 mg once daily) for 24 weeks. The efficacy outcomes will include the rate of RA graft failure (defined as modified Fitzgibbon Grade B, O, or S) at 7 days and 24 weeks, the time to first MACE (a composite of all-cause death, myocardial infarction, stroke, and unplanned revascularization), and the proportion of patients with angina recurrence during the study period. The safety outcomes will include the proportion of patients with at least one hypotension occurrence, the proportion of patients with renin-angiotensin-aldosterone system inhibitor withdrawal, and the proportion of patients with serious adverse events and other concerned adverse events during the study period.
Discussion
This study will offer epidemiological data on early-term RA graft failure and the preliminary efficacy and safety results of three different antispastic therapies after RA-CABG. With these data, the feasibility of a multicentre randomized trial with enough statistical power will be evaluated.
Trial Registration ClinicalTrials.gov: NCT04310995

C-O1-4 A systematic review of contemporary outcomes of continuous-flow left ventricular assist devices (LVAD)

Harry Narroway[1], Nicholas McNamara[2]
1) Vascular Surgery, Gosford Hospital, 2) Cardiothoracic Surgery, Royal Prince Alfred Hospital

Background:End stage heart failure (ESHF) is a major cause of morbidity and mortality, and its prevalence is expected to rise with the ageing population. Orthotopic heart transplantation is the gold standard therapy for suitable patients. However, a scarcity of donor organs has led to the development of left ventricular assist devices (LVAD). These devices can be utilized as either a bridge-to-transplant (BTT) or as an alternative to heart transplantation. LVADs can prolong and improve quality of life, however they are associated with a significant number of adverse events.Methods:A systematic review was performed to determine outcomes following implantation of a cf-LVAD. Primary outcomes were survival and frequency of adverse events (such as bleeding, infection, thrombosis, stroke and right ventricular failure). Secondary outcomes included quality of life and assessment of functional status.Results:Sixty-three studies reported clinical outcomes of 9,280 patients. Industry-funded trials reported generally superior overall survival compared with case series. The largest registry report documented twelve, twenty-four and forty-eight-month survival rates of 82%, 72% and 57% respectively. Bleeding, right-heart failure (RHF) and infection were the most frequent adverse events, occurring in up to 35%, 40% and 55% of patients, respectively. Quality of life as measured using the Kansas City Cardiomyopathy Questionnaire (KCCQ) and functional status as measured with the 6-minute walk test (6MWT) improved after cf-LVAD implantation with no decline evident two years after implantation.Conclusions:Scarcity of donor hearts has led to the development of LVADs as a BTT or as a destination therapy (DT). Short-term survival following cf-LVAD implantation is comparable to heart transplantation. Long-term survival remains limited due to the incidence of post-implantation adverse events. Despite these complications, quality of life and functional status improve significantly post-implantation and remain improved over the long-term. This study demonstrates the potential benefits of cf-LVAD therapy.

Adult Cardiac mini Oral 2

March 26, 2022 16:40-17:15 / Track 1

C-mO2-1 Hemodynamic performance of INSPIRIS RESILIA aortic bioprosthesis for severe aortic stenosis: 2-year follow-up

Naoto Fukunaga, Soshi Yoshida, Akio Shimoji, Toshi Maeda, Otohime Mori, Kosuke Yoshizawa, Tatsuji Okada, Nobushige Tamura

Cardiovascular Surgery, Hyogo Prefectural Amagasaki General Medical Center

INSPIRIS RESILIA aortic bioprosthesis (Edwards Lifesciences LLC, Irvine, USA) was introduced in late 2018 in Japan. This valve was fixed without glutaraldehyde, so that long-term durability is expected. We evaluated hemodynamic performance after aortic valve replacement (AVR) for severe aortic stenosis (AS).Twenty-nine patients underwent AVR with INSPIRIS RESILIA bioprosthesis for severe AS between 1/November/2018 and 31/December/2020. The mean age was 75.1 ± 4.5 years old and 19 females were included. Body surface area was 1.58 ± 0.19m2 and New York Heart Association functional class 2.2 ± 0.5. Follow-up transthoracic echocardiographic data at 3-6 months, 1 year and 2 years were evaluated to assess hemodynamic performance. The mean follow-up duration was 19.2 ± 7.2 months and follow-up rate was 100%.The valve size used was 19mm (n=8), 21mm (n=13), 23mm (n=7) and 25mm (n=1). One patient died of heart failure postoperatively. Preoperative mean and peak transvalvular pressure gradients (PGs) and effective orifice area were 51.9 ± 18.4mmHg, 89.3 ± 34.9mmHg and 0.72 ± 0.26cm2, respectively. They improved at 10.2 ± 3.5mmHg ($p<0.0001$), 19.3 ± 6.6mmHg ($p<0.0001$) and 1.73 ± 0.47cm2 ($p<0.0001$) at discharge. The mean transvalvular PG at 3-6 months (n=24), 1 year (n=25) and 2 years (n=15) was 11.2 ± 3.8mmHg, 11.1 ± 3.2mmHg and 11.2 ± 3.3mmHg, respectively. Left ventricular mass index decreased from 123.0 ± 35.0g/m2 before surgery to 113.4 ± 35.0g/m2 ($p=0.0136$) at discharge. It was significantly down to 88.0 ± 25.0g/m2 at 2 years. Freedom rates from valve-related events at 1 and 2 years were 100 ± 0.0% and 94.4 ± 5.4%, respectively. One patient suffered from heart failure secondary to constrictive pericarditis.Improved hemodynamic performance of INSPIRIS RESILIA bioprosthesis was observed at early phase postoperatively. In addition, left ventricular mass index decreased during the follow-up period. Less valve-related event was noted.

C-mO2-2 Totally endoscopic approach facilitates excellent conduct in aortic valve replacement in a rare dextrocardia case

Ilias Skaltsiotis[1)], Winn Maung M Aye[1,3)], Gao Yujia[2)], Guohao Chang[1)], Evangelos Papadimas[1)], Laszlo Kiraly[1)], Theodoros Kofidis[1)]

1) CTVS, National University Hospital Singapore, 2) Hepatic Surgery, National University Hospital Singapore, 3) NUS, Yong Loo Lin School Of Medicine

Background: Dextrocardia with situs inversus is a rare condition affecting 1/10.000. We present a case of dextrocardia where aortic valve replacement was performed in totally endoscopic technique, from the left side.Patient and Methods: A 61 year old Eurasian male was presented to our minimal invasive program, with symptomatic AV regurgitation. Preop imaging with CT and MRI revealed complete situs inversus implying a left anterior mini thoracotomy. Also, the Aortic root at the pulmonary bifurcation level seemed sufficiently located to the left of the sternum for right mini thoracotomy access. Hence the operative setup was reversed, with endoscopic entry from the left third intercostal space, with the thoracoscopic tower on the right side of the patient.Results/Conclusions: Following bifemoral groin cannulation, we entered the chest via the third intercostal space and arrested the heart with a single dose of del Nido cardioplegia, using the Chittwood clamp. With meticulous progressive exposure and retraction, we proceeded to replace the aortic valve with a bioprosthetic 25mm Avalus, using 30-degree scope.Surgical decision making was further enhanced by holographic guidance (HoloLens, Microsoft, USA) based on preoperative 3D-CT reconstruction.Conclusion: Advanced preop imaging and a specialized toolkit, facilitates totally endoscopic AVR even in the most demanding conditions. Utilizing a scope, strict rules of position of the aorta relative to the sternum and chest wall are not so relevant.

Adult Cardiac mini Oral 2

March 26, 2022 16:40-17:15 / Track 1

C-mO2-3 Aortic valve replacement using Suture less valve is useful for elder patients.

Senri Miwa, Yuzuru hamuro, Toshitsugu Kurokawa, Kenji Yamamoto, Sakae Enomoto
Cardiovascular Surgery, Okamura Memoriel Hospital

Background: Aortic stenosis (AS) is one of most important heart diseases for elder patients. TAVI has been popular surgery for AS in elder population, however some patients are not suitable for TAVI, and alternative surgery is required. Aortic valve replacement using Suture less valve (S-AVR) is one of the alternative surgeries.Methods: In our institute, since March 2020, forty-five patients received S-AVR. We studied early result of S-AVR retrospective fashion.Results: Patient's average age was 82.9 years old, and female patients was 33%. Simple AVR was 22 cases include 9 cases of mics AVR. Redo AVR was 5 cases include 2 PVE patients. In simple open AVR, total CPB time was 75.7min, and cross clamp time was 43.1min. In mics AVR, total CPB time was 81.6min, and cross clamp time was 116.7min. 65% patients were implanted S size. In S size S-AVR, mean pressure gradient was decrease from 51.2 mmHg to 13.1 mmHg, and low pressure gradient has been continued next 12 months.Discussion: S-AVR can decrease CPB time and cross clamp time. Patients can discharge home 4.4 days earlier than usual AVR in elder population. Especially in mics AVR patients can 2.4days earlier discharge than usual S-AVR.Size S suture less valve shows good post-surgical lower pressure gradient than usual AVR. Therefore, S-AVR maybe suitable for small elder Japanese women.Conclusion: S-AVR can be one of the good choices in elder patients

C-mO2-5 Short and mid-term results of aortic valve leaflet reconstruction with equal three autologous pericardium based on STJ size

Tadamasa MIYAUCHI, Yuta Tsuchida, Yuko Gatate, Takeo Tedoriya
Cardiovascular Surgery, Ageo general central hospital

Aortic valve leaflet reconstruction (AVLR) with autologous pericardium is one of the important options as a surgical treatment for aortic valve disease, especially in cases where with a narrow annulus or artificial valve is not optimal. Since 2016 we perform AVLR with equal three autologous pericardium based on STJ size. We report its short and middle term results.34 cases that were performed AVLR (AS 11 cases, AR 18 cases, ASR 1 case, IE 4cases). As preoperative evaluation of the aortic root, VR images were constructed using a 3D workstation from preoperative cardiac CT data. We confirmed that the three leaflets were equal by maesuring the diameter of the STJ, the angle of the commissure, and the annulus size. In cases where Valsalva sinus was asymmetrical or the leaflets were not equal including bicuspid valve, the most suitable commissure line was determined by the previously constructed VR image. The mean observation period was 52 months. There was no surgical death. 32 cases showed none or mild AR, but the other 2 cases, they were initial cases, were converted to AVR during surgery. Of the 32 cases that received AVLR, 30 showed none or mild AR in most cases during the observation period .However, in one case with hemodialysis, mechanical valve AVR was performed because one of the aortic valve leaflet was perforated 6 months after the operation. In addition, one the other hemodialysis case with low ejection fraction died 26 months after surgery. Conclusion:AVLR is performed with equal tricuspid autologous pericardium, and even in cases with anatomically unbalanced aortic root such as bicuspid valve, the reproducibility is high by using VR, short and midterm results were good. Further long-term results can be expected.

Adult Cardiac mini Oral 2

March 26, 2022 16:40-17:15 / Track 1

C-mO2-6 To evaluate the clinical and hemodynamic results of transcatheter replacement of the aortic valve with the MedLab CT prosthesis

Vladlen Bazylev, Andrey Voevodin, Yaroslav Slastin

cardiac surgery department, Federal Centre of Cardiovascular Surgery of the RF Ministry of Public Health Penza Russia

Objective. To evaluate the clinical and hemodynamic results of transcatheter replacement of the aortic valve with the MedLab CT prosthesis.Methods. MedLab-CT is the first model of a transcatheter prosthetic with polytetrafluoroethylene leaflets. It is a balloon-expandable stent, the cusps of which are made of 0.1 mm thick PTFE plates. The reason of choice of synthetic material was the hypothesis of the absence of biodegradation of PTFE in the organism. The valve has passed the preclinical phases of the in vitro and in vivo tests.The study included 271 patients who had undergone implantation of the MedLab CT prosthesis. The survival rate and the frequency of a clinically significant stroke, as well as hemodynamic parameters according to echocardiography for up to 5 years, were evaluated. 228 patients were examined in person, the rest went through a telephone survey.Results. The average follow-up was 20.4 months, the maximum - 5 years. The majority of patients belonged to the elderly group,mean age 71.7 years. For 243 patients according to the EuroSCORE II scale a high risk of surgical intervention was determined.5-yaers survival was 83,1%; 14 (5,1%) deaths were noted at the hospital stage, 32 patients died in the long-term period. 6 (2,2%) strokes were recorded. In the personal examination group, the average gradient on the aortic valve prosthesis is defined at 8.0 ± 4.6 mm Hg; failure due to paraprosthetic fistulas not higher than I degree was noted in 144 patients (42%), not higher than II degree in 5 (1,8%) case; transvalvular aortic insufficiency was not detected.Conclusion. The results of the studied parameters are comparable with the data provided by known randomized clinical studies of famous models of transcatheter aortic valve prostheses.

C-mO2-7 Trans-apical transcatheter valve replacement in complex valve disease with J-Valve system

Qing Zhou, Yunxing Xue, Shuchun Li, Min Jin, Dongjin Wang
Department of Thoracic and Cardiovascular Surgery, The Affiliated Drum Tower Hospital of Nanjing University Medical School

Introduction: J-Valve system is one special designed for trans-apical TAVR (Transcatheter aortic valve replacement) with three U-shape graspers. With the unique structure, J-Valve is suitable for both aortic stenosis and aortic regurgitation.Objective: To retrospectively analyze the single-center application of J-Valve transapical transcatheter valve implantation surgery in the treatment of complex valve surgery.Methods: From February 2018 to December 2020, a total of 92 patients with valvular disease received J-Valve transapical valve implantation surgery at Nanjing Drum Tower Hospital. Among them, aortic valve replacement was performed in 76 patients (46 with aortic stenosis as the main disease and 30 with pure aortic regurgitation), 8 with the aortic valve ViV, 7 with the mitral valve ViV, and one case of tricuspid valve ViV. The perioperative treatment results and follow-up of all patients were summarized and analyzed. Results: The average age was 76.4 ± 7.0 years, and 65% were male. The preoperative mean STS score and EuroSCORE II score were 6.8 ± 4.6% and 8.2 ± 6.7%, respectively. One patient was converted to open surgery, and two patients had the second valve ViV immediately during the operation. The overall treatment mortality was 3.3% (3/92). Stroke occurred in one patient, two patients suffered heart dysfunction postoperatively, and apical pseudoaneurysm in one patient. At discharge, one patient had mild to moderate paravalvular leakage. During the follow-up period, one patient died. Compared with the preoperative peak flow velocity and transvalvular pressure difference, the postoperative and follow-up periods were significantly reduced.Conclusions: J-Valve transapical transcatheter valve implantation system can reduce the risk of surgery and obtain good treatment results for high-risk, elderly and redo valve replacement patients.

Adult Cardiac mini Oral 2

March 26, 2022 16:40-17:15 / Track 1

C-mO2-8 Surgical outcomes and cardiac reintervention after transcatheter aortic valve implantation

Ryo Suzuki, Akihito Mikamo, Ryosuke Nawata, Toshiki Yokoyama, Sarii Tsubone, Yutaro Matsuno, Hiroshi Kurazumi, Bungo Shirasawa, Kimikazu Hamano

Department of Surgery and Clinical Science, Division of Cardiac Surgery, Yamaguchi University Graduate School of Medicine

Background:Recently, transcatheter aortic valve implantation (TAVI) has been widely used for severe aortic stenosis (AS) in patients low or intermediate surgical risk, and a considerable number of TAVI are performed every year. However, only a few studies of cardiac reintervention after TAVI have been reported.**Objectives**:This study aimed to assess the surgical outcomes and cardiac reintervention after TAVI.**Methods**:Between 2014 and 2020, 164 consecutive patients with AS underwent TAVI.**Results**:This study included 31% men and 69% women with a mean age of 85 years. The mean follow-up period was 2.9 years with a 100% rate. The mean Society of Thoracic Surgeons (STS) risk score and clinical frailty scale were 7.9% and 4.2, respectively. No hospital death was recorded. The mean effective orifice area index and valve gradients were 1.1 cm2/m2 and 11 mmHg, respectively, after ≥ 1 year. Although valve hemodynamics was not particular, moderate or severe paravalvular leakage (PVL) occurred in 17 (10.4%) patients, and 18 (11.0%) patients required hospital readmission due to cardiac failure. The 7-year survival rate was 49.1%. The indications for cardiac reintervention included PVL (n=2), coronary obstruction (n=1), prosthetic valve endocarditis (n=1), and mitral regurgitation (n=1). The mean time to cardiac reintervention was 15 months. Conventional cardiac surgeries were done for prosthetic valve endocarditis and mitral regurgitation. Although the STS risk score was 31.96%, no hospital death was noted during the second intervention. The 7-year cardiac reintervention rate, including the catheter procedure, was 95.4%.**Conclusions**:Postoperative valve hemodynamics was sufficient after TAVI; however, moderate or severe PVL and hospitalization due to heart failure occurred in more than 10% of cases, requiring cardiac reintervention. Operative risk at cardiac reintervention after TAVI is high; hence, TAVI should be reconsidered, especially in lower risk and young patients.

Thoracic aorta 1

March 26, 2022 09:50-10:40 / Track 2

A-Ab1-1 Early and late outcomes of aortic arch aneurysm repair -Proper selection of open surgery or TEVAR-

Naritomo Nishioka, Yoshihiko Kurimoto, Kento Hanada, Keita Sasaki, Takahiko Masuda, Ryushi Maruyama, Eiichiro Hatta, Syuichi Naraoka, Akira Yamada
Department of Cardiovascular Surgery, Teine Keijinkai Hospital

Objective: We investigated the early and late outcomes of aortic arch aneurysm repair and the validity of the surgical strategy depending on the patient's condition.
Methods: Between January 2013 and December 2020, 82 patients underwent total arch replacement (TAR) and 39 patients underwent fenestrated thoracic endovascular aortic repair (fTEVAR) for aortic arch aneurysm. We selected the surgical strategy on the basis of the patient's condition with or without frailty and if surgical risks including cancer or a respiratory condition precluded open surgery.
Results: The patients' mean ages were 73.5 ± 8.8 years in the TAR group and 76.6 ± 7.7 years in the fTEVAR group ($p = 0.08$). EuroSCORE2 was 4.1 ± 3.4 in the TAR group and 5.9 ± 3.4 in the fTEVAR group ($p<0.01$). Frailty was observed in 11 patients (13.4%) in the TAR group and 11 patients (28.2%) in the fTEVAR group ($p<0.01$). In the fTEVAR group, there were 5 patients (12.8%) with cancer and 3 patients (7.7%) with a respiratory condition that precluded open surgery. The operative mortality rate was 2.4% in the TAR group and 2.6% in the fTEVAR group ($p = 0.816$). Median (quartile) and maximum follow-up periods were 2.0 (1.0-3.7) and 8.0 years, respectively. The cumulative survival rate was 86.7% and 78.9% in the TAR group and 81.5% and 60.7% in the fTEVAR group at 2 and 5 years, respectively ($p=0.08$). There were both 92.5% of patients in the TAR group and 92.7% and 78.2% of patients in the fTEVAR group who were free from reoperations at 2 and 5 years, respectively ($p=0.18$).
Conclusions: Our surgical strategy and outcomes for aortic arch aneurysm were generally acceptable.It was important to select open surgery or TEVAR depending on the patient's condition.

Thoracic aorta 1

March 26, 2022 09:50-10:40 / Track 2

A-Ab1-2 Brain isolation perfusion to prevent embolic events in aortic arch surgery for patients with shaggy aorta

Tomohiro Mizuno, Tatsuki Fujiwara, Kiyotoshi Oishi, Tomoki Tahara, Junya Nabeshima, Masashi Takeshita, Masafumi Yashima, Eiki Nagaoka, Keiji Oi, Hirokuni Arai
Department of Cardiovascular Surgery, Tokyo Medical and Dental University

Background: Key to succeed aortic arch surgery is how to prevent perioperative stroke. What to do to prevent stroke in aortic arch surgery are not to send debris to the brain and to protect the brain against ischemic environment with proper perfusion. Our strategies are as follows: The ascending aorta (AscA) is primarily selected as the main arterial cannulation site, and the tip of the main cannula is put toward the aortic root not to brake intra-aneurysmal atheroma. The femoral artery (FA) was used to remove debris after distal aortic anastomosis. If the AscA is not good for cannulation, the right axillary artery (AxA) and FA are used for systemic perfusion. In patients with severe atheroma at the AscA and aortic arch, the bilateral AxAs and FA are used for systemic perfusion and isolated selective perfusion to the left common carotid artery (LCCA) is added just after CPB is started (brain-isolation perfusion). During circulatory arrest, selectively deep hypothermic cerebral perfusion was also used for all arch vessel. Methods: This strategy was applied for 128 patients who underwent aortic arch surgery with reconstruction of all arch vessels from 2012 to 2021. Results: Total arch replacement (TAR) was performed in 66 patients and hybrid aortic arch repair were performed in 62 patients. AscA cannulation with FA cannulation was selected in 71 patients, and only AscA cannulation in 7, only FA cannulation in 15, unilateral AxA and FA cannulation in 19 patients, bilateral AxA and unilateral FA cannulation in 14 patients. Of them, selective perfusion of the LCCA during CPB was used in 11 patients. Ischemic stroke occurred in only one patient (0.7%), and the patient had no permanent neurological deficits. Conclusions: Our surgical strategy, especially brain isolation perfusion technique for shaggy aorta, is effective to prevent stroke in aortic arch surgery.

A-Ab1-3 The optimal timing of TEVAR for aortic remodeling in Stanford type B aortic dissection

Kentaro Kiryu, Takayuki Kadohama, Gembu Yamaura, Fuminobu Tanaka, Daichi Takagi, Yoshinori Itagaki, Takeshi Arai, Takuya Wada, Itaru Igarashi, Yuya Yamazaki, Wataru Igarashi, Hiroshi Yamamoto
Cardiovascular surgery, Akita University School of Medicine

Objectives
In the present study, we investigated the timing of TEVAR for Stanford type B aortic dissection (STBAD) by assessing the time-dependent aortic remodeling after surgery.
Methods
Fifty-three patients (62.0 ± 11.5 years old, 44 men) who underwent TEVAR for STBAD (DeBakey IIIb) at our institute from March 2015 through August 2020 were included in the study. The area ratio of the true lumen to the aorta (TL/A-ratio) was measured on the pre- TEVAR CT and post-TEVAR follow-up CTs. The patients were divided into 3 groups according to the duration between the onset and the surgical intervention, Group A (acute): 0 - 14 days, Group SA (subacute): 14 - 90 days, Group C (chronic): over 90 days).The TL/A-ratio at the distal end level of the stent graft (SG-level) and renal artery level (RA-level) was measured by follow-up CT (1 to 3 years after surgery).
Results
One year after surgery, the TL/A-ratio was significantly greater both in Group A and Group SA than in Group C at the SG-level (81.3 ± 23.8, 71.0 ± 18.8 and 47.8 ± 27.4, respectively) and the RA-level (66.5 ± 28.2, 64.7 ± 22.2 and 35.3 ± 23.9, respectively). At 2 and 3 years after surgery, the TL/A-ratio tended to be greater in Group A and Group SA than in Group C at the SG-level and RA-level, but the difference did not reach a statistical significance.
Conclusion
TEVARs for STBAD should be performed in the acute or subacute phase (earlier than 90 days), which may contribute to satisfactory aortic remodeling and prevention of false lumen (FL) enlargement, the mechanism of which may be associated with TEAVR effects on preventing the FL enlargement caused by retrograde FL blood flow through the reentry.

Thoracic aorta 1

March 26, 2022 09:50-10:40 / Track 2

A-Ab1-4 Does resternotomy increase risk in total arch replacement?

Noriyuki Takashima, Tomoaki Suzuki, Kenichi Kamiya, Masahide Enomoto, Naoshi Minamidate, Youtaro Mori, Yuji Matsubayashi, Syunta Miwa
Cardiovascular surgery, Shiga University of Medical Science

Objective: Resternotomy in total arch replacement is considered to be a risk factor for adverse outcomes. We analyzed whether resternotomy was really a risk factor in total arch replacement. Methods: From January 2008 to February 2021, 384 consecutive total arch replacement were performed at our institution. Resternotomy were performed in 53 cases (14%). The preoperative characteristics, operative data, and postoperative outcomes were compared between the first-sternotomy group and the resternotomy group.Results: The proportion of degenerative aneurysms was higher in the first-sternotomy group, and chronic dissection was higher in the resternotomy group. The resternotomy group was younger, with a higher mean EuroSCORE II and higher prevalence of Marfan syndrome than the first-sternotomy group. In the resternotomy group 77% of cases involved peripheral cannulation (axially artery or femoral artery) before sternotomy. There was no catastrophic injury during resternotomy. The median durations of operation, cardiopulmonary bypass, coronary ischemic, selective antegrade cerebral perfusion and circulatory arrest were significantly longer in the resternotomy group. However, there was no significant difference in major post-operative complications or length of stay between the two groups. In-hospital mortality rates in the first-sternotomy group and the resternotomy group were 5% and 1%, respectively (P= 0.50). On multivariable analysis, cardiopulmonary bypass time (odds ratio, 1.012/min; p< 0.01), being female (odds ratio, 4.270; P=001) and emergency status (odds ratio, 8.014; P< 0.01) emerged as independent predictors of in-hospital mortality, and resternotomy did not.Conclusions: Total arch replacement requiring resternotomy is often technically complex. Nevertheless, preoperative evaluation, appropriate surgical strategies and methods of organ protection can achieve the same results as the first-sternotomy surgery.

A-Ab1-5 Virtual imaging analysis for preoperative planning in a reoperation case of thoracic descending aortic aneurysm after the coarctation aortic repair.

Yuji Matsubayashi, Shunta Miwa, Yotaro Mori, Masahide Enomoto, Naoshi Minamidate, Kenichi Kamiya, Noriyuki Takashima, Tomoaki Suzuki
cardiovascular surgery, Shiga University of Medical Science

We report a 77-year-old-woman diagnosed with an expanding aortic aneurysm of thoracic distal arch. The patient had a previous patch repair for aortic coarctation of the simple post ductal type 30 years ago. Preoperative CT angiography (CTA) showed the saccular aneurysm with the maximal diameter of 57 mm just distal to the left subclavian artery (LSCA). The patient was indicated for a surgical re-intervention. However, the endograft therapy was considered unsuitable because of the narrow proximal landing zone of 15mm whereas the distal diameter showed 27 mm at the Th-6 level. The expected operative risks included the innate vascular fragility due to the previous surgery as well as the postoperative adhesions. More thorough preoperative planning seemed indispensable for the open repair. We uploaded the CTA data into the novel virtual-reality (VR) software, the Vesalius 3D suite (PS medtech, Amsterdam, Netherland), visualizing the three-dimensional (3D) reconstructed images of the thoracic aortic anatomy. The virtual image provided the surgeons' view of the left thoracotomy with exquisite detail, elucidating the intra-vascular structures of both the proximal and the distal sites for anastomosis, the morphology of the cervical vessels, and the surrounding structures of the descending aorta such as the intercostal arteries, left bronchi, and the esophagus. The operative procedure was performed by left thoracotomy at the fourth intercostal space, cardiopulmonary bypass was established using the left femoral vessels. Open proximal anastomosis was carried out just below the LSCA under the deep hypothermic arrest based on the preoperative VR simulation. The postoperative course was uneventful without any complications. The virtual imaging enabled us to explore the patient-specific anatomy, allowing the quick, easy, and accurate preoperative planning with 3D images of high spatial resolution. This technology may serve as a sufficient tool for optimizing the anatomically complicated cardiaovascular surgery.

A-Ab2-1 The outcome of debranch TEVAR for zone 0 and zone 1

Akihito Matsushita[1)], Toshihisa Asakura[2)], Takashi Hattori[1)], Hideomi Hasegawa[1)], Fumie Saito[1)], Wahei Mihara[1)]

1) Department of Cardiovascular Surgery, Seikeikai Chiba Medical Center, 2) Department of Cardiovascular Surgery, Saitama Medical University International Medical Center, Japan

OBJECTIVE: Endovascular and hybrid operations involving the use of zone 0 or 1 as a landing zone have been introduced in elderly patients with aortic arch disease. We reported the results of debranching TEVAR for zone 0 and zone 1.

METHODS: We conducted a retrospective cohort study reviewing 10 consecutive patients who underwent hybrid procedures combining TEVAR with extraanatomical bypass between 2015 and 2021. Our study subjects were divided into two groups according to the proximal landing zone: 6 cases underwent total debranch TEVAR with zone 0 landing, and 4 cases underwent 2 debranch TEVAR with zone 1 landing. The endpoint was mortality and the incidence of endoleak. The mean follow up duration was 23.2 ± 16.7 months, and the follow up rate was 100%.

RESULTS: The mean age was 82.0 ± 4.1 years in Zone 0 landing group and 79.8 ± 6.3 years old in Zone 1 landing group. All procedures were successful, without any endoleak and in hospital mortality. There were 2 early complications in Zone 0 landing group (cerebral infarction and renal failure). Two patients had a birdbeak configuration with type 1a endoleak in Zone 0 landing group 6 months after the operation. A patient needed additional TEVAR for Zone 0 landing and dead with retrograde type A aortic dissection after that. The 1 and 3 year all cause mortality rates were 83.3%, 25.0% in Zone 0 landing group, and 100%, 100% in Zone 1 landing group.

CONCLUSIONS: We had a few early complications and late endoleak patients who underwent total debranch TEVAR with zone 0 landing.

A-Ab2-2 Endovascular Total Arch Repair Using In Situ Fenestration for Thoracic Aortic Aneurysm and Chronic Aortic Dissection.

Yoshiki Endo, Hitoshi Nakanowatari, Yoshiaki Katada, Yasuhisa Fukada, Yoshihito Irie
Cardiovascular surgery, Iwaki city medical center

Surgical total arch replacement is golden standard for Thoracic aortic aneurysm and is possible treatment for chronic type A dissection, with good reported outcomes. However, it can be difficult to perform in some patients especially high-aged patients or second operation because surgical replacement is extremely invasive. We designed an endovascular total arch repair procedure with the use in situ fenestration. We report our experience and clinical outcomes. From 2012 to 2021, eighteen patients (chronic type A aortic dissection, n=3; chronic type B aortic dissection, n=1; thoracic arch aneurysm, n=14) who underwent endovascular total arch repair with the use of in situ fenestration thoracic endovascular aortic repair from a zone 0 landing were retrospectively analyzed.Mean age was 77.8 " ± "8.5 y/o. All the procedure were performed under general anesthesia and cardiopulmonary bypass. The triple branches were manually punctured in a retrograde manner with 18 or 21-gaige needle. And all the branches were reconstructed with the use of stent grafts; balloon touch-up was performed if necessary. Mean duration of operation was 322.7 " ± "97.7 min. The procedure was successful in 17 of the 18 patients; 1 patient additionally underwent an axillary-axillary artery bypass grafting during the operation because the left subclavian artery was difficult to puncture. 1 patient died of non-occlusive mesenteric ischemia: NOMI three days after the operation. Remaining 17 patients had an acceptable postoperative course, with no 30-day and in-hospital deaths. None of the patients had endoleaks, and all the patients exhibited a reduction in aneurysm diameter of thrombosed false lumen during a mean follow-up period of 52.9 months. Endovascular total arch repair with the use of in situ fenestration can be performed with acceptable results.

A-Ab2-3 Short(hyphen)term clinical outcomes of thoracic endovascular aortic repair for arch aneurysms with the Najuta stent-graft system

Takashi Hashimoto[1)], Yoshito Inoue[1)], Shun Yamanaka[1)], Kentaro Yamabe[1)], Shigeshi Ono[2)], Koichi Masuda[3)], Yosuke Nozawa[3)], Takashi Hachiya[4)]

1) Department of Cardiovascular Surgery, Tokyo Dental College, Ichikawa General Hospital, 2) Department of Surgery, Tokyo Dental College, Ichikawa General Hospital, 3) Department of Radiology, Tokyo Dental College, Ichikawa General Hospital, 4) Department of Cardiovascular Surgery, Saiseikai Yokohamashi Tobu Hospital

Objective: Endovascular treatment for arch aneurysm is still challenging in some cases. This study evaluated short(hyphen)term clinical result of fenestrated zone 0 TEVAR with Najuta stent(hyphen)graft.
Methods: From April 2021 to November 2021, 6 patients underwent zone 0 TEVAR for aortic arch aneurysms with Najuta stent(hyphen)graft system in our facility. All of them were excluded from candidate for open arch replacement due to age, frailty, or obesity. Due to short proximal neck, all of them were inappropriate for debranching TEVAR with conventional grafts. We retrospectively analyzed the short(hyphen)term clinical results.
Results: Of all 6 cases, technical success rate was 88%. All cause 30(hyphen)day mortality was 0%. The postoperative results revealed 2 patients with minor type 1a endoleak and 1 patient with type 2 endoleak at discharge, which disappeared in CT on 1POM. Another one patient did not show intraoperative endoleak, however, showed hypotension of lower extremities due to endograft collapse, and needed early open conversion. There were 2 patients with stroke.
Conclusion: The fenestrated stent(hyphen)graft is a less(hyphen)invasive option for the treatment of high(hyphen)risk patients with arch aneurysms, however, further study is needed to clarify the optimal indication of this stent(hyphen)graft and to prevent severe aortic events.

A-Ab2-5 Are the current scoring systems of acute type A aortic dissection valid for our patients?

Bongyeon Sohn[1], Hyoung Woo Chang[2], Jae Hang Lee[2], Dong Jung Kim[2], Jun Sung Kim[2], Cheong Lim[2], Kay-Hyun Park[2]

1) Department of Cardiothoracic Surgery, Sejong General Hospital, 2) Department of Thoracic and Cardiovascular Surgery, Seoul National University Bundang Hospital

Purpose: The aim of this study was to evaluate the outcome predictive power of recently introduced clinical scoring tool and classification system for acute type A aortic dissection (AAD).
Methods: The German Registry of Acute Aortic Dissection Type A (GERAADA) score system and Type, Entry site, Malperfusion (TEM) classification were evaluated with our institutional results. 417 patients who underwent emergent aortic surgery for AAD between January, 2005 and May, 2021 were enrolled. Calculations of the GERAADA score were individually performed via a web-based application. TEM system was investigated for the association with 30-day mortality.
Results: Predicted 30-day mortality using GERAADA score was higher than our actual mortality; 15.6 % vs 9.6%, $P < 0.001$. Area under the curve from receiver operating characteristic analysis for comparison of the GERAADA score's prediction vs actual mortality of the study patients was 0.752. The discrimination of the GERAADA score were evaluated using concordance index (0.741). There was no statistical difference in the 30-day mortality rate according to the TEM classification (both entry site and malperfusion status). Resuscitation at referral ($P = 0.029$) and dissection extension to downstream of descending aorta ($P = 0.035$) were independent risk factors of 30-day mortality.
Conclusion: This study shows that the GERAADA score could predict the potential risk of 30-day mortality after AAD surgery. However, there is a tendency to overestimate actual mortality. TEM classification offers practical information of AAD, but its role as a predictor is limited. Further validation and modification of the current scoring systems are required.

Miscellaneous Aortic Issues 1

March 26, 2022 11:50-12:30 / Track 2

A-Ab3-1 Toward the best surgical strategy for mycotic aneurysms of the thoracic-iliac arteries

Naoto Fukunaga, Soshi Yoshida, Akio Shimoji, Toshi Maeda, Otohime Mori, Kosuke Yoshizawa, Tatsuji Okada, Noboshige Tamura

Cardiovascular Surgery, Hyogo Prefectural Amagasaki General Medical Center

Mycotic aneurysms of the aorta and iliac arteries are rare, but life-threatening conditions. Therapeutic strategies have been controversial regarding operative timing and surgical options. We reviewed our experience to pursuit the best surgical strategy.Between 2007 and 2015, we operated on 14 patients with mycotic aneurysms of aortic arch (n=6), descending (n=1), thoracoabdominal (n=2), abdominal (n=4) and iliac artery (n=1). Four cases were complicated with psoas abscess preoperatively. The mean age was 70.4 years and 10 males were included. Either blood culture or tissue culture, or both was positive in 11 patients. Thirteen patients were symptomatic and leukocytosis and elevated C-reactive peptide were observed. Four out of five patients with mycotic abdominal aorta and iliac artery underwent anti-anatomical bypass. The remaining 11 underwent in-situ graft replacement of the infected aorta. Omental pedicle grafting was added in 10 patients. Postoperative intravenous antibiotics were administered for a few weeks and oral antibiotics were prescribed before discharge. The mean follow-up period was 8.6 years.There were three death (21.4%) due to refractory infection (n=1), sepsis secondary to rectal necrosis (n=1) and gastric bleeding (n=1). Recurrent infection was observed in one patient with mycotic aneurysm of iliac artery about 3 months after the initial surgery. He underwent anti-anatomical bypass with omental pedicle grafting as a redo. Nine patients were discharged and followed up prospectively. No recurrence of infection was observed. Two patients died of cancer and heart failure. Survival rates at 5 and 7 years were 100% and 85.7%, respectively.A combination of radical debridement of infectious source and omental pedicle grafting with either in-situ graft replacement or anti-anatomical bypass is an effective strategy for mycotic aneurysms of the aorta and iliac arteries.

A-Ab3-2 Treatment strategy for aorto-esophageal fistula

Tatsuki Fujiwara, Tomohiro Mizuno, Keiji Oi, Eiki Nagaoka, Kiyotoshi Oishi, Masafumi Yashima, Masashi Takeshita, Jyunya Nabeshima, Tomoki Tahara, Hirokuni Arai
Department of Cardiovascular Surgery, Tokyo Medical and Dental University

Background: Aorto-esophageal fistula (AEF) and graft-esophageal fistula (GEF) after aortic surgery are conditions with a risk of major bleeding. Radical surgery is extremely invasive and poses concerns such as infection control and esophageal reconstruction.Methods: From January 2012 to October 2021, we encountered two cases of GEF and six cases of esophageal cancer invading the thoracic aorta (ECIA). Since cases of ECIA eventually develop an AEF, the treatment strategy was considered through eight cases.Results: [GEF Case 1] A 57-year-old woman was urgently admitted to our hospital due to hematemesis. She had undergone ascending replacement at the age of 53, and total arch replacement (TAR) and omentopexy at the age of 55 because of the development of graft infection. She was diagnosed with GEF and underwent an emergency thoracic endovascular aortic repair (TEVAR). She underwent subtotal esophagectomy on day 16. Re-total arch- and descending aorta replacement using rifampicin graft and muscular flap attachment were performed on day 66. Esophageal reconstruction was performed on day 149, and she was discharged on day 196.[GEF case 2] A 70-year-old man with an extensive thoracic aortic aneurysm, who underwent hybrid-TAR, had a fever 3 months postoperatively and was diagnosed with GEF. Due to good infection control, an over-the-scope clip (OTSC) fistula closure was performed on day 54, and he was discharged on day 92.[ECIA-group] All patients underwent TEVAR, and 1-2 weeks later, esophagectomy was performed in two patients and esophageal bypass surgery was performed in one patient. No bleeding complications were experienced after TEVAR. A patient who underwent radical resection is alive more than two years after surgery.Conclusion: TEVAR was sufficient in preventing bleeding complications. To ensure infection control and obtain stable results, it is important to perform stepwise treatment. Palliative treatment should also be considered depending on frailty.

A-Ab3-4 The Impact of Dialysis Dependency in Aortic Surgical Patients with Chronic Kidney Disease

Kang Min Kim, Sang Yoon Kim, Joon Chul Jung, Bongyeon Sohn, Hyoung Woo Chang, Jae Hang Lee, Dong Jung Kim, Jun Sung Kim, Cheong Lim, Kay-Hyun Park
Department of Thoracic and Cardiovascular Surgery, Seoul National University Bundang Hospital

Purpose: Although chronic kidney disease (CKD) and hemodialysis (HD) dependency are associated with worse prognosis after aortic surgery, it is unclear whether preoperative HD is a truly independent risk factor of early and late mortality in CKD patients. We investigated clinical impact of preoperative HD in aortic surgical patients with CKD.

Methods: Among 1,473 patients who underwent aortic surgery using cardiopulmonary bypass, 263 patients with CKD (grade ≥ 3, estimated glomerular filtration rate (eGFR) <60mL/min) were enrolled. Early and overall mortality were compared between preoperative HD group (n=233) and non-HD group (n=30). Subgroup analyses were performed by dividing the groups into moderate to high risk (MHR, n=204) with eGFR ≥ 30mL/min and very high risk (VHR, n=59) with eGFR <30 mL/min. The mean follow-up period was 2.8 ± 3.3 years.

Results: There was no difference in indications of surgery and surgical extent between HD and non-HD groups. Ten-year survival rate of patients with CKD is significantly lower than that of normal patients (36.6 ± 5.0% vs. 76.9 ± 1.8%, p<0.001). There was no difference in early mortality between HD and non-HD groups (23.3% vs. 18.5%, p=0.522). Ten-year survival was not significantly different between HD group and non-HD group (29.3 ± 11.9% vs. 38.5 ± 5.1%, p=0.642). Early mortality of VHR was significantly higher than that of MHR (28.8% vs. 16.2%, p=0.029). Five-year survival of VHR was significantly lower than that of MHR (38.4 ± 8.1% vs. 55.3 ± 4.5%, p=0.014). In Cox-regression multivariate analysis, VHR was one of the risk factors for overall mortality (hazard ratio 1.008, 95% confidence interval 1.187-2.815, p=0.006), but HD was not.

Conclusion: VHR was associated with increased early and overall mortality in CKD patients. However, HD itself is not a risk factor of early and overall mortality in CKD patients. Risk stratification of aortic surgical patients with CKD should be based on eGFR rather than HD dependency.

A-Ab3-5 Early outcomes of open descending and thoracoabdominal aortic replacements from a single center in Hong Kong

Jacky Yan Kit Ho, Simon Chi Ying Chow, Kevin Lim, Micky Wai Ting Kwok, Randolph Hung Leung Wong, Takuya Fujikawa
Division of Cardiothoracic Surgery, Department of Surgery, Prince of Wales Hospital, Shatin, Hong Kong SAR

OBJECTIVE:
Despite advancement of endovascular interventions, open aortic surgery remains a definitive treatment option for descending and thoracoabdominal aortic diseases. Outcomes from open descending aortic surgery are promising in high volume centres. We retrospectively reviewed the early outcomes of the development on open descending aortic and thoracoabdominal surgery of our institute.

METHODS:
Between 2/2017 and 11/2020, 34 patients in our institution (mean age 56 ± 14) have undergone open replacement of the descending and thoracoabdominal aortic replacement. There were 12 emergency cases (31%), including 9 cases of ruptured descending aorta. Perioperative parameters were retrospectively reviewed and analysed.

RESULTS:
All patients underwent surgery with left thoracotomy with left femoral cannulations. The 30 days mortality in descending aortic replacement achieved 0% and the overall mortality was 5.8% (n=2/34). One patient required reoperation on the infected aorto-esophageal fistula for infection control.

CONCLUSION:
Open descending aortic replacement remains a safe standard option with acceptable outcomes. Perioperative strategy and multidisciplinary teams commitment are crucial. The development of an aortic team for complex aortic interventions is possible with good early outcomes. Longer term outcome would allow further understanding of the natural progression of disease and optimise open versus endovascular selection for patients.

Targeted Oral/Video session 1

March 26, 2022 14:25-15:55 / Track 2

P-T2-2 Management for atrioventricular valve regurgitation with single ventricle physiology: Before Glenn shunt

Hiroki Ito, Akio Ikai, Keiichi Hirose, Maiko Tachi, Motonori Ishidou, Daisuke Toritsuka, Yuji Nakamura, Kisaburo Sakamoto

Cardiovascular surgery, Mt.Fuji Shizuoka Children's Hospital

We have performed atrioventricular valve plasty using various techniques for patients with functional single ventricle, even before Glenn shunt. Our strategy of valve surgery for these patients is 1. Determine the leaflets to be left, 2. Control regurgitation by combining annuloplasty, 3. Expect growth of the valve and lead to re-repair with or after Glenn shunt. Surgical technique is 1. Commissural annuloplasty: annuloplasty on the commissure aiming deep and strong coaptation. 2. Inter-annular bridging annuloplasty: annuloplasty for the central regurgitation with controlled commissural regurgitation aiming deep and strong coaptation between facing leaflets. We will present some cases of tricuspid valve plasty and common atrioventricular valve plasty.

P-T2-3 Biventricular repair of atrioventricular septal defect with double outlet right ventricle: successful repair with two-patch technique

Jae Hong Lee, Woong-Han Kim
Thoracic and Cardiovascular Surgery, Seoul National University Children's Hospital

We report a case of atrioventricular septal defect (AVSD) with double outlet right ventricle (DORV) which was successfully corrected with two-patch technique in a 15-month-old boy. The patient was first diagnosed with complete AVSD with DORV at an outside hospital, where he underwent pulmonary artery banding 8 days after birth. One year after receiving surgery, he visited our center for a second opinion. Preoperative echocardiography revealed complete AVSD with DORV, and there was no atrioventricular valve regurgitation preoperatively. The patient had a relatively small left ventricle (z-score -2.5) and a small left-side atrioventricular valve (annulus z-score -1.2).Under moderate hypothermic cardiopulmonary bypass, surgical procedures were performed. After aortic cross-clamping, the AVSD was exposed through a right atriotomy. We performed a careful inspection of the common atrioventricular valve using a saline test. During this procedure, the points of apposition of the valves were identified and marked. Next, the left side cleft was repaired with multiple interrupted sutures. Once the planned line of division was identified, the superior and inferior bridging leaflets were divided for appropriate exposure of the VSD margin. A comma-shaped patch was designed in order to prevent left ventricular outlet tract obstruction. After VSD closure with multiple interrupted pledgeted sutures, the previously divided left-sided valve components were attached and resuspended to the patch. After, the right side cleft was repaired with the attachment of divided right-sided valve components to the patch. Finally, patch closure of the primum ASD with attachment to the VSD patch and both bridging leaflets was carried out.Postoperative echocardiography demonstrated no leakage of the defects without significant ventricular outflow tract obstruction and valvar lesions. The patient was extubated on postoperative day 1. The patient was moved to general ward on the day after and discharged without any complications 5 days after surgery.

Targeted Oral/Video session 1

March 26, 2022 14:25-15:55 / Track 2

P-T2-4 Surgical results of atrioventricular septal defects -two patch repair vs modified single patch repair-

Shingo Kasahara, Junko Kobayashi, Takuya Kawabata, Yosuke Kuroko, Yasuhiro Kotani
Cardiovascular Surgery, Okayama University

(Introduction) There are two surgical methods for complete atrioventricular septal defect (AVSD): two-patch (T-P) method and single-patch (S-P) method. The Australian method (mS-P), which directly closes the ventricular septal defect without incising the atrioventricular valve, has been widely adopted. In this study, we compared the mS-P method with the T-P method, which was performed at the same time, from the standpoint of aggressively performing the mS-P method. (Subjects, Methods) The patients included in this study were 111 patients from 2005 to 2020, except for intermediate cases including VSD pouch formation, cases of right ventricular outflow tract stenosis (complicated with tetralogy of Fallot), and cases of unbalanced ventricle. The T-P technique was used in 29 patients (age, 8.1 ± 5.9 months; weight, 5.1 ± 1.9 kg), and the mS-P technique was used in 80 patients (age, 5.3 ± 5.3 months; weight, 4.3 ± 1.5 kg). We compared the reoperation rate, VSD diameter, LVDd, EF, BNP, and aortic cutoff time (ACC), etc. were compared between the two methods. We also obtained technical knowledge about the division line of the atrioventricular valve.(Results) There was only one case of death in the T-P group. There were 4 cases of reoperation in the T-P group and 1 case in the mS-P group. No single papillary muscle case was involved in the reoperation. In the mS-P group, VSD diameter was shallower (T-P:mS-P=8.4 ± 3.1mm:7.7 ± 3.3mm,P=0.252), aortic interruption time was significantly shorter (T-P:mS-P=87.4 ± 25min:50.3 ± 11min,P In addition, the aortic blockade time was significantly shorter (T-P:mS-P=87.4 ± 25min:50.3 ± 11min,P=0.001) and BNP was also lower (T-P:mS-P=42.8 ± 33:22.1 ± 24,P=0.031).(Discussion, Conclusion) The results of mS-P, including the surgical results, were satisfactory and comparable to those of T-P. The results of mS-P are comparable to those of T-P. The choice of surgical technique should be based on the quality of the procedure, not the simplicity of the procedure.

P-T2-5 Surgical Management of Unbalanced AVSD

David M. Overman
Division of Cardiac Surgery, The Children's Heart Clinic, Minneapolis, MN, USA;
Division of Cardiovascular Surgery, Children's Minnesota, Minneapolis, MN, USA;
Mayo Clinic-Children's Minnesota Cardiovascular Collaborative, Rochester, MN, USA

Surgical management of right dominant unbalanced atrioventricular septal defect demands, with rare exception, a binary choice which properly matches surgical strategy with anatomic substrate. This choice is complex, and the risk of mortality or significant morbidity is high when the wrong strategy is chosen. No single metric can reliably identify proper strategy, but several have been demonstrated to have significant association with unbalance and outcomes of surgical strategy. These include modified atrioventricular valve index (mAVVI), left ventricular inflow index (LVII0, right ventricular/left ventricular inflow index (RV/LV inflow index), morphologic features of the ventricular septal defect (inVSD), and ventricular volumetrics. The coexistence of Trisomy 21 in this patient population further complicates this binary choice.

The research which identified these metrics, and what is known about clinical outcomes for patients with balanced and unbalanced AVSD, patients undergoing Fontan palliation with uAVSD, as well as those with Trisomy 21, are reviewed. A simple stepwise decision-making process is presented to optimize the chance of success in selection of surgical strategy for this difficult patient population.

Oral/Video abstract session 2

March 26, 2022 16:15-17:35 / Track 2

P-Ab2-1 Evaluation of the usefulness of Sutureless angioplasty for peripheral pulmonary artery stenosis

Daisuke Toritsuka, Akio Ikai, Keiichi Hirose, Maiko Tachi, Hiroki Ito, Motonori Ishidou, Yuji Nakamura, Kisaburo Sakamoto

Cardiovascular surgery, Mt.Fuji Shizuoka Children's Hospital

IntroductionTreatment options for peripheral pulmonary artery stenosis associated with congenital heart disease include patch expansion, balloon dilation, and hybrid technique. Conventional pulmonary artery angioplasty may be technically difficult or may cause restenosis or reoperations in patients with complex congenital heart disease. In 2016, Kim and colleagues reported the Sutureless method for such cases.At our hospital, we introduced the Sutureless method for complex congenital heart disease with peripheral pulmonary artery stenosis in 2015, and have performed 5 cases by 2021.SubjectOf the patients who underwent pulmonary artery angioplasty between 2015 and 2021, five cases using the Sutureless method were reviewed. The patients were 496 days old at the time of surgery and weighed 7.4 kg. The primary diagnosis was hypoplastic left heart syndrome in 3 cases, tricuspid atresia in 1 case, and common ductus arteriosus in 1 case.Surgical techniqueThe periapical pulmonary artery was not dissected circumferentially, and the posterior wall was left adherent. The anterior wall of the pulmonary artery was incised beyond the stenosis. In cases where the vessel wall protruded into the lumen, the vessel wall was smoothed by resecting the vessel intima leaving the adherent tissue. The patch was sutured to the surrounding adherent tissue, not to the vessel wall. (Video)ResultsThe preoperative peripheral pulmonary artery diameter averaged 2.9 mm by CT scan, but was clearly enlarged to 6.7 mm postoperatively. All patients with univentricular heart could reach TCPC.ConclusionsThe Sutureless technique can achieve good vessel patency in patients with peripheral pulmonary artery stenosis associated with complex congenital heart disease requiring multiple operations.

P-Ab2-3 Feasibility of Three-dimensional Printing Technology in the Diagnosis for the Complex Congenital Heart Disease in the Undeveloped Southwest China

Dianyuan Li
Cardiovascular Surgery, The Affiliated Suzhou Hospital of Nanjing Medical University, Nanjing

Objectives: To evaluate the feasibility of three-dimensional (3D) printing technology on improving the diagnosis of the complex congenital heart disease (CHD) in undeveloped southwest China.Background: Diagnosis of the complex CHD strongly relies on the practitioners with the rich clinical experiences and recognition in the enigmatic heart structural malformations. However, there is a shortage of excellent CHD diagnosticians in southwest China, the complex CHDs are often misdiagnosed.Methods: Fifty-six complex CHD cases in two southwest China hospitals and multidisciplinary team of two tertiary hospitals in Beijing were involved in this study. Cardiac computed tomography angiography (CCTA) and echocardiography were used to acquire medical imaging data in local hospital, and clinic data and medical imaging(CCTA) data were translated to Beijing for 3D printing. The diagnosis which were made based on 3D printed models were fead back to local hospital for comparison with the primary diagnosis based on CCTA and echocardiography.Results: Excellent measurement correlation (r = 0.98) was found between CCTA imaging and 3D printed models. All of patients, the cardiac malformations found in-operation were consistent with the 3D models. However, five cases were misdiagnosed through echocardiography, and three cases were misdiagnosed through CCTA .Conclusions: 3D printing technology of the complex CHD has a unique advantage on the clinical diagnosis via the anatomical imitation and realistic display of the spatial relationships. It is of great significance in improving the diagnosis of complex CHD in the underdeveloped regions of China.

Oral/Video abstract session 2

March 26, 2022 16:15-17:35 / Track 2

P-Ab2-4 Three-Dimensional Virtual and Printed Prototypes in Complex Congenital and Pediatric Cardiac Surgery

Laszlo Kiraly[1,2,3], Nishant Shah[2], Ching Kit Chen[3], Theodoros Kofidis[1]

1) Pediatric Cardiac Surgery CTVS, National University Hospital Singapore, 2) Pediatric Cardiology/Surgery, Sheikh Khalifa Medical City, Cardiac Sciences, Abu Dhabi, UAE, 3) Dept of Public Health, Semmelweis University, Budapest, Hungary, 4) Pediatric Cardiology, National University Hospital Singapore

Background. Three-dimensional (3D) modelling and printing promotes individualized medicine and surgery. Congenital cardiac surgery remains a high-risk discipline where increased patient-safety and achievement of the best possible outcomes is of paramount importance. 3D models and printed prototypes can help in realizing these goals by the better understanding of the complex anatomy, allowing hands-on preoperative surgical planning and emulation, improved communication within the multidisciplinary team and to patients.Objective. We report our single centre experience about realization and validation of possible clinical benefits arising from the use of 3D printed models in surgical planning of complex congenital cardiac surgery. Methods. CT-angiography raw-data were segmented into 3D virtual models of the heart-great vessels. Prototypes were 3D-printed as real-size "blood-volume" (rigid material), and 1.5x-scaled "hollow" (translucent, flexible material). Accuracy of the models was evaluated intraoperatively. Production steps were realized in the framework of a clinical/research partnership.Results. We produced 3D-prototypes of the heart-great vessels for 16 case-scenarios (9 males, median age: 11 months) undergoing complex intracardiac repairs. Models re-fined diagnostics in 13/15 and provided relevant new anatomic information in 9/16; in 13/16, they significantly contributed to improved/alternative operative plans. Complex operative procedures (staged reoperations in 13/15; Aristotle-score mean: 9.64+/-1.95) were rehearsed on the 3D models preoperatively. Model accuracy was excellent within 1-2mm range, intraoperatively. No operative morbidity/mortality occurred. Acceptance of the 3D-printed models was 94% and 98% among the healthcare team and patient families, respectively. Our clinical/research partnership provided coverage for the extra time/labor and material/machinery not financed by insurance.Conclusion. 3D printed models offer numerous advantages and enhance patient-safety, optimal outcomes by improved preoperative planning and surgical emulation. Congenital cardiac surgery mainly deals with reconstructive procedures in which the 3D-printed models represent the first step towards bioprinting of patient specific and viable implants.

P-Ab2-5 Clinical nomogram for Predicting the Prognosis of Patients with Pulmonary Venous Obstruction after TAPVC Repair

Ling Chen, Liangwan Chen, Zhihuang Qiu, Fan Xu, Xingfeng Chen
Department of Cardiac Surgery, Union Hospital, Fujian Medical University, Fujian Medical University

AbstractBackgroundThe aim was to establish a nomogram to quantify the risk of postoperative pulmonary venous obstruction (PVO) and to make scientific decision through decision curve. Methods151 PVO patients with TAPVC repair including the sutureless surgery were involved in this study. A nomogram was generated based on the contribution weights of variables, which were found out by logistic analysis. The optimal clinical decision point were determined by the decision analysis and clinical impact curve, which could assess the net benefit between the nomogram and each independent risk factor for postoperative pulmonary venous obstruction (PVO) .ResultPVO with TAPVC repair was found to be positively and independently correlated with preoperative pulmonary hypertension, surgical methods and preoperative pulmonary venous stenosis.Conclusion(s)The study introduced a novel model to aid in clinical decisions making for the TAPVC patients individualy, which may shed light on the evaluation of PVO risk.

Lung cancer 2

March 26, 2022 10:00-10:50 / Track 3

T-O3-1 Integral lymph node descriptor system including location, station, and number

Woohyun Jung, Sukki Cho, Yoohwa Hwang, Jae Hyun Jeon, Kwhanmien Kim, Sanghoon Jheon

Division of Thoracic Surgery, Department of Thoracic and Cardiovascular Surgery, Seoul National University Bundang Hospital

INTRODUCTION We comprehensively evaluated the prognostic impact of three lymph nodes (LNs) descriptors including the location of metastatic regional lymph nodes (rN), station information (nN), and the number of metastatic LNs (#N).

MATERIALS AND METHOD We reviewed 637 patients who underwent major pulmonary resection for pathological N1 or N2 NSCLC between 2004 and 2018. We integrated three LNs descriptors and built a postoperative recurrence risk stratification model using C5.0 algorithm. Recurrence-free survival comparisons were performed by log-rank test and multivariable Cox regression model. Predictive power was compared using area under the time-dependent ROC curve (AUC).

RESULTS All patients consisted of 382 of pathologic N1 and 255 of pathologic N2. The median number of dissected and metastatic LNs were 24 (range, 6-103) and 3 (range, 1-31). In the results of C5.0 algorithm analysis, patients with multi-station N1 (N1b) with ≥ 3 metastatic N1 LNs (#N1), patients with single-station N2 (N2a) with ≥ 3 #N1 or ≥ 2 metastatic N2 LNs (#N2), and patients with multi-station N2 (N2b) were designated as the high-risk group. The rest of them were designated as the low-risk group. Five-year recurrence-free survival of low and high-risk groups were 58.0 and 30.4, respectively. (Log-rank P <.001) Results were consistent in the multivariable Cox regression model (adjusted P <.001). Our integrated model showed more AUC than rN or nN. (P=.030, and .005).

CONCLUSION By integrating three LNs descriptors, postoperative recurrence risk could be stratified more precisely.

T-O3-2 Comparison of Surgery after Neoadjuvant Therapy and Salvage Surgery in Stage 3B Non-Small Cell Lung Cancer

Gizem Ozcibik Isik, Ismail Sarbay, Ezel Ersen, Hasan Volkan Kara, Burcu Kilic, Mehmet Kamil Kaynak, Akif Turna
Thoracic Surgery, Istanbul University-Cerrahpasa Cerrahpasa Medical Faculty

ABSTRACT:INTRODUCTION:Surgery can be performed in resectable non-small cell lung cancers after neoadjuvant therapy in patients with Stage 3A/3B non-small cell lung cancer. However, feasibility and safety of salvage surgery is yet to be defined. In our study, we aimed to compare the survivals of patients who had resectional surgery after neoadjuvant therapy with the cases who had salvage surgery.PATIENTS AND METHODS:Between December 2004 and December 2020, 54 patients who received neoadjuvant or definitive chemoradiotherapy for non-small cell lung carcinoma who were evaluated as resectable and underwent lobectomy as anatomical resection were retrospectively analyzed. While 38 patients had lobectomy after neoadjuvant therapy(1.Group), 16 patients had lobectomy after definitive chemoradiotherapy(2.Group). Laboratory values(leukocytes count, lymphocytes count, monocytes count), respiratory values(FEV1, FVC), preoperative tumor size, standardized tumor uptake value and Suvmax value of lymph nodes, pathological diagnosis, survival were evaluated and compared in two groups.RESULT:There was no statistical significance in FEV1 value with p=0,062. FVC value was statistically significance higher in the first group(p=0,026)(Table 1). There was no statistically significant difference between the tumor diameter and the Suvmax value of the tumor between the two groups(p=0,631 and 0,211 respectively)(Table 1).There was no statistically significantly difference in survival between the two groups(p=0,988)(Figure 1).CONCLUSION:The study showed that, survival rates of patients who had neoadjuvant therapy or definitive chemoradiotherapy were not different. However, salvage surgery is technically more demanding and seems not feasible in all stage 3 patients.

Lung cancer 2

March 26, 2022 10:00-10:50 / Track 3

T-O3-3 Pleural Photodynamic Therapy and Surgery for Patients with Non-small Cell Lung Cancer and Ipsilateral Pleural Metastases

Kuan-Hsun Lian, Jang-Ming Lee
Division of Thoracic Surgery, Department of Surgery, National Taiwan University Hospital

IntroductionPleural dissemination were classified as M1a based on the 8th edition of AJCC cancer staging manual, and radical surgical resection is not recommended by current NCCN guideline. However, malignant pleural disease consists of heterogenous morphology, and pleural photodynamic therapy (PDT) in addition to radical debulking surgery was one of the entities showing adequate safety, good local control and longer median survival in a phase II trial. Our institution reviews the survival outcome in our series of NSCLC and ipsilaterally limited pleural dissemination undergoing surgical resection and intra-pleural photodynamic therapy.MethodBetween December 2006 and April 2020, we reviewed the clinical characteristics, treatment course and outcome of 55 patients with non-small cell lung cancer and pleural seeding. The eligibility criteria are as follows: pathologic diagnosis of lung cancer with metastases limited to ipsilateral pleural cavity, medical feasibility for PDT and surgery. Anatomic resections was first conducted to remove all grossly detectable tumors, followed by radical parietal pleurectomy before proceeding to thephotodynamic therapy.Result:The mean patient age was 55.6 years. Using Kaplan-Meier survival analysis, the 3-year survival rate and the 5-year progression free survival rate were 38.9% and 24.2%, and the 3-year and 5-year overall survival rate were 68.3% and 56.6%.Before 2018, Only one ARDS occurred immediately after the procedure, and improved after medical treatment; other minor complications also developed, including prolonged air-leakage (five patients) and skin redness (six patients). No procedure-related mortality was reported. The data after 2019 still required further analysis. Conclusion:Photodynamic therapy could be an additional therapy for patients with non-small cell lung cancer and pleural dissemination as our data reported promising results with adequate safety and improving survival.

T-O3-4 Prognosis of 10-year lung cancer survivors and the necessity of long-term postoperative surveillance

Satoshi Shiono, Makoto Endo, Kenta Nakahashi
Department of Thoracic Surgery, Yamagata Prefectural Central Hospital

Objective: Recurrence and second primary lung cancer may occur at 10 years after lung cancer surgery. However, studies of lung cancer survivors after 10 years or more are insufficient. Here, we assessed the prognosis of 10-year survivors who underwent lung cancer surgery.Methods: Between May 2004 and December 2010, 466 patients underwent complete resection of lung cancer. After excluding patients who died after 10 years or less, who missed follow-up, or whose outcomes were unknown, 193 patients surviving 10 years after surgery were assessed.Results: The median follow-up time and median age at surgery were 14.5 and 67 years, respectively. One hundred fifteen and 78 patients had stage 0-IA and stage IB-III disease. Twenty-three patients had cancer recurrence at 10 years after surgery. Recurrence of lung cancer was found in 1 patient, and second primary lung cancer was found in 3 patients. The 15-year overall survival rate was 66.7%. Univariate analyses revealed that age ($p < 0.001$), smoking index ($p = 0.013$), forced expiratory volume in the first second (FEV1; $p = 0.029$), FEV1% ($p = 0.042$), physical activity ($p = 0.011$), and adenocarcinoma ($p = 0.045$) were prognostic factors. Multivariate analyses confirmed that age ($p < 0.001$), smoking index ($p < 0.001$), and physical activity ($p = 0.007$) were prognostic factors.Conclusions: Patients who were younger, were nonsmokers, and engaged in physical activity tended to have longer survival at 10 years after surgery. Because recurrence is rare, postoperative surveillance after 10 years may not be necessary.

Thoracic Video

March 26, 2022 11:10-12:10 / Track 3

T-V1-1 Combined left thoracoscopic and median sternotomy approach to resect an aortopulmonary mediastinal paraganglioma following feeding artery embolization

Kota Itagaki[1)], Hirotsugu Notsuda[2)], Tomoyuki Suzuki[1)], Ryota Tanaka[2)], Hiroki Kamada[3)], Kei Omata[4)], Hideki Ota[3)], Yoshinori Okada[2)], Yoshikatsu Saiki[1)]

1) Cardiovascular Surgery, Tohoku University Hospital, 2) Thoracic Surgery, Tohoku University Hospital, 3) Diagnostic Radiology, Tohoku University Hospital, 4) Nephrology, Endocrinology and Vascular Medicine, Tohoku University Hospital

(Background)Aortopulmonary mediastinal paraganglioma is rare. A complete resection of the tumor is desirable regardless of tumor size in view of the risk of sudden death by adjacent organ compression and the poor prognosis of after partial resection or observation. Due to hypervascularity of the tumor, the risk of intraoperative bleeding is significant, and cardiopulmonary bypass is often required.(Case presentation) A 57-year-old man was diagnosed as having bilateral carotid body tumors at the age of 53 and underwent resections of bilateral carotid body tumors. The pathology of the tumor was paraganglioma in both sides. A familial SDHD gene mutation had been identified. Four years later, a contrast-enhanced CT scan showed an enlarged tumor of 45 mm in size at the aortopulmonary mediastinum. Based on the gene mutation, the tumor was thought to be a paraganglioma. After our endocrinologist confirmed that the aortic body tumor was non-functional, we requested our radiologists to perform preoperative embolization of the feeding vessel. Subsequently, the aortic body tumor was resected by a team approach consisted of thoracic and cardiovascular surgeons using a video assisted small left thoracotomy approach and a median sternotomy approach. The procedure was completed without cardiopulmonary bypass and blood transfusion eventually. The patient was discharged home on POD 9.(Discussion)In our present case, we performed a VATS approach to dissect the tumor around esophagus, descending aorta and left pulmonary artery followed by a median sternotomy approach to dissect it around the ascending aorta, aortic arch, right pulmonary artery and trachea. More to the point, there have been no reports on scheduled preoperative embolization of feeding vessels for aortopulmonary mediastinal paraganglioma. We could achieved this challenging surgical procedure by multidisciplinary approach.

T-V1-3 Infrared thoracoscopic pulmonary segmentectomy for an unpalpable tumor with intravenous indocyanine green administration using preoperative simulation

Hitoshi Igai, Matsuura Natsumi, Kazuki Numajiri, Fumi Ohsawa, Mitsuhiro Kamiyoshihara
General Thoracic Surgery, Japanese Red Cross Maebashi Hospital

OBJECTIVES: It is essential to ensure sufficient surgical margins during thoracoscopic pulmonary segmentectomy for malignant neoplasia. Herein, we describe successful outcomes of two cases of unpalpable tumors that were treated using infrared thoracoscopic segmentectomy with intravenous indocyanine green (ICG) administration according to a preoperative simulation. METHODS: In the simulation workstation, the boundary line between the colored (target segment) and uncolored (preserved segment) area, considered the "virtual intersegmental plane," was expected to correspond to the one that would be identified via infrared thoracoscopy with intraoperative administration of ICG. The surgical margin between the tumor and the closest boundary line was calculated.RESULTS: We show two cases with unpalpable tumor (1. ground glass opacity (GGO) dominant, rt. S2 segmentectomy/2. 10mm small nodule, lt. S6 segmentectomy) using a video.The operations were performed under general anesthesia using a uniportal approach with the patients in a lateral decubitus position. Initially, the dominant bronchus and pulmonary vessels including those which we selected in the preoperative simulation were divided. We subsequently switched to infrared light observation, and ICG was administered intravenously. The target segment was isolated due to ischemia induced by blood vessel dissection and therefore remained uncolored. The intersegmental plane was identified and the boundary line was marked by electrocautery. Finally, the intersegment was divided using staplers. We managed the surgical margin by shifting the staple line away from the target tumor because the tumors were adjacent to the virtual intersegmental plane. The discrepancy between the simulated and pathological surgical margins was within 5 mm in each case.CONCLUSION: This preoperative simulation can help obtain sufficient surgical margins without palpation of the tumor in infrared thoracoscopic segmentectomy with intravenous ICG. This preoperative simulation is particularly useful for non-palpable tumors like pure GGO or the small tumor deeply located in lung parenchyma.

T-V1-4 Uniportal thoracoscopic lateral and posterior basal (S9+10) segmentectomy by using modified version of the intersegmental tunneling method

Hitoshi Igai, Mitsuhiro Kamiyoshihara, Kazuki Numajiri, Fumi Ohsawa, Natsumi Matsuura
General Thoracic Surgery, Japanese Red Cross Maebashi Hospital

OBJECTIVE: Lateral and posterior basal (S9+10) segmentectomy is one of the most challenging operations because it requires exposure and recognition of pulmonary vessel branches and bronchus which are located deeply in lung parenchyma. Previously, our team reported the successful results of S9+10 segmentectomy using "intersegmental tunneling" via multiportal thoracoscopic approach. However, this method was initially considered difficult to be achieved via uniportal approach because of the poor maneuverability of surgical instruments and the limited angulation of inserted stapler. In this study, we describe S9+10 segmentectomy using modified version of the intersegmental tunneling method, which is suitable for uniportal approach. Moreover, the perioperative results were compared between uniportal and multiportal approaches.METHODS: Between May 2013 and March 2021, thoracosopic S9+10 segmentectomy was performed for 14 patients (uniport: n=5, multiport: n=9).The surgical steps were as follows:At fissure, A9+10 was exposed. After pulmonary ligament was incised up to inferior pulmonary vein, a small branch of pulmonary vein to the posterior segment was divided by a stapler at hilum. After the A9+10 was taped, we dissected B9+10, located just behind the A9+10, toward the back retracting the A9+10 toward the abdomen. This dissection of B9+10 made the entrance of the intersegmental tunnel between S6 and S9+10. Subsequently, the intersegmental plane was divided by staplers after the intersegmental tunneling was performed. After the division, the dominant vessels and bronchus were divided. Finally, the intersegmental plane between S7+8 and S9+10 was divided.RESULTS: Uniportal approach was superior to multiport about operative time (u vs. m:168 vs. 216min., p=0.017) although there were no significant differences about other perioperative results. Moreover, there were no cases revealing conversion to thoracotomy, intraoperative massive bleeding, or postoperative 30-day mortality.CONCLUSION: Thoracoscopic uniportal S9+10 segmentectomy can be performed appropriately using the modified version of the intersegmental tunneling method.

T-V1-5 Robot-assisted segmentectomy for early lung cancer: The strategy employed by Kyoto University Hospital

Akihiro Ohsumi, Hidenao Kayawake, Satona Tanaka, Yoshito Yamada, Yojiro Yutaka, Daisuke Nakajima, Masatsugu Hamaji, Toshi Menju, Hiroshi Date
Thoracic Surgery, Kyoto University Hospital

The use of robot-assisted thoracoscopic surgery (RATS) has spread worldwide, with the number of capable institutes and cases increasing. Since the introduction of the DaVinci™ surgical system in 2011 at Kyoto University Hospital, 166 lobectomies have been performed. In December 2020, we started RATS segmentectomy for small lung cancer and 24 cases segmentectomies and sub-segmentectomies have been performed to date. Herein, we introduce the RATS segmentectomy strategy adopted by our institution.

Three-dimensional computed tomography images are taken preoperatively using Synapse Vincent (Fujifilm, Japan), and the operative procedure and strategy is planned based on the tumor location and anatomy of the vasculature and bronchial tree. The radiofrequency identification (RFID) marker, which was primarily developed and clinically applied in our University Hospital, is placed via fiberoptic bronchoscopy in case the tumor location requires attention and is near the intersegmental plane.

The DaVinci Xi system has been used since 2017 and all surgeries have been performed using four robotic arms without CO2 insufflation. After division of the pulmonary artery and vein branches, the segmental or sub-segmental bronchi are dissected and intersegmental lymph nodes are taken as frozen samples for intraoperative pathological diagnosis. The exposed segmental or sub-segmental bronchi are identified via fiberoptic bronchoscopy under the fire-fly mode, and then divided using the EndoWrist Stapler. After lung inflation, indocyanine green (ICG) is injected intravenously for near-infrared imaging. Blood flow disruption is detected using the fire-fly mode, and the EndoWrist stapler is used to create the intersegmental plane. Then, detection of the RFID marker placed preoperatively is utilized to maintain sufficient margins from the tumor. After completion of the segmentectomy, ICG is re-injected to identify and resect the residual lung tissue with blood flow disruption.

T-V1-6 The right medial-basal segmentectomy (S7) for the lung cancer with an incomplete fissure between the middle and lower lobes

Makoto Endoh, Kenta Nakahashi, Marina Nakatsuka, Chikara Nakagami, Satoshi Shiono
general thoracic surgery, Yamagata prefectural central hospital

The bronchus 7 from the basal bronchus and pulmonary artery 7 from the basal artery are commonly run ventrally to the inferior pulmonary vein in the right pulmonary lower lobe. Dr. Shimizu reported its anatomy as B7a anatomic type, and it was found in about 75% of the population.A 1.7 cm nodule in S7 of the right lung was detected in an 80-year-old male, 3.5 years after left upper division segmentectomy for left lung cancer. It was diagnosed as non-small cell lung cancer via a transbronchial lung biopsy. Since the patient had left lung surgery and therefore had limited respiratory function, a right S7 segmentectomy was planned.Although the interlobar fissure between the middle and lower lobes was incomplete, the interlobar fissure approach was useful for right S7 segmentectomy in a case having B7a anatomic type, and its fissure was divided. Then, the ventral side of the common basal vein was exposed. The anatomy of B7 and A7 crossing the common basal vein was confirmed. B7 was exposed, then a HFJV was used to selectively inflate the S7 segment via bronchoscopy. The S7 segment was inflated while the preserved segments remained collapsed, and a line was formed between the inflated and deflated lung parenchyma to allow visualization of the anatomic intersegmental plane. The B7 and A7 segments were dissected. The S7 was resected using a stapling device in line with the inflation-deflation line. The S7 was extracted. The shortest resection margin from the tumor was 0.6 cm. The drain was removed on the second postoperative day, and the patient was discharged on the sixth postoperative day.Understanding the branching pattern of B7 was important to complete the right S7 segmentectomy. The interlobar approach was also feasible in cases with incomplete fissure between the middle and lower lobes.

T-O4-2 Minimally Invasive Thymectomy Could Be Tried In Locally Advanced Thymic Malignancies: A Propensity-matched Study

Xiuxiu Hao, Zhitao Gu, Wentao Fang

Department of Thoracic Surgery, Shanghai Chest Hospital, Shanghai Jiao Tong University

OBJECTIVES: Former studies have demonstrated the feasibility of the minimally invasive thymectomy (MIT) approach in early stage thymic tumors when compared to median sternotomy thymectomy (MST). This study aims to evaluate whether MIT could be tried in locally advanced disease in terms of perioperative and oncological outcomes compared to MST.

METHODS: The clinical data of 128 patients between January 2008 to December 2019, with UICC 8th edition staging T2-3NxM0 who underwent MIT or MST for thymic malignancies, were retrospectively analyzed. The difficulty of the surgical procedure was evaluated by the total number of structure resection as resection index (RI). Perioperative outcomes and survival were assessed using multivariable logistic regression, Cox proportional hazards analysis, and propensity-score matched (PSM) analysis.

RESULTS: Of the 128 patients that were evaluated, 58(45.3%) were performed by MIT initially, and 8 patients were converted to open during surgery. There was no significant difference in RI between MIT and MST group (P=0.876). There was no significant difference in perioperative outcomes between the conversion and MST group except longer operation time (P=0.002) in the conversion group. After PSM analysis, the MIT group had less blood loss (P<0.001), shorter chest tube duration (P=0.002), and shorter length of hospitalization (P<0.001), however, no significant differences in operative time (P=0.369), or morbidity (P=0.713) were identified. There was no significant difference in recurrence-free survival between the 2 groups before (79.9% vs 79.7%, P=0.990) or after PSM analysis (81.2% vs 77.0%, P=0.762).

CONCLUSIONS: The current study suggests that MIT for locally advanced thymic tumors is safe to perform, with perioperative benefits and comparable oncological results when compared to MST. The MIT approach could be tried in carefully selected patients with locally advanced thymic malignancies.

Key Words: Locally advanced thymic malignancy, minimally invasive thymectomy, median sternotomy, resection index, propensity-score matched analysis

Thoracic 1

March 26, 2022 14:20-15:20 / Track 3

T-O4-3 Outcomes of Surgical Resection after Induction Immunotherapy for Resectable Non-Small Cell Lung Cancer

Feichao Bao
Department of Thoracic Surgery, Shanghai Chest Hospital, Shanghai Jiao Tong University

Background:The safety and feasibility of surgical resection after neoadjuvant immunotherapy has remained poorly explored in resectable non-small cell lung cancer (NSCLC). The purpose of this study was to clarify the role of surgical resection, especially minimally invasive surgery after induction immunotherapy.Methods:We performed a retrospective review of our database to identify patients with clinical stage 1B-3B NSCLC who received surgical resection after induction therapy regimens containing immune checkpoint inhibitors. Perioperative outcomes and survival results were compared between open surgery and minimally invasive surgery.Results:From January 2019 to September 2021, a total of 68 patients who completed surgical resection after induction immunotherapy was retrospectively included in this study. According to RECIST criteria, re-evaluation of tumor invasiveness after induction treatment showed that the objective response rate (ORR) was 54.4%. 37 (54.4%) patients have partial response (PR) to induction treatment, while 31 (45.6%) patients have radiological stable disease (SD). 37 cases (54.4%) were initiated through a minimally invasive approach (VATS: 30 cases; RATS: 7 cases), only one case planned for VATS was converted to open thoracotomy because of dense adhesion. 31 cases were resected by open surgery as the initial approach. For patients resected by minimally invasive surgery, they were with better response to induction treatment, they had more early stage after induction treatment when compared with those of open surgery, although the tumor stage before induction treatment were comparable between the two groups. The two groups had comparable R0 resection rate. For patients after complete resection, the mid-term survival outcomes were comparable between the two groups.Conclusions:This is the largest single-center series to date which report the surgical outcomes for different approaches of resection after neoadjuvant immunotherapy for NSCLC. Minimally invasive surgery could be conducted with high rate of success in selected patients.

T-O4-4 Results of treatment after induction therapy for N2 lung cancer performed at our facility

Takashi Inoue[1,2], Kazufumi Magara[1], Satomi Imamura[1], Yuuki Yazaki[1], Syota Umeda[1], Aya Nomura[2], Osamu Araki[1], Takahiro Nakajima[1], Sumiko Maeda[1], Hiromi Ishihama[2], Masayuki Chida[1]

1) General Thoracic Surgery, Dokkyo Medical University, 2) Cancer Medical Treatment Center, Dokkyo Medical University

Introduction. Treatment for non-small cell lung cancer with N2 lymph node metastasis is controversial. Our facility performs induction therapy (chemotherapy ± radiation) for N2 lung cancer, then surgery when not PD. Cases with induction therapy for N2 lung cancer were examined.Methods. Forty-one patients who underwent induction therapy from January 2011 to December 2018 were included, with prognosis surveyed in November 2021. Survival rate was calculated using the Kaplan-Meier method and comparisons between groups by the log-rank method.Results. Average age was 66.0 years and there were 38 males. Treatment was chemo-radiotherapy in 22, chemotherapy in eight, chemotherapy + VEGF inhibitor in six, and EGFR-TKI in five patients. Thirty-five underwent surgery (CR n=1, PR n=18, SD n=16), while six did not (PD n=4, interstitial pneumonia n=1, refusal n=1). Overall five-year survival was 51.5%, with that in the surgery group 60.2%. Surgical procedures were lobectomy in 32 (bronchial plasty n=9, left atrial resection n=1, superior vena cava resection n=2), middle and lower lobectomy in two, and pneumonectomy in one. Ef3, EF2, EF1, and EF0 were noted in 7, 15, 12, and one, respectively. Perioperative complications occurred in 20. None had surgical death. Postoperative adjuvant chemotherapy was performed in 23. The average observation period was 1104 days, with postoperative recurrence in 18, survival in 24, and death in 11 (cancer n=6, other disease n=5). Postoperative pathological stage, pathological therapeutic effect, histological type, age, presence/absence of radiotherapy, complications, and prognosis were not significantly different in univariate analysis, while postoperative adjuvant chemotherapy was significant (p=0.014 HR 0.183, 95% CI: 0.048-0.705), with the prognosis of those patients good (three-year survival rate 89.1%).Conclusion. Results of treatment for N2 lung cancer patients and prognostic factors were examined. Prognosis was poor in the non-surgery group following induction. Postoperative adjuvant therapy resulted in better prognosis.

Thoracic 1

March 26, 2022 14:20-15:20 / Track 3

T-O4-5 Superior Vena Cava Syndrome Secondary to Anterior Mediastinal Tumor : Role of General Practitioner as the Frontliner

Hendwell Hendwell, Andry Umbu Lapu Landudjama, Kenny Satrio, Felicia Puspita Sari, Theodorus Kevin Putra Johansyah, Arvin Diego Tandoyo

General Practitioner, Umbu Rara Meha Hospital, East Nusa Tenggara, Indonesia

Superior vena cava syndrome (SVCS) comprises various symptoms due to occlusion of the superior vena cava (SVC). The typical syndrome of SVCS consist of facial edema and congestion of the head, upper extremities, and neck. Patients with SVC obstruction usually present with a well-established syndrome that is easily recognized and unmistakable. However, mediastinal tumors which is the major cause of SVCS are uncommon in clinical practice, represent only 3% of tumors seen within the chest and remains to be an interesting diagnostic and therapeutic challenge for medical experts. A case of 40 year old woman complaining of dyspnea, swelling face, and big mass protruding at her sternum is reported. The case is found in Sumba, one of rural areas in Indonesia. In this case we discuss the importance of General Practitioners to know the clinical appearance of such distinct yet rare cases like SVCS, medical emergencies, etiology, and treatment to consider as the front line of medical care to consider for taking care of patients with SVCS especially in rural areas when there is no cardiothoracic surgeon available.

T-O4-6 Safety of robotic surgery with or without perioperative continuation of antiplatelet agents

Takefumi Doi, Yugo Tanaka, Yuki Nishioka, Takeshi Okamoto, Daisuke Hokka, Yoshimasa Maniwa

Thoracic Surgery, Kobe University Graduate School of Medicine

In recent years, there has been an increase in the number of lung cancer surgery cases in which patients are using antiplatelet agents due to cardiovascular or cerebrovascular diseases. But there are no established criteria for the availability or safety of preoperative withdrawal of antiplatelet agents in endoscopic surgery. In this study, we retrospectively evaluated the safety of robotic surgery under continuous antiplatelet agent at our institution.Among 217 patients who underwent robotic surgery in our institution from June 2018 to September 2021, we analyzed 27 patients who underwent lobectomy or segmentectomy using antiplatelet agents. We compared 15 patients who stop taking antiplatelet agents perioperatively and 12 patients who continued to take one antiplatelet agent.Aspirin was taken in 20 cases, clopidogrel in 5 cases, and cilostazol in 3 cases, and these agents were mainly used as antiplatelet agents. Eight patients were using two or more antiplatelet agents, and the antiplatelet agent continued in the perioperative period was aspirin in all 12 cases. The mean surgical duration, console time, and blood loss were 184.8 min, 103.1 min, and 15.7 mL in the withdrawal group, and 188.3 min, 99.7 min, and 5.0 mL in the continued group. There was no significant difference in the comparison of mean operative time, console time, or mean intraoperative blood loss (p=0.8326, 0.8001, and 0.2276). There was no case of reoperation. There was only one perioperative death in the antiplatelet agent withdrawal group, and the causes of death were postoperative cerebral infarction and ischemic enterocolitis.Robotic surgery can be safely performed under continuous one antiplatelet agent, mainly aspirin. Further studies will be needed in the future, including the safety of continuing antiplatelet agents other than aspirin in the perioperative period.

Thoracic 2

March 26, 2022 15:30-16:30 / Track 3

T-O5-1 Robotic Assisted left cardiac sympathetic denervation

Nikolaos Panagiotopoulos, Nikolaos Madouros, Robert Nicolae, Kunal Bhakhri, David Lawrence

Thoracic Surgery, University College London Hospitals UCLH

Long QT syndrome (LQTS) is a rare and potentially fatal life threatening arrhythmia. Left cardiac sympathetic denervation (LCSD) is reserved for patients that cannot take or tolerate beta blockers and are at high risk of symptoms (syncope, cardiac arrest, or sudden death). Purpose of the presentation is to highlight the technical details and efficacy of a minimally invasive robotic assisted LCSDUnder general anaesthesia and with the use of CO2 insufflation, a 3- arm robotic approach with the Da Vinci Robotic System is utilised. In the anterior axillary line, a 8mm camera port is placed at the level of the 6th intercostal space, an 8mm port for Cadiere forceps at the 4th space and a third 8m at the level of the 8th space for monopolar scissors. Under direct vision and with the benefits or robotic magnification a sympathectomy in multiple levels is performed with the monopolar scissors. Cadiere forceps are helpful to mobilise the lung and expose the sympathetic chain. A 24F drain is inserted that can be removed the following day. LCSD does not cure LQTS but it can reduce the arrhythmia events and improve overall severity and frequency of symptoms. Careful patient selection is of the utmost significance.

T-O5-2 Endoscopic transthoracic sympathectomy is a safe and useful option for severe intractable angina and catecholaminergic polymorphic ventricular tachycardia

Mitsuhiro Kamiyoshihara, Hitoshi Igai, Natsumi Matsuura, Fumi Ohsawa, Kazuki Numajiri
Department of General Thoracic Surgery, Japanese Red Cross Maebashi Hospital

Introduction: Intractable angina and catecholaminergic polymorphic ventricular tachycardia is a rare but severe cardiac disease that carries a risk of sudden cardiac death. The purpose of this study was to assess the feasibility and usefulness of endoscopic transthoracic sympathectomy (ETS) for this disease.
Methods: In the last twelve years, twelve patients who were unable to tolerate, or who were refractory to, medical therapy underwent ETS. Under general anesthesia, the pleural cavity was entered through two 5-mm incisions in the subaxillary area. The thoracic sympathetic chain was identified, and the T2 to T4 sympathetic chain was cauterized and resected using a bipolar energy device on the right and left sides, respectively.
Results: The mean patient age was 54 years, and the male to female ratio was 7:5. The diseases included intractable angina in nine patients and catecholaminergic polymorphic ventricular tachycardia in three patient. Of these, five patients had a previous history of cardiac arrest. The mean operative time was 81 +/- 10 min. Blood loss was minimal. The median postoperative stay was 14.8 days. There were no major complications in the intra- and postoperative courses. Postoperatively, the frequency of cardiac attacks decreased from 3.1 times per day to 0.7 every few months. No syncopal events have occurred to date. The mean medicine dosage decreased from 8.1 drugs to 3.2.
Conclusions:ETS is a safe and effective treatment option for patients with intractable angina and arrhythmia refractory to medical management.

Thoracic 2

March 26, 2022 15:30-16:30 / Track 3

T-O5-3 Completely portal robotic right upper lobectomy for lung cancer: How to do it.

Makoto oda, Rurika Hamanaka
General thoracic surgery, Shin-yurigaoka General Hospital

Background: Thoracic surgeons' concerns are toward to further minimally invasive thoracic surgery such as robotic surgery. In Japan, health insurance has covered robotic lobectomy for lung cancer since April 2018. We reported our early good results of completely portal robotic right upper lobectomy for lung cancer.Methods: Between Nov. 2018 and Oct. 2021, 56 patients underwent completely portal robotic right upper lobectomy for lung cancer except 1 conversion to open.Operative techniques of robotic right upper lobectomy: Our approach was followed by Dr. M Dylewski (Dr D) of South Miami Hospital. Dr. D was implemented with 0 degree view camera with low CO2 insufflation (maximum 8mmHg) with a da Vinci Xi robotic system. In the case of right upper lobectomy, 12mm port (1st arm) in the 7th or 8th intercostal space (ics) for retraction and da Vinci stapler is placed in front of anterior axillary line. Every 3 or 4 fingers towards the back from the first port at 6th ics, 8 mm right arm, camera, left arm are placed, respectively. Assist port are placed at 10th ics in anterior axillary line.Results: Mean operative times were 144 min. for first 28 pts (PI), and 97 min. for last 28 pts (PII) (PI vs PII, $P<0.01$). Mean blood loss was 28 (0-665). There was no fibrin glue usage in the surgery. There was no ICU/HCU stay after surgery. All the patients started drink/food intake and walking within 3 hours (usually 2 hours) after surgery. Median chest tube drainage was 1 day (0-4 days). Median hospital stay after surgery was 1 day (1-5 days).Conclusion: Completely portal robotic right upper lobectomy for lung cancer has brought us fewer air leakage, fast-track, short learning curve surgery for lung cancer patients.

T-O5-4 Dynamic right ventricular outflow tract obstruction in severe pectus excavatum

Zhao Kai Low[1)], Kok Hooi Yap[1)], Jonathan Choo[2)], Masakazu Nakao[1)]

1) Cardiothoracic Surgery, KK Women's and Children's Hospital, Singapore, 2) Pediatric Cardiology, KK Women's and Children's Hospital, Singapore

We present a case of a 17 year old boy with severe pectus excavatum with echocardiographically-diagnosed dynamic right ventricular outflow tract (RVOT) obstruction, which was exacerbated by change in posture from supine to standing. This subsequently resolved after Nuss bar insertion, with a marked reduction in the RVOT gradient seen on the postoperative echocardiogram.A 17 year old boy with severe pectus excavatum (Haller index 4.2) was admitted to the hospital for elective Nuss bar insertion. He reported symptoms of decreased effort tolerance, with previous outpatient workup demonstrating a blunted VO2 increment on exercise testing, and reduced total lung capacity of 4.6L. He also reported experiencing posture-related palpitations, giddiness and near-syncope when getting from a supine to standing position. In the ward, he was noted to have a postural-dependent change in heart rate, from 80bpm while lying supine to 110bpm while standing up. This change was consistently observed within 5-10 seconds of postural change, and the resolution of tachycardia could be accelerated by elevating the lower limbs and inducing the hepatojugular reflex to increase venous return. Oxygen saturations were maintained at 98% in both the supine and standing position. A preoperative echocardiogram measured an RVOT gradient of 1m/s supine and 1.78m/s standing. There was normal biventricular systolic function and no pulmonary hypertension (TR peak velocity 2.14m/s).He subsequently underwent Nuss bar insertion for correction of the pectus excavatum deformity. Postoperatively, he reported symptomatic improvement with no further palpitations or postural giddiness. Echocardiography performed on the second postoperative day demonstrated resolution of the dynamic RVOT obstruction, with an RVOT gradient of 0.95m/s supine and 0.8m/s standing.

Thoracic 2

March 26, 2022 15:30-16:30 / Track 3

T-O5-5 A retrospective multi-institutional survey of characteristics of surgically treated spontaneous hemopneumothorax patients

Hitoshi Igai[1)], Noryoshi Sawabata[2)], Toshiro Obuchi[3)], Noriyuki Matsutani[4)], Mitsutaka Kadokura[5)]

1) General Thoracic Surgery, Japanese Red Cross Maebashi Hospital, 2) Thoracic and Cardio-Vascular Surgery, Nara Medical University School of Medicine, 3) Thoracic Surgery, St. Mary's Hospital, 4) Surgery, Teikyo University Hospital, 5) Respiratory Disease Center, Showa University Northern Yokohama Hospital

OBJECTIVE: The Japan Society for Pneumothorax and Cystic Lung Disease conducted a nationwide retrospective survey to identify correlations between the timing of surgical intervention and the incidence of transfusion, and to examine the factors contributing to the need for transfusion among clinical features in surgically treated spontaneous hemopneumothorax (SHP) patients.METHODS: We analyzed the characteristics and perioperative results of patients with SHP who underwent thoracoscopy or thoracotomy between April 2009 and March 2019.RESULTS: From 17 institutions, 171 cases were enrolled in this study. Receiver operating characteristic curve analyses for the incidence of transfusion and waiting time before the operation revealed an area under the curve of 0.54 (95% confidence interval [CI]: 0.44-0.64). Therefore, we did not compare the clinical features using a cut-off value of waiting time before the operation. More than 80% of the patients underwent surgical treatment within 24 hours from admission. Multivariate analysis revealed that the total volume of hemorrhage was the only significant factor contributing to the incidence of transfusion ($p = 0.00011$, odds ratio: 0.03, 95% CI: 0.0051-0.18). Moreover, multivariate analyses revealed that the waiting time before the operation was a contributing factor for prolonged total hospitalization ($p < 0.0001$, estimated regression coefficient: 0.036, 95% CI: 0.027-0.045). CONCLUSION: In SHP patients, a reduction in the waiting time before the operation significantly contributed to not the avoidance of transfusion but a reduction in total hospitalization time. Additionally, transfusion was performed depending on the volume of blood loss.

T-O5-6 Patients' Clinical Characteristics and Postoperative Course After Surgery for Spontaneous Pneumothorax According to Body Mass Index

Chikara Nakagami, Kenta Nakahashi, Takayuki Sasage, Makoto Endoh, Satoshi Shiono
Thoracic surgery, Yamagata prefectural central hospital

OBJECTIVE: Spontaneous pneumothorax tends to develop in thin and young men. This study aimed to compare the clinical characteristics and outcomes from surgery for spontaneous pneumothorax according to the body mass index (BMI).
METHODS: This retrospective study included 362 patients who underwent surgery for spontaneous pneumothorax at our institution between January 2008 and April 2020. We investigated the clinical differences, postoperative course, and recurrence according to the BMI.
RESULTS: The median age of the patients was 34.0 years, and the median BMI was 19.7 kg/m^2. The ratio of men/women was 314/48 (86.7%/13.3%), and that for with/without a history of smoking was 139/223 (38.3%/61.7%). Sixty-four (17.7%) patients had recurrence of pneumothorax. We classified the patients into two groups by the median BMI value. Group T included patients with a BMI <20 kg/m^2 (191 patients, 52.8%) and group F included those who had a BMI ≥ 20 kg/m^2 (171 patients, 47.2%). The median age in group T was 27.0 years and that in group F was 46.0 years ($p<0.001$). The number of smokers in group T was 94 (26.0%) and that in group F was 129 (35.6%) ($p<0.001$). There was no significant difference in the duration of postoperative chest tube drainage ($p=0.543$) or the postoperative hospital stay ($p=0.919$) between the groups. Forty-three (22.5%) patients in group T and 21 (12.3%) patients in group F developed recurrence of pneumothorax ($p=0.008$).
CONCLUSIONS: There are several limitations to this study because the patients underwent surgery and recurrence could not be confirmed in all patients. However, this study showed that patients with a lower BMI were younger and had a lower rate of smoking than those with a higher BMI. Patients with a lower BMI also had a higher rate of postoperative recurrence of pneumothorax.

A-Ab4(m)-1 Surgical Facilitation of a Zone Zero Landing

Jacob Jamesraj, Ezhilan Janakiraman
Cardiac Surgery, The Madras Medical Mission

A saccular aneurysm of the distal aortic arch of a 63 year old gentleman was dealt with in a novel hybrid method. He had presented with left vocal cord palsy due to pressure from the aneurysm arising adjacent the left subclavian and obstructing it. He had occluded right iliac and diseased left lower limb vessels which precluded the access from lower limb vessels. So a hybrid procedure was planned. The initial part was to debranch the neck vessels. This was achieved with a Dacron graftfashioned as a Y from the ascending aorta to the innominate and the left common carotid vessels. An access conduit, again a Dacron graft was sewn onto the ascending aorta. The patient was then shifted to the catheterization laboratory where a covered stent was deployed across the mouth of the aneurysm from the ascending aorta to the descending aorta. The patient recovered well.

A-Ab4(m)-2 Zone zero total debranching thoracic endovascular aortic repair with bilateral femoral arteries inflow

Yohei Yamamoto, Hidetoshi Uchiyama, Masahiro Oonuki
Vascular Surgery, Tsuchiura Kyodo General Hospital

Surgical approaches to aortic arch remain a challenge associated with substantial risk for perioperative stroke and death. Despite the rapid evolution of endovascular devices and techniques, the technology available to repair complex arch aneurysms is limited. We herein report a case of an aortic arch aneurysm in a 94-year-old female. The patient underwent a hybrid procedure consisting of total supra-aortic debranching using bilateral femoral arteries inflow and zone zero thoracic endovascular aortic repair (TEVAR). Completion angiography demonstrated successful exclusion of the aneurysm. The patient recovered well from the surgery without any complications and was discharged on the 18th postoperative day. At 10-month follow-up, the patient is in good condition with dependent ambulation. Follow-up CT scan confirmed patent bypass grafts and shrinkage of the aneurysm sac. Although careful selection of cases is highly recommended, zone zero TEVAR combined with extra-thoracic total debranching is considered a viable rescue option for patients with aortic arch aneurysm who are not eligible for open surgical repair.

A-Ab4(m)-3 A Case of Impending Rupture of Type B Aortic Dissection treated by Total Arch Replacement with Frozen Elephant Trunk

Takashi Hashimoto, Akihiro Yoshitake, Yuto Hori, Akitoshi Takazawa, Chiho Tokunaga, Atsushi Iguchi, Toshihisa Asakura, Hiroyuki Nakajima
Cardiovascular Surgery, Saitama Medical University

A 47-year-old male patient was admitted to our institution complaining chest pain. Computed tomography (CT) scan revealed impending rupture of patent Stanford type B acute aortic dissection, which entry site was on the origin of left subclavian artery. Huge hematoma was surrounding around descending aorta and hemorrhagic pleural fluid was estimated to be more than 1000ml. Since rupture site was not identified, antihypertensive therapy was initiated without any surgical intervention. On the 2nd day of admission, the patient showed severe hypotension, and we decided to perform total arch replacement with frozen elephant trunk (J graft 24mm, FROZENIX 27mm x 120mm). His postoperative course was uneventful, and he was discharged on POD16. CT scan on POY1 showed remodeling of the descending aorta distal to the open stent graft without significant dilatation of aorta.

A-Ab4(m)-4 Petticoat Valve Conduit for Recurrent Aortic Valve Detachment in Behcet's Disease

Guanhua Li[1,2)]

1) Department of Cardiovascular Surgery, Sun Yat-sen Memorial Hospital, 2) Department of Cardiovascular Surgery, Guangdong Provincial People's Hospital

Recurrent aortic valve detachment is not an uncommon postoperative catastrophe in Behcet's disease patients who underwent previous aortic valve replacement as the annulus and aortic wall are involved in the pathological changes of Behcet's disease. To avoid this, a modified Bentall procedure was developed with a 'petticoat' valve conduit. This 'petticoat' valve technique was introduced in our institution from 2018 and was successfully performed in three Behcet's disease females (mean age, 32 years) with recurrent postoperative aortic regurgitation. The intervals from the primary replacement to redo-operation varied from 4 to 13 months. Briefly, after mediastinum adhesiolysis, cardiopulmonary bypass was established conventionally as other re-do surgeries, and the primarily replaced prosthetic valve was removed, with coronary buttons mobilized. We constructed a 'petticoat' valve conduit where the prosthetic valve was introvertedly sutured approximately 3 cm upwards from the conduit edge, which was attached to the left ventricular outflow tract myocardium with a continuous 4-0 prolene suture. After completing proximal anastomosis, the coronary buttons were re-implanted. Distal end of the 'petticoat' valve conduit was anastomosed to the distal ascending aorta, also with a continuous 4-0 prolene suture. In this series, the duration for cardiopulmonary bypass or aortic cross clamping did not lengthen as compared to conventional Bentall procedures. Neither difficulty in hemostasis nor postoperative re-exploration was encountered. All patients were discharged and followed up for at least 2 years with continuous use of corticosteroids. No recurrent aortic regurgitation was noted. The flexibility of 'petticoat' conduit well compensates the size mismatch between the conduit and left ventricular outflow tract. Moreover, the 'petticoat' edge is free from postoperative inflammatory involvement and alleviates the tension of proximal anastomosis thus reduces the incidence of postoperative aortic valve detachment. Long-term follow-up is warranted to fully assess the efficacy of this 'petticoat' modification in the treatment for Behcet's Disease.

A-Ab4(m)-5 A Novel Hybrid Approach to an Aberrant Right Subclavian Artery with Symptomatic Kommerells

krystal dinh
Vascular Surgery, Westmead Hospital

Kommerell's diverticulum is an uncommon vascular anomaly resulting from anomalous aortic arch development (1). Due to the rare occurrence, well-established guidelines are not available to aid in management decision making. We describe a case of a symptomatic Kommerell's diverticulum from an aberrant right subclavian artery with concurrent coronary artery disease which required several staged multidisciplinary procedures.Clinical Summary:A 78-year-old male presented with sudden onset tearing chest pain with radiation to the back and associated dyspnoea and dysphagia. This was on a background of ischaemic heart disease with coronary stents, hypertension, hypercholesterolaemia, and previous small bowel resection for neuroendocrine mesenteric malignancy. He was an ex-smoker with no personal or family history of connective tissue disorders. On computed tomography angiography (CTA) he was found to have an aberrant right subclavian artery (SCA), coursing posterior to the trachea and oesophagus, with an associated 4.4cm Kommerell's diverticulum (figure 1). Imaging also illustrated tracheal stenosis and oesophageal compression. A coronary angiogram demonstrated severe double vessel coronary artery disease. A staged procedure with aortic arch debranching and coronary artery bypass grafting (CABG), followed by a thoracic stent graft and amplatzer plug to address the Kommerrel's Diverticulum was planned.The initial procedure, performed via a median sternotomy, involved debranching the left common carotid artery (CCA) and left SCA with simultaneous double vessel CABG (left internal mammary artery to left anterior descending, and saphenous vein T graft to obtuse marginal artery) (figure 2). This provided a sufficient landing zone for a thoracic aortic stent graft. His post-operative recovery was complicated by atrial fibrillation, hospital acquired pneumonia and delirium requiring reintubation for severe agitation. The patient was discharged home following rehabilitation with a plan to perform the second stage of the repair as a semi-elective procedure.

A-Ab4(m)-6 Surgical Techniques of our one-stage hybrid total aortic arch repair for extended aortic arch disease

Tomohiro Mizuno, Tatsuki Fujiwara, Kiyotoshi Oishi, Tomoki Tahara, Junya Nabeshima, Masashi Takeshita, Masafumi Yashima, Eiki Nagaoka, Keiji Oi, Hirokuhi Arai
Department of Cardiovascular Surgery, Tokyo Medical and Dental University

Background: To establish less invasive surgical procedure with less neurological complications in extended aortic arch and descending thoracic aortic disease, we worked on hybrid aortic arch repair with reconstruction of all arch vessels. Objective: Typical HAR procedure and the technique to prevent stroke in shaggy aorta were shown in this video. Methods: A debranching graft (3 branch) was anastomosed to a main artificial graft with a branch at 90 degree to the right side of its branch as a customized main graft before replacement. After median sternotomy, an 8mm supported graft was anastomosed to the left axillary artery. Under moderately hypothermic circulatory arrest with antegrade selective deep hypothermic cerebral perfusion, the aorta was transected between the brachiocephalic artery and left common carotid artery, and the ascending aorta and partial aortic arch were replaced. During rewarming, all arch vessels were reconstructed. The anastomosed 8mm supported graft was used for reconstruction of the left subclavian artery and the ostium was ligated. After CPB was weaned off and stable hemodynamic conditions with a systolic blood pressure higher than 120mmHg was established, thoracic endovascular aortic repair (TEVAR) from Zone 0 to the descending aorta was performed via the side branch of the main graft in one stage. In patients with shaggy aorta, brain isolation perfusion technique was used during CPB not to send debris to the brain. Results: From 2012, 60 patients underwent our HAR for extended aortic arch disease. No operative mortalities or permanent neurological deficits were observed. The mean height of the distal end of the stent grafts was located at Th8.6 (Th7 to 11). Paraplegia was observed in one patient (1.5%). Conclusion: Our HAR can be used to treat extended arch and thoracic descending aortic disease and provides excellent postoperative outcomes.

A-Ab4(m)-8 Risk factors of postoperative acute kidney injury in patients with acute type A aortic dissection

Yohnosuke Wada, Yuichiro Kitada, Tomonari Fujimori, Homare Okamura, Hideo Adachi
cardiovascular surgery, Nerima hikarigaoka hospital

Study Objective:
This retrospective cohort study aims to investigate risk factors of postoperative acute kidney injury (pAKI) among patients with acute type A aortic dissection(ATAAD)
Methods:
Patients who underwent surgical procedure for ATAAD at Nerima Hikarigaoka Hospital during the period from May 2016 to July 2021 were selected. After exclusion of 9 patients who died within postoperative day 7th and 20 cases who were not categorized into Debakey type 1, 109 out of 138 subjects were classified into the two groups: pAKI(n=29) and non-pAKI(n=89), and we analyzed the characteristics of patients, operative data, short-term outcomes and risk factors of postoperative AKI. "pAKI" was defined as either increase in serum creatinine level >0.3 mg/dL within 48 hours postoperatively or increase in serum creatinine level >1.5 times baseline within 7 days postoperatively.
Results:
The pAKI group was younger (pAKI: 59.7 ± 12.8 years old, non-pAKI: 68.1 ± 13.7 years old, P=0.015), had higher prevalence of Chronic Kidney disease [pAKI: 5(17.2%), non-pAKI: 4(5%), P=0.04]and Diabetes Mellitus [pAKI: 4(13.8%), non-pAKI: 2(2.5%), P=0.02]. No significant differences were found regarding intraoperative data except for operation time (pAKI: 362 ± 123 min, non-pAKI: 313 ± 89min, P=0.02). Also, rates of 30-day mortality and duration of hospital stay showed no significant differences [6.9% vs. 2% (P=0.28) and 37 ± 44 days vs. 31 ± 33 days (P=0.40), respectively]. However, it was necessary for more patients in the pAKI group to have hemodialysis (24.1% vs. 3.8%, P=0.001) and prolonged ventilation use >48 hours (72.4% vs. 46.3%, P=0.02). A logistic regression analysis revealed that prolonged ventilation use >48 hours was a risk factor of pAKI, odds ratio 3.00(95% confidence interval 1.02-8.84: P=0.046).
Conclusion:
This study has identified prolonged ventilation use >48 hours as a risk factor of pAKI among the patients with ATAAD. There would be a possibility of endotracheal extubation within 48 hours to decline the risk of pAKI.

A-Ab4(m)-9 Full PETTICOAT procedure after total aortic arch replacement with frozen elephant trunk in type A aortic dissection.

Masashi Yada, Kazuo Yamanaka, Takeshi Nishina, Yuji Sekine, Soutaro Katsui, Shun Satou, Yuichi Tara

Cardiovascular surgery, Nara prefecture general medical center

The frozen stent technique is feasible technique in terms of downstream aortic remodeling. We added TEVAR in the downstream aorta to facilitate expansion of true lumen and false lumen thrombosis in type A aortic dissection(AAD). In practice, we exclude d-SINE or re-entry tear with covered stent and extended bare metal stents were placed to the aortic terminal. We call the procedure "full PETTICOT". We herein present 4 cases of full PETTICOAT procedure after total aortic arch replacement with frozen elephant trunk in type A aortic dissection. Case1; In a 60-year-old man with AAD, total arch replacement and frozen elephant trunk (TARFET) was performed. 5 months after the surgery, we added PETTICOAT procedure to treat distal stent graft-induced new entry and narrowed true lumen.Case2; A 47-year-old man who underwent ascending aorta graft replacement for AAD one year ago was admitted because of an expansion of distal arch aneurysm due to the false lumen flow. We performed TARFET and following PETTICOAT procedure, resulting in feasible aortic remodeling of descending aorta.Case3; In a 67-year-old man with ULP in AAD, TARFET was performed. He developed paraplegia, renal malperfusion, and celiac artery stenosis next day. Emergent PETTICOAT procedure improved malperfusion and false lumen was diminished.Case4; In a 55-year-old man with lower limb malperfusion in AAD, emergent TARFET improved lower limb perfusion. We added PETTIOCOAT procedure for further aortic remodeling 2 week after first surgery, and expansion of true lumen was obtained.CONCLUSION:Although the long term outcome of this procedure is still unknown, the short-term result was acceptable on aortic remodeling.

A-Ab4(m)-10 Surgical and medical outcomes of type A acute aortic dissection in nonagenarians.

Yumeka Tamai, YOSHIO ARAI, ATSUSHI NAGASAWA, TAKEICHIRO NAKANE, KAZUHISA SAKAMOTO, RYOKO ARAKAKI, YUKI KURODA, YUKI WADA, TAKASHI FUKUSHIMA, AKIRA MARUI, NOBUHISA ONO
Cardiovascular surgery, Kakura memorial hospital

[Background]Optimal treatment strategy for acute type A aortic dissection (ATAAD) has not been well elucidated in frail, elderly patients, particularly in nonagenarians.[Methods]Between 2009 and 2021, a total of 20 patients with ATAAD of ≥ 90 years old had surgical or medical treatment in our institution (92 ± 1.2 years old, males 4 [20%], frailty score 4.7 ± 1.9). As a primary treatment strategy, we selected surgery in 6 patients (30%, group S) and 14 with medication (group M). Treatment strategy was selected mainly based on the patient's or the family's requests.[Result](Group S vs. M)Estimated in-hospital mortality by JAPAN scores was not different between the groups (20.6 ± 11.9% vs. 24.4 ± 8.6%, p=0.50).Computed tomography revealed the ratio of patent false lumen was 83% vs. 35% (p=0.15). Diameter of ascending aorta and false lumen thickness were higher in the group S (55.8 ± 5.2 vs. 48.3 ± 5.9mm, p=0.02 and 26.2 ± 10.2 vs. 14.0 ± 9.2mm, p=0.02).Operative procedures were 4 hemiarch replacement, 1 partial-arch replacement and 1 concomitant aortic valve replacement. In-hospital mortality was not different (50% vs. 36%, p=0.36). Causes of in-hospital death were as follows: ventricular arrhythmia, gastrointestinal perforation, and cardiac tamponade, for the group S; 2 rupture, 2 exacerbation of dissection, and 1intestinal ischemia for the group M. Five patients in the group S (83%) needed prolonged ventilation(>72 hours).Median follow-up periods were 123 (interquartile 16-494) days vs. 177 (11-1653) days (p=0.39). After discharge, there was no aorta-related death in both groups. Only 1 patient in the group M required re-admission due to recanalization of the closed false lumen. Freedom from aortic events at 1 and 3 year were not different between the groups(50.0% vs. 48.2%, and 50.0% vs. 40.2%, p=0.96).[Conclusion]In nonagenarians with ATAAD, both surgical and medical treatment were associated with poor in-hospital outcomes. However, aortic events might not happen so often after discharge.

A-Ab4(m)-11 Efficacy of In Situ Fenestrated Open Stent Technique(FeneOS) for the surgery of Acute Aortic Dissection type A

Shuhei Azuma, Masafumi Morita, Shinji Fukuhara
the Cardiovascular Surgery, Kyoto Katsura Hospital

Background: The surgical repair of acute aortic dissection type A [AAD(A)] by reconstructing the left subclavian artery (LSCA) is sometimes difficult because of the deep surgical field and the occurrence of left recurrent nerve palsy or bleeding. In Japan, since 2014, a commercially available open stent graft (J-graft OPEN STENT) has been used for promoting thrombosis of the false lumen in the descending aorta. We would like to show and talk about the efficacy evaluation of the surgeon-made in situ fenestrated open stent (FeneOS)in a patient with AAD(A).Method: We performed surgery with FeneOS using the open stent graft by first deploying it from the entry of the LSCA into the descending aorta and manually making a hole on the LSCA side of the stenting portion; then, the four-branched J graft was anastomosed between left common carotid(lt.CCA) and SCA(ZONE 2). At our institution, 55 patients with AAD(A) underwent this surgery with FeneOS from 2014 to 2021 (FeneOS group) and 97 patients with AAD(A) underwent a normal open-stenting procedure from 2008 to 2014 (non-FeneOS group). We analyzed the postoperative results of patients in the FeneOS and non-FeneOS groups.Results: Preoperative characteristics of patients in both groups were similar. Patients in the FeneOS group had an acceptable postoperative course, with no 30-day and in-hospital deaths. The mean operation time, cardiopulmonary bypass time, selective cerebral perfusion time, and open distal anastomosis time were significantly shorter in patients in the FeneOS group($p<0.01$). None of the patients had left recurrent nerve palsy, and postoperative computed tomography or arterial echo showed that the blood flow through the LSCA was intact and revealed no endoleakage.Conclusion: FeneOS is simple, fast, and less invasive for the reconstruction of the LSCA without the risk of left recurrent nerve palsy and can become effective for treating patients with AAD(A).

A-Ab4(m)-12 Surgical results using FROZENIX, the only device made in Japan for FET

Ikuo Katayama, Kenichirou Noguchi, Shigeru Hattori, Motoki Nagatsuka, Hideo Kagaya, Yusuke Gunji

Cardiovascular surgery, Shonan Kamakura general hospital

BackgroundsIn the aging society, surgery for thoracic aortic aneurysms is desired to be minimally invasive, speedy, and complication-free.The standard surgical procedure for patients with aortic arch aneurysms is still the conventional total arch replacement, but in recent years our institution has been actively introducing TAR+FET for patients with aortic arch aneurysms based on the patient's background.I will discuss the findings of precautions and innovations to avoid complications specific to FET, and the evolution of the technique.MethodsAmong 143 true aortic arch aneurysm surgeries performed from January 2015 to August 2021, 101 patients who underwent TAR+FET, excluding emergency surgeries and acute dissections, were included in the study, and a comparison was made between the first 48 patients from 2015 to 2016 and the second 53 patients after 2017.ResultsWe experienced one case of the spinal cord (paraparesis) injury and one case of SINE in the FET technique. There were no 30-day deaths and 3 in-hospital deaths.In the late TAR+FET since 2017, after the change of the distal anastomosis and the increased use of the left axillary artery bypass in the reconstruction of the left subclavian artery according to the case, both operative times have been predominantly shortened, especially the lower body circulatory arrest time within 30 minutes on average. A video focusing on distal anastomosis in the first and second semesters will be shown. ConclusionsTAR+FET had good results even in elderly patients and patients with high preoperative frailty. In addition, minimally invasive techniques such as shortened circulatory arrest time and minimal dissection operation contributed to the avoidance of complications.