C-O2-1 Azerbaijan experience of Ozaki procedure and our mid-term results

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Objective.To report our mid-term results of Ozaki procedure with reconstruction of the aortic valve leaflets from autologous pericardium in Azerbaijan.Material and Methods.We performed retrospective analyse of 20 patients (12 males and 8 females, mean age 63 ± 8 years) who underwent aortic valve reconstruction (AVRec) using autologous pericardium (Ozaki procedure) between august 2018 and november 2021 at our centre. The glutaraldehyde-treated autologous pericardium was used as described by Ozaki and colleagues.Results.Patients were suffering from aortic stenosis (AS, n = 7), or a combination of aortic stenosis and aortic regurgitation (AS/AR, n = 13). On preoperative echocardiography peak and mean pressure gradients were measured 79.1 ± 34.6 mmHg and 49.2 ± 23.1 mmHg respectively. There was no in-hospital mortality. No pacemaker had to be implanted after Ozaki procedure during follow-up period. No patient presented with aortic stenosis and valve regurgitation was graded no more than mild in all patients. There was no significant augmentation of aortic gradients during follow-up period. No reoperation was required. The median follow-up period was 24.3 months (range 3 to 38 months). Freedom from major adverse valve-related events was 100% at our study.Conclusions.Since Ozaki and colleagues first reported their results of aortic valve reconstruction by autologous pericardium, this technique become very popular. Mid-term results of Ozaki procedure showed optimal results in term of mortality, transaortic valve gradients, recurrent valve regurgitation and freedom from major adverse valve-related events. Long-term results will be presented in the future.

Adult Cardiac Oral 2

March 27, 2022 9:00-10:00 / Track 1

C-O2-2 Midterm result of aortic valve replacement in patients with aortic stenosis using aortic root enlargement technique

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We report our experience of aortic root enlargement (ARE) in aortic valve replacement (AVR) in patients with aortic stenosis (AS).Methods: From April 2018 to October 2021, 61 patients underwent AVR for aortic stenosis (AS). Eighteen patients had ARE, (AVR+ARE). Forty-three patients underwent AVR without ARE, (AVR). The age was 74.3 ± 9.0 years (AVR+ARE) vs 76.6 ± 7.0 years (AVR), respectively (p=0.35). The BSA was 1.5 ± 0.1 m2 vs 1.5 ± 0.1 m2 (p=0.17). The echo-measured diameter of the basal ring was 18.9 ± 1.9 mm vs 21.3 ± 2.6 mm ($p < 0.01$). ARE procedures consisted of the Nicks technique in 10 patients and the Manouguian technique in 1 patient. Seven patients had enlargement of the Valsalva sinus only. In AVR+ARE group, all patients had bioprosthesis. The labelled size was 19mm: 3, 21mm: 10, 23mm: 5. In AVR group, the bioprosthesis was used in 42 patients and labelled size was 19mm: 1, 21mm: 14, 23mm: 23, 25mm: 4. The mechanical valve was used in 1 patient.Results: There was one 30-day mortality in the AVR due to non-occlusive mesenteric ischemia. The echo-data at the discharge showed that the effective orifice area index (EOAi) was 0.96 ± 0.18 cm2/m2 vs 1.00 ± 0.20 cm2/m2 (p=0.57), the mean pressure gradient was 9.3 ± 2.8 mmHg vs 9.8 ± 3.3 mmHg (p=0.55). The follow-up duration was 16.8 ± 11.5 months (AVR+ARE) and 18.6 ± 11.8 months (AVR), the EOAi was 0.85 ± 0.22 cm2/m2 vs 0.91 ± 0.15 cm2/m2 (p=0.36), the mean pressure gradient was 11.1 ± 3.8mmHg vs 10.2 ± 3.8 mmHg (p=0.47).Conclusion: The midterm result of aortic valve replacement using aortic root enlargement technique was satisfactory. We could avoid the PPM by using ARE even in the patients with small aortic root.

C-O2-3 Clinical Outcomes of Surgical Treatment for Infective Endocarditis with Root Abscess

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Introducion: Infective endocarditis (IE) with aortic root abscess is crucial, and the surgical treatment for root abscess is complex and challenging. We assessed the early and long-term clinical outcomes.Methods: Between 1999 and 2001, consecutive 35 patients underwent surgical treatment for IE with aortic root abscess. Mean age was 59 ± 15 year-old, and the rate of male was 80% (28/35). Preoperative Japan Score was 24 ± 23%, and Euro Score II was 36 ± 28%. There were native valve endocarditis in 13 patients (37%) and prosthetic valve endocarditis in 22 patients (63%). Re sternotomy was performed in 23 patients (66%), and previous surgery included aortic valve plasty in 1, AVR in 13, double valve replacement in 1, Bentall in 4, aortic root replacement with stentless valve in 3, Reimplantation in 1. Causative microorganisms were Streptococcus in 11, MRSA in 8, MSSA in 8, MRSE in 3, MSSE in 1, Enterococcus in 1, negative in 2, and unknown in 1.Results: Operative procedures included aortic root replacement with stentless valve in 14, Bentall in 7, AVR in 5, Commando in 5, and Ross in 4. Mean operative time, cardiopulmonary time, cardiac ischemic time were 731 ± 366, 365 ± 160, and 253 ± 113 minutes, respectively. Concomitant procedures included mitral replacement/repair in 5, CABG in 3, ASD repair in 3, total arch replacement in 2, ascending aortic repair in 1, tricuspid annular plasty in 1. Twenty nine patients (29/35, 83%) underwent coronary artery reconstruction. There were 8 in-hospital death (Pneumonia in 2, uncontrollable bleeding in 2, sepsis in 1, lung bleeding in 1, DIC in 1, bowel perforation in 1). Overall survival was 56 ± 9% at 10 years, and freedom from reoperation was 79 ± 11% at 10 years. Freedom from reinfection was 76 ± 12% at 10 years.Conclusions: Early and Long-term clinical outcomes of surgical treatment for IE with aortic root abscess were acceptable.

Adult Cardiac Oral 2

March 27, 2022 9:00-10:00 / Track 1

C-O2-4 Outcomes among mitral valve repair and replacement in native mitral valve endocarditis

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Outcomes among mitral valve repair and replacement in native mitral valve endocarditisSitichok Wachirasrisirikul MD,Jessada Methrujpanont MD,Amnuaypon Kridanchalee MD,Chanaphan Setthawaisayaphong MDDivision of Thoracic and Cardiovascular Surgery , Buddhachinnaraj hospital, Phitsanulok , Thailand.AbstractBackground : The feasibility of mitral valve repair in infective endocarditis(IE) are depend on center experienced. The benefit of mitral valve repair(MVr) compare mitral valve replacement(MVR) in setting of IE condition remain unclear. Methods : We retrospective review 96 patients who underwent mitral valve surgery(MVR,MVr) on native mitral IE from Sep 2007 to Sep 2020, 71(73.95%) case were MVr. 47.5 , 40.6 and 5.9 , 9.5 were mean age and median euroScore2 on MVr , MVR group respectively. Perioperative data and mid term outcomes were evaluated.Results : Median follow up for MVr and MVR were 49.75 ± 38.12, 117.82 ± 48.51 months. Preoperative stroke , CHF with intubated were comparable(18.3%,24% p=0.566 ; 19.7%,36% p=0.101) on MVr,MVR group. Bypass and CPB time were similar(134min,132min P=0.628; 170min,165min P=0.658). Inhospital mortality in MVr was superior (7%,16% p=0.233). By Cox regression multivariate analysis MVR was higher risk mortality(hazard ratio[HR],0.83;95% confidence interval[CI],0.10-6.52). Post-op valve failure(≥ mitral regurgitation or stenosis) in MVr was 11.9% , although this did not higher rate valve reintervention(2.9%,0% p>0.99). 5 years survival and composite freedom from major adverse events(Dead,valve reintervention,stroke,major bleeding, recurrence IE) were (85.36% versus 74.22% P=0.03), (72.21% versus 58.38% P=0.019) for MVr and MVR respectively. Conclusion : Mitral valve repair should be encourage when technically feasible, the midterm survival and major adverse events were better than mitral valve replacement.

C-O2-5 Transaortic papillary muscle suspension technique for functional mitral regurgitation

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(Background)Functional mitral regurgitation (MR) was recognized as valvular disease associated with left ventricular dysfunction by dilated cardiomyopathy or myocardial infarction. However,significant MR had been reported in patients with chronic atrial fibrillation. Functional MR include annular dilatation and severe leaflet tethering. The purpose of our study is to evaluate clinical outcome after mitral valve(MV) repair using ring annuloplasty and transaortic papillary muscle suspension technique for severe leaflet tethering.(Methods) Retrospective cohort of chronic heart failure in Awaji Island in Awaji medical center (KUNIUMI Registry) was used. Between April 2019 and October 2021, 1722 patients with valvular heart failure had been registered. Among them, 44 consecutive patients underwent MV surgery for functional severe MR. We performed MV plasty(Ring&String technique)for 32 patients among them (The rest 12 patients underwent MV replacement). The etiology of mitral valve disease was ischemic MR in 4, dilated cardiomyopathy in 5, and atrial functional MR in 23 cases. Ring annuloplasty with full ring (median 30mm) was combined with the adjunctive String-technique. A Teflon-pledgeted 3-0-polytetrafluoroethylene-suture was anchored in the posterior or both papillary muscle via horizontal aortotomy, exteriorized through the aorto-mitral continuity, and tied in the arrested heart under direct view. Mean follow-up was 17.6 ± 8.4 months.(Results)There was no 30-day mortality. The most recent echocardiography findings of the patients with Ring&String technique showed that the severity of mitral insufficiency, left ventricular diastolic diameter and ejection fraction were 1.2 ± 0.5 (grades 0-4), 47.2 ± 7.0 mm and 56.4 ± 7.8%, respectively. Freedom from MR>2 at 2 years was 100%. Freedom from mitral valve reoperation at 2 years was 100%.(Conclusions)Early results of our concept with modified Ring&String technique are acceptable, especially for patients with atrial functional mitral regurgitation. Long-term follow-up will be needed to evaluate our strategy for functional mitral regurgitation.

Adult Cardiac Oral 2

March 27, 2022 9:00-10:00 / Track 1

C-O2-6 Collar-Like neo-commissure in mitral valve repair for extensive commissural prolapse

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Background: Mitral valve repair for mitral valve extensive commissural prolapse is complex, several methods have been reported with variant results. In order to restore the leaflet area, we introduce an innovated and effective method rather than simple folding technique through reconstructing a neo-commissure with a "Collar-like" plasty technique.Methods: Between 2016 and 2021, 62 patients with mitral valve extensive commissural prolapse received "Collar-like" plasty technique were included.Results: The mean age was 51.7 ± 13.8 years, and 38(61%) were female. Post-plasty TEE showed the mean transvalvular pressure gradients was 3.8 ± 1.2 mmHg, end diastolic peak flow velocity was 1.1 ± 0.3 m/s, coaptation height was 7.9 ± 1.1mm. During 3-6 months follow-up, no deaths or cardiovascular/valvular plasty related adverse events occurred. All patients acquired heart function improvement and recovered back to normal physical activities.Conclusions: "Collar-like" plasty technique can be safely performed for patients with extensive commissural prolapse. Echocardiology showed that the technique can restore the leaflet area with lower transvalvular pressure and flow velocity.

C-O3-1 Multidetector CT Angiographic Evaluation of Graft Patency Rate After CABG with Endarterectomy in Bangladesh

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Background: This study aims to assess the graft patency rate following coronary artery bypass graft surgery using non-invasive computed tomography (CT) angiography.Materials & Methods: A total of 168 patients were prospectively evaluated with CT angiography (Group-I: 84 patients with Coronary endarterectomy and Group-II:84 patients without Coronary endarterectomy). Coronary endarterectomy was performed in multi-segmental diffuse coronary artery disease or when calcified or extremely thick plaques made anastomosis troublesome. Interventional radiologists and the cardiac surgeon did the evaluations of graft patency rate.Results: A total of 520 bypass grafts were evaluated in 168 post CABG status patients (268 grafts in Group-I and 252 grafts in Group-II; moreover, a total of 208 were arterial and 312 venous grafts). Post CABG, CT angiography demonstrated a graft patency rate of about 90% in both study groups at 5 years follow up, which was statistically insignificant (P >0.05) in terms of graft patency rate. The sensitivity, specificity, positive and negative predictive values for CT angiographic evaluation in detecting graft stenosis were 91%, 99%, 90%, and 99%, respectively. However, for graft occlusion, all values were 100%. Following endarterectomy, five years angina-free survival rates were 89% and 91% accordingly.Conclusion: Coronary endarterectomy with OPCABG is reliable and achieves complete surgical myocardial revascularization with patients identified having diffuse CAD having no alternative option for adequate revascularization.

Adult Cardiac Oral 3

March 27, 2022 10:10-11:10 / Track 1

C-O3-2 Early results of arterial revascularization to the right coronary artery system in a provincial hospital of Thailand

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Favorable results of off-pump coronary artery bypass grafting have been reported in Asia. However, the guidelines or recommendation regarding applying arterial revascularization to the right coronary system is scarce. This literature intended to show our early results interms of major adverse cardiac cerebral events and death and angiographic evidence after patients' discharge From April 2011 to February 2022, consecutive 167 patients underwent aortic non-touch OPCAB by using right internal mammary artery (RIMA) to right coronary artery (RCA) target or posterior descending artery (PDA) 39 patients (23.4%), RCA composite left radial artery bypassed to PDA or posterolateral branch or other 79 patients (47.3%) and RIMA composite with saphenous vein to right coronary artery branch 48 patients (28.7%) performed in our hospital. Preoperative characteristics included 61% male, mean age 63.7 years, 44.3% diabetic, mean creatinine 1.2 mg/dL, mean EF 50.0% Mean total and postoperative hospitalization were 11.7 and 6.3 days. Computed tomography coronary angiography showed 96.4% patency. 30-day mortality was 3(1.8%), stroke was 0%. The early results for this intricated technique was satisfactory regarding postoperative stroke was 0%, postoperative graft patency was 96.4%, however, the mid-term results and graft patency will be followed.

C-O3-3 Long-term Outcomes After Off-pump versus On-pump Coronary Artery Bypass Grafting for Ischemic Cardiomyopathy

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Background: A post-hoc analysis of the Surgical Treatment for Ischemic Heart Failure (STICH) trial was performed to evaluate the perioperative and long-term outcomes after off-pump versus on-pump coronary artery bypass grafting (CABG) in patients with ischemic cardiomyopathy (coronary artery disease with left ventricular ejection fraction less than 35%).
Methods: Patients who underwent isolated CABG were enrolled from the STICH trial. Operative details, perioperative outcomes and long-term outcomes were compared in a 1-to-2 propensity score matching cohort. The primary outcome was death from any cause.
Results: Among 768 included patients operated on between July 2002 to May 2007, 152 (19.8%) received off-pump and 616 (80.2%) received on-pump CABG. In the 1-to-2 matched cohort (152 off-pump and 304 on-pump), off-pump was associated with a higher prevalence of multiple arterial grafting (17.1% vs. 8.6%, P = 0.01) and incomplete revascularization (34.2% vs. 17.1%, P < 0.001). The overall 30-day mortality (3.3% vs. 5.3%, P = 0.34) was comparable between two groups. After a median follow-up of 8.7 years, off-pump was associated with a similar risk of death from any cause (hazard ratio = 0.82, 95% CI: 0.61-1.09), with comparable estimated all-cause mortality at 1-year (12.5% vs. 11.9%), 5-year (32.0% vs. 32.8%) and 10-year (51.4% vs. 62.3%). No significant interaction was detected in the subgroup analyses of incomplete revascularization, multiple arterial grafting and three-vessel disease.
Conclusions: In patients with ischemic cardiomyopathy, off-pump CABG could be performed with comparable 30-day mortality, similar long-term survival, and appears to have a lower incidence of perioperative morbidities.

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March 27, 2022 10:10-11:10 / Track 1

C-O3-4 Change of Left Ventricular Volume and Clinical Outcomes in Ischemic Cardiomyopathy With or Without Coronary Artery Bypass Grafting

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Background: Left ventricular end-systolic volume index (ESVI) reflects the severity of left ventricular remodeling, which could be reversed after appropriate medical therapy (MED) or revascularization. The present post-hoc analysis of the Surgical Treatment of Ischemic Heart Failure (STICH) trial aims to determine how MED or coronary artery bypass grafting (CABG) affects ESVI in patients with ischemic cardiomyopathy, and to investigate the association between the change of ESVI and clinical outcomes in patients with or without undergoing CABG.

Methods and Results: A total of 523 patients with paired ESVI measured by the same modalities at baseline and 4-month were included in our study, with 291 (55.6%) assigned to MED arm and 232 (44.4%) to the CABG arm. ESVI significantly reduced from baseline to 4-month in CABG arm (85.0 ± 28.6 mL/m^2 to 81.1 ± 32.9 mL/m^2, P = 0.011), but not in MED arm (85.0 ± 31.2 mL/m^2 to 83.8 ± 33.9 mL/m^2, P = 0.301). After a median follow-up of 10.3 years, the increased change of ESVI was significantly associated with a higher risk of cardiovascular mortality in MED arm (1-SD increment: aHR 1.32; 95% CI, 1.10-1.58), but not in CABG arm (1-SD increment: HR 1.10; 95% CI, 0.90-1.35). Patients with a reduction of ESVI above 15% were significantly associated with a lower risk of cardiovascular mortality in MED arm (HR 0.50; 95% CI, 0.32-0.79), but not in CABG arm (HR 0.70; 95% CI, 0.44-1.14).

Conclusions: In patients with ischemic heart failure, although CABG could reduce ESVI, the increased change of ESVI from baseline to 4-month was associated with a higher risk of cardiovascular mortality in patients assigned to MED but not CABG arm. Reduction of ESVI above 15% might provide patients with additional survival benefits and assist clinical decision-making as a pragmatic prognostic indicator in patients received medical therapy.

C-O3-5 A LONG TERM MODIFIED MAZE PROCEDURE CONCOMITANT WITH MITRAL VALVE SURGERY

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Introduction: The association between mitral valve disease and atrial fibrillation (AF) is common. A simplified Maze with radiofrequency ablation is good result with low risk. Atrial reduction would improve better outcome.Material and Method: From June 2004 to October 2021, a radiofrequency ablation concomitant with mitral valve operation was performed on 407 patients. All patients presented with permanent atrial fibrillation. The underlying diseases were rheumatic heart disease in 238 patients (58.3%), degenerative heart disease in 165 patients (40.4%), and congenital heart disease in 3 patients (0.7%). Left atrial reduction was done on 373 patients (91.6%).Results: Valve replacement was performed in 173 patients (42.5%), mitral valve repair in 234 (57.5%). We had 10 thirty day mortality (2.5%). Twelve patients (2.9%) need permanent pacemaker implantation. Atrial fibrillation disappeared in 9.3% immediate after operation, 74.5% on day seven, 88.9%, 83% , 80%, 73.3%, and 67.3% at 1,5,7,10, and 12year. We found preoperative postoperative left atrium bigger than 50 mm. (p 0.035), technique of reduction if left atrium >60 mm. (p=0.004), and AF on day 7 (p< 0.001) are factors influence success. The prognostic factors for survival rate are degenerative cause (p 0.044), age more than 60 (p < 0.001), and postoperative ejection fraction < 40 % (p 0.003)Conclusion: Radiofrequency ablation combined with mitral valve surgery is safe and beneficial to continuous AF concomitant with mitral valve disease patients.

Adult Cardiac Oral 3

March 27, 2022 10:10-11:10 / Track 1

C-O3-6 The results of 850 patients of MAZE IIIB for 12 years.

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The purpose was the analysis of the results of the surgical treatment for atrial fibrillation by the new approach MAZE IIIB
Materials and Methods: We analyzed 876 patients operated on within 2010-2021 years at one department. The men number were 52% (452), the mean age of the patients was 58 (52-64) years. All the patients underwent surgical treatment of AF accordingly patent number 2017 120 391 of 03.06.2017. Durational AF was 66 (43-120) months. All those patients who underwent mitral valve replacement were 310. Those who underwent aortic valve replacement were 45 patients. In the group of patients with the MV plastic plus MAZE IIIB procedure were the next group of patients: 1. Correction of AV valves insufficiency - 393 patients and 2. multicomponent reconstruction of MV in degenerative disease in 51 cases. 77 patients due to good functional of MV weren't operated on this valve.
The results: total mortality was 4.21%(n=37). In the group of patients who underwent MV replacement and surgery for AF the mortality was 2.39 (n=21); in the group of aortic valve replacement plus surgery for AF - 1.14% (n=10). In the group of the patients with the plastic surgery for MV and AF the mortality was 0.68% (n=6). The median longevity of postoperative period was 54 months (42-72). 99% of patients for the time lived and alive doing well. The frequency of freedom from seizures of AF was 83% In MV replacement group, it was 89.35%, in MV plastic - 90.77% In group without surgery for valve it was 85%
Conclusion: The MAZE IIIB which was used for AF, complicated by arrhythmogenic mitral and tricuspid insufficiency showed high efficiency of sinus rhythm restoration and long-term postoperative period.

AES-6 Research and innovations are the cornerstones for a successful future for cardiac surgery

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In a rapid changing modern world with an exponential growth of new opportunities, research and innovations are the prerequisites for any successful development in medicine in the near future.Cardiothoracic surgery has had a very successful and groundbreaking past because of many disruptive innovative surgical techniques were developed that allowed treatment of patients who were before either difficult-to-treat or not treatable at all. At that time there were no competing techniques available and cardiothoracic surgery had many unique characteristics. In order to support innovative ideas in our specialties we have to inaugurate various fields of research and have to create enthusiasm among our younger colleagues for the almost endless opportunities we have nowadays based on the digital and communication revolutions which will change of way of knowledge exchange and knowledge generation as compared to previous years.Possible innovations could include four levels of new developments:Improvement in current standard procedures, e.g.reduce perioperative complications (e.g. infections, bleeding, stroke, etc.);reduce intraoperative complications (e.g. quality assessment of myocardialprotection, avoid early graft occlusion by intraoperative coronary angiography)reduce ICU and hospital stayFurther developments of standard procedures, e.g.new materials and/or new coatings for biological valvesanticoagulation free mechanical valvestissue-engineered grafts for coronary artery bypass graftingCreate new procedures for current diseases, e.g.robotic surgerystentgrafts for type A aortic dissectionsDevelop new treatments for up-to-date unsolved problems ("blue sky thinking")AtherosclerosisCancerlongevityThe effective implementation of innovation strategies today will be the most important single factor to achieve success tomorrow.

Targeted Oral/Video session 2

March 27, 2022 9:00-10:30 / Track 2

P-T3-1 A case of leaflet extension aortic valve repair with severe aortic regurgitation – Bridge to replacement in young children

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AbstractLeaflet extension for aortic valve repair is able to freely determine the leaflet length and the coaptation height. This technique is now provisionally performed as a bridge to aortic valve replacement in young children to maintain their general condition and cardiac function. We presented the case of a 7-year-old girl (weight 23 kg, height 123cm) with severe aortic regurgitation (AR). Echocardiography detected unbalanced tricuspid valve, and severe AR coming from the posterior commissure and the center with retracted cusps without enough coaptation height. We performed leaflet extension technique with pericardium treated with 0.6% glutalaldehyde. There was a small left coronary cusp which had well elasticity, and fused right and non-coronary cusp which had thick and poor elasticity. The aortic diameter was 19mm. The geometric height of the left coronary cusp was 12mm and the effective height was 3mm. The new 21mm cusps were trimmed with our original cusp template. The left coronary cusp was extended with pericardium cusp with 8-0 prolene running suture. The raphe of the fused cusp was excised and the right coronary cusp and non-coronary cusp were extended in the same manner. Postoperative echocardiography showed the good valve opening and trivial AR. Five years after the aortic valve repair (weight 52 kg, height 158cm), AR was gradually increased (moderate-severe), although aortic stenosis was mild. We performed aortic valve replacement with 21mm mechanical valve.

P-T3-2 Biventricular repair conversion after Norwood procedure.

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Cardiovascular Surgery, Okayama University

Interrupted aortic arch (IAA) with ventricular septal defect (VSD) is generally treated with one-stage repair with favorable outcomes. Patients with IAA often have left ventricular outflow tract obstruction (LVOTO). If it is difficult to decide to go for biventricular repair in neonate with LVOTO, a staged strategy is planned to perform a combination of the Norwood and Rastelli procedures. The degree of LVOTO, including the growth of the aortic valve annulus after the palliative surgery, is a vital factor that influences the treatment strategy. In this study, we report our experience of two cases of IAA/VSD type B with LVOTO for which Norwood procedure was performed in neonate.Patient 1: 1y.o. male. Because of small aortic valve size (31% of predicted normal value), he underwent bilateral pulmonary artery (PA) banding at 7days, followed by Norwood procedure at 15 days. Thereafter, Blalock Taussig Shunt (BTS) was added for insufficient PA flow. Both ventricles were developed and biventricular repair was scheduled. The aortic valve size was borderline (64% of predicted normal value) and the presence of subaortic stenosis, we selected Yasui procedure.Patient 2: 2y.o. female. Although the aortic valve size was borderline (4.6mm, 66% of predicted normal value), it was bicuspid and required valvotomy to achieve biventricular repair. Norwood procedure was performed at 8 days, followed by additional BTS. Rastelli-type operation was planned at first. Given the fact that the aortic valve was large enough (79% of predicted normal value), DKS was taken down and biventricular repair was achieved.Rastelli-type operation is usually performed for cases of IAA with VSD in which Norwood procedure is selected by LVOTO. However, if conditions such as valve growth and no complication of other LVOTO, there is a possibility of biventricular repair using only the native aortic valve as the systemic outlet valve.

Targeted Oral/Video session 2

March 27, 2022 9:00-10:30 / Track 2

P-T3-4 The Dutch German Ross Registry: Lessons learned from 300 pediatric patients and 25 years of follow up

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Background: The Dutch-German Ross Registry was established in 1988 with the aim to prospectively collect data of Ross operations. The aim of the present report was to analyze the pediatric patient cohort.
Methods: Data of all children <16 years of age at the time of the Ross operation were evaluated.
Results: Three hundred patients were below 16 years of age at the Ross operation. Survival at 10 years and 20 years was 91.5% [95% CI: 88.2-94.9%] and 90.0% [95% CI: 85.6-94.5%], respectively. Survival was significantly lower compared to the age and gender matched general population (p<0.001). Survival was significantly lower in children <1 year compared to children between 1 and 16 years at the time of the Ross operation (p<0.001). Freedom from autograft and homograft reoperation at 10 years and 20 years was 79.3% [95% CI: 74.2-84.9%] and 59.5% [95% CI: 51.7-68.4%], respectively. Freedom from autograft operation at 20 years was 82.9% [95% CI: 76.0-90.5%] and freedom from homograft operation at 20 years was 68.4% [95% CI: 61.1-76.6%].The mean z-values of the autograft showed a significant increase with follow-up time at the level of the sinus (0.5 ± 0.1/year, p<0.001), and the sinotubular junction (0.7 ± 0.2, p<0.001), but not at the level of the annulus (0.1 ± 0.1, p=0.59). There was a slow but significant increase in AR with follow-up time (0.07 ± 0.02 grade/year, p<0.001). Within-patient, there was significant evidence that AR increased with sinotubular junction diameter (p=0.028).
Conclusions: There is a consistent need for conduit reintervention following the Ross operation in children. Reinterventions on the autograft are rare within the first decade but increase in the second decade. Growth of the annulus matches somatic growth; however, the diameters of the sinus and the sinotubular junction increase significantly relative to somatic growth. The latter may explain the development of aortic regurgitation.

P-T3-6 Biventricular Repair of Interrupted Aortic Arch with Hypoplastic Annulus: Staged vs. Primary Repair

James St Louis
Surgery, Augusta University

Early repair of Interrupted Aortic Arch with severe Left Ventricular outflow tract obstruction to include hypoplasia of the aortic annulus was performed by Yasui in 1987. The procedure entails routing the systemic outflow from the left ventricular via a ventricular septal defect to both the aortic and pulmonary valves. An aortic arch reconstruction along with a Damus-type operation is then accomplished to create unobstructed systemic outflow. And homograft is then unitized to establish right ventricular to pulmonary artery continuity. Although early results have been good in several studies, morality and morbidly remain high in others. This presentation will review the options for primary vs staged repair of this lesion the contemporary surgical outcomes associated with each management strategy.

Mini oral/video abstract session

March 27, 2022 10:50-12:10 / Track 2

P-Ab3(m)-1 Correlation between Pre-Operative Pulmonary Valve Z-score and Valve Morphology with Post Operative Pulmonary Regurgitation in Tetralogy of Fallot patients

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Surgical repair is the main treatment for Tetralogy of Fallot (TOF). One of the most important integral of its surgical repair is evaluation and repair of the pulmonary valve. Hence it's wide range of Pulmonary Valve anatomical variations, surgeons must be very cautious in assessing the Pulmonary Stenosis pre-operative and intra-operatively. Pre-operative echocardiography Pulmonary Valve annulus size has been used to determine whether Trans Annular Patch (TAP) Procedure is necessary or not. The main downside of TAP is pulmonary free flow regurgitation after surgery which impacts long term survival and morbidity of patients. This study is conducted to determine if pulmonary valve annulus size (calculated in z-score) and morphology affects post operative Pulmonary regurgitation degree in TOF patients

P-Ab3(m)-2 Reconstruction of pulmonary valve with Hybrid Hemi-Contegra and Neoleaflet Technique in Tetralogy of Fallot Repair: A Case Report

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Case PresentationAn one year old boy who weighed 13kg with previous right modified Blalock-Taussig shunt for Tetralogy of Fallot was admitted for complete repair.Intra-operative techniquesAfter an uneventful redosternotomy, cardiopulmonary bypass was established with moderate hypothermia. The heart was arrested with aortic crossclamp and cardioplegia. The conal septum was resected via right ventriculotomy to relieve the right ventricle outflow tract obstruction. This is followed for ventricular septal defect closure with Dacron patch through the ventriculotomy. The ventriculotomy incision was extended across pulmonary valve annulus to main pulmonary artery. The pulmonary valves leaflets were thickened and dysplastic and they were deemed to be unusable for reconstruction, hence resected. The posterior leaflet was reconstructed with an on table tailored Gortex membrane. A size 14 Contegra with three valve leaflets was laid open through the smallest leaflet so this became a patch with two functional leaflets. This Hemi-contegra patch was then used as lay-on patch across right ventricular outflow tract and main pulmonary artery. This was done with matching of the sinotubular junction of the Hemi-Contegra and sinotubular junction of the patient native pulmonary valve. Patient was then weaned off cardiopulmonary bypass uneventfully. The patient had an uneventful post-op recovery and was discharged home on pot-operative day 8. Post-operative echo showed mild to moderate pulmonary regurgitation.ConclusionThe authors postulate that this technique of pulmonary valve reconstruction is simple and reproducible, it also has the advantage of keeping patient own native pulmonary artery tissue which allows for growth compared to complete contegra conduit

P-Ab3(m)-3 Modification of Warden Procedure for Anomalous Right Superior Venous Cava Drainage into Left Atrium with Partial Anomalous Pulmonary Venous Drainage

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We present a modification of the Warden Procedure in an infant with anomalous systemic venous connection to the left atrium, as well as partial anomalous pulmonary venous drainage. A term infant presented with persistent desaturations to 84-88% at 6 hours of life, for which she was started on continuous positive airway pressure, and subsequently intubated at 14 hours of life. Transthoracic echocardiography and CT angiography demonstrated anomalous right superior vena cava (SVC) drainage into the left atrium (LA), with all three of the right upper lobe pulmonary segmental veins draining into the SVC, near the SVC-LA junction. The rest of the pulmonary veins drained normally into the LA. The left atrium and ventricle were dilated, and there was a small atrial septal defect/patent foramen ovale and patent ductus arteriosus (PDA) with left-to-right flow. The child continued to be oxygen-dependent with profound desaturations to 40% without supplemental oxygen, and plan was made for surgical correction.The child underwent the modified Warden procedure and PDA ligation at 3 weeks of life with a body weight of 3.5kg. The azygos vein was transected and oversewn. The SVC was transected above the level of insertion of the right upper pulmonary vein, and the proximal end of the SVC was closed with 6-0 prolene. Subsequently, the right atrial appendage was opened, trabeculations removed, and anastomosis was performed between the right atrial appendage and SVC with 7-0 prolene. Postoperative pressure measurements recorded 11mmHg in the right atrium, 10mmHg in the inferior vena cava and 12mmHg in the SVC. The patient remained well at the three-month postoperative follow-up consultation, with patent SVC-RAA anastomosis.

P-Ab3(m)-4 3D-printing and surgical emulation in preoperative planning for recurrent pulmonary vein stenosis

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Objective
Recurrent pulmonary venous stenosis after surgical repair of total anomalous pulmonary venous connection (TAPVC) represents a surgical challenge. Precise knowledge of the anatomy and meticulous surgical planning is critical in ensuring successful outcomes and to prevent recurrence and/or progression. We evaluated 3D-printed models for anatomical clarity and their usefulness at preoperative emulation in planning for a third-time redo to relieve pulmonary vein re-stenosis.
Patient
A 2.5-year-old female child (born prematurely) with VACTERL association and unobstructed intracardiac TAPVC (pulmonary veins draining into coronary sinus, and a large atrial septal defect) first underwent successful TAPVC repair at 10 months of age. New-onset bilateral ostial pulmonary vein stenosis required reoperation by partially sutureless technique 5 months postoperatively. Bilateral pulmonary venous stenosis rapidly recurred with a mean gradient of 17-20 mmHg across the pulmonary venous ostia and severe pulmonary hypertension.
Methods
A virtual 3D-model of both atria and the pulmonary veins were segmented from the CT-angiography (2mm slices) with a commercially available software. Two identical hollow models were 3D-printed into a soft polyjet photopolymer material (Elastico). Preoperative surgical emulation was performed on one of the models to identify the appropriate surgical strategy. The other model was used for reference and to test alternative surgical strategy.
Results
Intraoperative findings confirmed the accuracy of the 3D-printed model. Pulmonary venous ostia were relieved by an entirely sutureless technique via the left atrium. Postoperative echocardiography demonstrated unobstructed pulmonary veins, laminar flows into the LA. The child made an uneventful recovery and was discharged home in 5 days.
Conclusions
3D-printed models offer hands-on access to the intricate details of complex cardiac anatomy; they also allow unique possibility of preoperative emulation of different surgical strategies and thus can improve the overall safety of patients undergoing re-redo operations, presented with recurrent and progressive pulmonary vein stenosis.

P-Ab3(m)-5 Surgery for congenital vascular ring

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Background: Vascular ring is a congenital anomaly in which the aortic arch and its branches completely or incompletely encircle and compress the trachea or esophagus or both. Knowledge of the normal embryonic development of the aortic arch and related structures is important to understand and classify the various form of vascular rings. Development of vascular ring begins with the embryonic aortic arch system. Persistence, involution, or regression of the arches determines the multiple different varieties of vascular rings.Patients: Between 2008 and 2021, 16 patients underwent surgical repair of vascular ring. Complete vascular ring consisted of a double aortic arch (n=5), right aortic arch with an aberrant subclavian artery and left arterial ligament (n=5), right aortic arch with mirror image branching and left arterial ligament (n=2). Incomplete vascular ring consisted of an innominate artery compression (n=2), pulmonary artery sling (n=1) and left aortic arch with aberrant right subclavian artery (n=1). Surgical division of the vascular ring was performed in 14 patients and translocation of anomalous artery was performed in 2 patients.Results: There was no early and late death. Reoperation for tracheal compression was performed in 3 patients.Conclusions: Surgery for the vascular ring performed in symptomatic patients is effective, with excellent outcomes in most patients, including significant reduction and resolution of symptoms and low risk of morbidity and mortality.

P-Ab3(m)-6 Effect of natural anticoagulants (Protein C and Protein S deficiency) concerns in pediatric extracorporeal membrane oxygenation: case report

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A 4-year-old boy was diagnosed as DORV with TGA, unrestrictive ASD, and multiple VSD with abnormal coronary artery (double LAD). He was underwent arterial switch operation with ASD closure and VSD closure. Post operatively, the patient was presented with low cardiac output from biventricular failure. Central VA ECMO was initiated immediately with additional LV vent insertion via pulmonary vein, and immediate improvement of cardiac function was achieved. ECMO flow was stable. ACT post operation was 300-500 seconds without heparin infusion. Five hours later, the pressure across oxygenator was gradually increased despite the prolonged ACT. ECMO flow also gradually impaired. Laboratory results showed thrombocytopenia and hypofibrinogenemia. The oxygenator was exchanged immediately and heparin was infused.16 hours after changing the oxygenator, pressure gradient was gradually increased again to 240 mmHg and ECMO flow also decreased lower than 1 L/min with gas exchanging impairment. 3rd time oxygenator exchanging was done. This time, the extra coagulation status such as Anti-factor Xa level, Antithrombin-III (AT), Protein C, Protein S was monitored. A heparin infusion was infused continuously to maintain the ACT level and aPTT level. The platelet was kept above 80,000 per microliter and the other blood components were adjusted as needed. After that 30 hours, the pressure gradient was high and oxygenator function was deteriorated again. However, cardiac function was gradually improved. The LV vent can be removed and oxygenator was re-exchanged 4th time. The pediatric hematology noted that clot in oxygenator was caused by Protein C and Protein S deficiency and gave the FFP to patient. Post-operative vital sign and ECMO flow of patient was stable. Until 7 days, after ECMO insertion, pressure gradient across oxygenator was increased again, fortunately the cardiac function was improved enough and the ECMO can be discharged. However, 2 weeks later, he passed away from severe sepsis.

P-Ab3(m)-7 Polytetrafluoroethylene bridging suture for common atrioventricular valve repair in a single ventricular patient

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Common atrioventricular valve regurgitation has been identified as a predictor of adverse outcomes in patients with functional single ventricle. A variety of techniques were applied to regulate common atrioventricular valve regurgitation. Herein, we present a successful case of common atrioventricular valve repair using a polytetrafluoroethylene bridging suture.A 6-year-old boy born with right isomerism, functional single right ventricle, common atrioventricular valve, pulmonary stenosis and left superior vena cava was palliated initially with right modified Blalock-Taussig shunt. This was followed by bilateral bidirectional cavopulmonary shunt and atrioventricular valve repair with annuloplasty and, pulmonary artery repair. Preoperative echocardiography showed moderate common atrioventricular valve regurgitation. He was electively taken into the operating room, where Fontan operation and common atrioventricular valve repair were performed. After redo median sternotomy cardiopulmonary bypass was initiated with ascending aorta and bicaval cannulation. A saline test demonstrated regurgitation from the center of the atrioventricular valve and indentation of the left atrioventricular valve. The indentation was closed with interrupted sutures. Annulus to annulus polytetrafluoroethylene bridging suture was performed between right and left atrioventricular valve. The length of the suture was adjusted using a Hegar dilator and saline tests. The suture was reinforced with polypropylene sutures. After conforming trivial regurgitation with saline test, concomitant Fontan surgery was performed. Postoperative echocardiography showed mild common atrioventricular regurgitation. He is currently well at home with a regular check-up in the out-atient clinic.

A-Ab5(m)-1 Reconstruction of Infective Graft in Aortic Root and Arch Replacement by using a Rifampicin-bonded Gelatin-seal Dacron Graft

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Objective: A 59-year-old man underwent aortic root and arch replacement for dilated Valsalva and ascending aortic aneurysm. He had sustained fever and computer tomography showed an infective graft finding on ten post-operative-day. An infective prosthesis was diagnosed.Methods: We re-open the chest and found large amount of pus surrounding the graft. First, we placed two feeding and drainage drains for continuous irrigation of mediastinum, then covered the graft by povidone-iodine soaked gauze and sealed the chest by surgical drape. Fourteen days later, reoperation was performed. Chest was open by removed the drape. Cardiopulmonary bypass was established via right femoral vein and the branch of the ascending graft. Under circulatory arrest of rectal temperature at 26C., infected graft and tissue were resected completely and aortic arch was reconstructed using a Rifampicin-soaked gelatin-sealed Dacron graft. After the distal anastomoses, lower body circulation was restarted via a graft sewn at main graft. Aortic root was reconstructed by the graft with a mechanical valve. Chest was covered by gauze and surgical drape. Three days later, an omentoplasty was done and chest was closed completely. Results: Post-operative course was uneventful. After 6 weeks of intravenous antibiotics injection, patient was discharged on foot.Conclusions: A Rifampicin-soaked gelatin-sealed Dacron graft seems to be useful for treating an infective prosthesis.

A-Ab5(m)-2 Tracheobronchial compression syndrome secondary to Tuberculosis associated mycotic aneurysm.

krystal dinh
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40m from Tibet presented to ED with sudden onset dyspnoea and severe chest pain. He also reports a year history of intermittent haemoptysis. On presentation, the patient's observations were stable. The patient was born and raised in Tibet, and reported having previously been treated for confirmed tuberculosis. On CTA, the patient was found to have a large saccular proximal descending thoracic aorta aneurysm measuring 5.0x5.0x5.0cm in size, with evidence of contained rupture. The mass was found to be causing significant external compression of the left main bronchus leading to significant effacement of the left main primary bronchi leading to extensive collapse in the left lung. The patient proceeded to open repair. An extended posterolateral thoracotomy was performed to allow pleural entry via the 5th intercostal space. The distal aortic arch was encroached and the saccular aneurysmal portion at the inferior aspect at the distal inner curvature appreciated. The patient was placed on CPB, via the CFA and CFV, and the patient was cooled to 20oc. Peri- aortic tissue was dissected free of the target site; the rLN was not observed however suspected medial to the dissection area. The saccular aneurysm was opened and old clot was evacuated and the area dissected to its neck at the inferior arch. Nil communication with the bronchus was evident. Remaining aorta appeared relatively normal. The edges of the aneurysm neck were fashioned towards health aorta and the resulting defect closed primarily with a single layer of bilaterally buttressed (bovine pericardial strips).

A-Ab5(m)-3 A case of Loeys-Dietz syndrome diagnosed with Stanford type A aortic dissection during medical treatment for COVID-19 pneumonia

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A 33-year-old woman with symptoms of fever and cough was diagnosed with COVID-19 pneumonia by a PCR test. A chest CT showed extensive inflammation in the left lung and revealed an aortic aneurysm in the aortic root, 89 mm in diameter. Echocardiography showed severe aortic regurgitation. SpO2 was 90% in room air, requiring a nasal high flow oxygen therapy, and the patient was hospitalized. Although physical characteristics of tall stature and scoliosis, history of the repaired cleft palate, and parental history of sudden death suspected Marfan-related disease such as Loeys-Dietz syndrome, the patient had not had a definitive genetic diagnosis. Due to severe pneumonia involving fibrosis, the surgical risk was expected too high. In accordance with the ASA statement for COVID-19, a surgery was scheduled eight weeks after the COVID-19 infection until the surgery could be performed safely. Then, the patient was discharged with home oxygen therapy. At a follow-up outpatient clinic, a contrast CT scan and transthoracic echocardiography showed Stanford type A aortic dissection. The RCC/LCC commissure had fallen off, and the flap was close to both coronary artery ostia. Therefore, an emergency Bentall procedure (24 mm artificial graft with a 23 mm mechanical valve) was performed on the same day, the 28th day after the onset of COVID-19. Intraoperative findings showed that the aortic dissection looked chronic despite the circumferential intimal defect in the ascending aorta. The postoperative course was uneventful, and the patient was discharged on 10 POD. Although it is rare for the COVID-19 patient with type A aortic dissection to allow to wait for surgery for a sufficient period, in the present case, we could wait until to decrease the risk of COVID-19 pneumonia and guarantee the safety of medical staff by careful management resulting in successful surgery.

A-Ab5(m)-4 Recovery from acute kidney injury after aortic arch repair poses a persistent threat to the follow-up kidney function

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Introduction:
The impact of recovery from acute kidney injury (AKI) after aortic arch surgery on renal and survival outcomes is not fully elucidated.
Patients and methods:
This retrospective study consisted of 214 patients who underwent aortic arch surgery requiring hypothermic circulatory arrest in our institution between 2007 and 2019. AKI and its recovery were defined based on serum creatinine level. The incidence of recovery from AKI was determined. Outcomes in kidney function were compared among patients with no AKI (Group N, n = 99), recovery from AKI (Group R, n = 93), and persistent AKI (Group P, n = 22).
Results:
There was no significant difference in preoperative kidney function among the three groups. One hundred fifteen patients (53.7%) developed AKI after the surgery, 93 (80.9%) of whom recovered from AKI at discharge. The 5-year cumulative mortality rate were 18.0%, 24.5%, and 68.4% in Group N, R, and P, respectively (P = 0.50, Group N vs. Group R; P < 0.001, Group R vs. Group P). The 5-year cumulative incidence of renal replacement therapy dependency were 0.0%, 5.4%, and 22.7%, respectively (P = .04, Group N vs. Group R; P = .01, Group R vs. Group P). Estimated glomerular filtration rate (mL/min/1.73 m^2, median [interquartile range]) two years after surgery was 65.2 (50.4-80.2), 54.3 (41.4-65.9), and 56.9 (40.2-67.5), respectively (P = .03, Group N vs. Group R; P = 0.97, Group R vs. Group P).
Conclusions:
Although most patients recovered from AKI after open thoracic aortic repair by the time of their discharge, the persistent impact of AKI recovery on kidney function was observed after discharge. A closer follow-up is prerequisite to stratifying patients at high risk for progression of kidney disease.

A-Ab5(m)-5 Alternative Access for Thoracoabdominal and Peripheral Endovascular Intervention: Literature Review

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IntroductionThe majority of thoracoabdominal and peripheral endovascular interventions are performed with access via the common femoral artery (CFA). Arteriovenous fistulas (AVF) for haemodialysis are not traditionally utilised as access for endovascular intervention.MethodsA narrative review was performed to determine the incidence of arteriovenous fistula puncture for endovascular intervention. Primary outcomes of interest were technical success, defined as uncomplicated revascularisation or devascularisation of target lesions; and adverse events including pain, bleeding, infection, and injury to the access site. Electronic searches were performed using three databases, PubMed, EMBASE, and Google Scholar, and keyword terms related to adverse events.ResultsTwo case studies met inclusion criteria for analysis, both describing patients with end-stage renal failure (ESRF) undergoing haemodialysis through a native AVF. The first case reported a 59-year-old male with a large descending thoracic artery aneurysm extending proximal to the origin of the left subclavian artery. Following a carotid-carotid-subclavian bypass to debranch the aorta, the patient underwent a thoracic aneurysm endovascular repair (TEVAR) procedure. Lastly, the left subclavian artery was occluded using an Amplatzer plug with access via a left radiocephalic AVF. Post-operative CT angiography demonstrated successful exclusion of the aneurysm and bypass patency.The first case reported a 69-year-old male with ischaemic rest pain affecting his right below-knee amputation (BKA) stump in the setting of severe bilateral iliofemoral atherosclerotic disease. The patient underwent a right iliac artery angioplasty procedure with access via a left brachiocephalic AVF. The patient had no symptoms post-operatively and there were no procedural complications reported. Primary and primary-assisted patency durations were 4 and 15 months respectively at 15 months follow-up. Both patients continued dialysis without issues.ConclusionArteriovenous fistula puncture is a conceivable alternative for patients with limited arterial access options. Further studies involving larger patient populations are required for efficacy and safety validation.

Miscellaneous Aortic Issues 2

March 27, 2022 13:20-14:00 / Track 2

A-Ab5(m)-6 Two cases of surgical treatment of complicated chylothorax after thoracic aortic surgery

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We report two cases of surgical treatment of complicated chylothorax after thoracic aortic surgery.Case 1) A 71-year-old man with acute type B dissection after conservative therapy was admitted to our hospital with a complaint of fever. He was diagnosed as an infected aortic arch aneurysm and underwent distal arch replacement and omental implantation repair. The patient developed chylothorax 7 days after surgery. In spite of conservative treatment, there was no effect on reduction in drainage. 21 days after surgery, the thoracic duct was ligated and the leak point was covered with the 4th intercostal muscle flap by video assisted thoracic surgery (VATS). A chyle leak was found just below the blood vessel prosthesis.The chylothorax completely disappeared, and the patient was discharged on the 38th postoperative day.Case 2) A 49-year-old man with a left chylothorax was transferred to our hospital one month after arch aortic replacement and descending aortic replacement for an aneurysm at another hospital. The patient underwent a fistula closure by VATS. The leak point was covered with the 7th intercostal muscle flap only, because is difficult to identify the thoracic duct. After the surgery, a chylothorax recurred and was healed with conservative therapy. He was discharged on the 40th postoperative day.

A-Ab5(m)-7 Surgical Treatment for Acute Pulmonary Thromboembolism: The Appropriate Choice of Therapeutic Strategy

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Background
Although favourable results of surgical treatment of acute pulmonary thromboembolism(APTE) have been reported in recent years, there is still no consensus on its treatment strategy in comparison with thrombolysis and catheterization. At our hospital, we choose aggressive surgical treatment (pulmonary artery embolectomy; PAE) for massive central or para-central APTE with respiratory and circulatory instability, and conservative treatment with pharmacotherapy alone for the others with stable hemodynamics.
Methods
31 patients with APTE who required hospitalization from April 2017 to October 2021 were entired in this study. Of the patients, 6 patients underwent surgical treatment (group S) and 25 patients underwent conservative medical treatments (group M). We assessed the clot burden using pulmonary thrombus index (PTI) calculated by contrast enhanced CT and severity evaluated by pulmonary embolism severity index (PESI) score.
Results
All patients in group S had extensive APTE. 4 patients had preoperative CPA, and 3 patients ECMO was introduced. All patients underwent emergency PAE with a midline sternal incision, and cardiac arrest, with intermittent circulatory arrest for peripheral lesions. In one patient, pulmonary artery endarterectomy for CTEPH was performed in addition to PAE.
All patients in group M were introduced anticoagulant drugs, and one patient had sub-massive APTE and was treated with thrombolytic therapy. No thrombectomy bia catheter was performed.
There were significant difference in PTI between Group S and Group M (84.7% vs 22.2%, p=0.0002) and PESI score (215 vs 82, p=0.0015). All in group S were discharged from the hospital with good health. There were no thrombotic exacerbations or bleeding complications in both groups. All 31 patients had no related death with APTE.
Summary
Both surgical and non-surgical treatment groups of APTE in our hospital were relatively satisfactory. We continue to appropriate diagnosis and surgical treatment for APTE.

A-Ab5(m)-8 Catastrophic complication immediately after standard endo-vascular aortic repair

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Retrograde type A dissection is a well-known lethal complication of thoracic endovascular aortic repair (TEVAR). However, we report that retrograde type A dissection occurred immediately after standard EVAR. An 88-year-old man presented with an abdominal aortic aneurysm with a maximum diameter of 54 mm. We performed elective EVAR. After surgery, emergency computed tomography (CT) was performed to investigate the cause of the anemia. The CT scan revealed a type A aortic dissection. Emergency ascending aortic replacement surgery was performed. In the postoperative course, the patient required temporary dialysis during hospitalization. He was discharged on the 62nd postoperative day. After EVAR, the patients did not have no symptoms such as chest or back pain. We were able to diagnose unexpected dissection by close examination of the anemia. If not found, there was a risk of sudden death. Retrograde type A dissection is an extremely rare complication after standard EVAR. However we should take this catastrophic complication into consideration to prevent sudden death.

A-Ab6(m)-1 Demographic features of acute type A aortic dissection in a mixed population of the Gulf region

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Background:Type A aortic dissection (TAAD) management underwent significant changes in the past two decades. The effect of patient demographics on TAAD presentation and outcomes has not been extensively studied worldwide. We investigate patient characteristics and their association with the above clinical features in a mixed population of the Gulf region.Methods:68 individuals were analysed presenting with TAAD at a single centre between 2015 and 2021. Data on patient characteristics, including regional origin and socioeconomic status, presenting symptoms, operative techniques, postoperative complications, and in-hospital mortality were collected, retrospectively. We used descriptive analysis on patient characteristics. Further comparison was undertaken between patients with low vs high socioeconomic status (SES), and a p-value <0.05 was considered statistically significant.Results:Among 68 TAAD patients, mean age at presentation measured 48.2 $\pm$ 15.6 years, 79.4% were males. A peak of 25 (36.7%) cases occurred in Spring, 16 (23.5%) in Winter, 12 (17.7%) in Summer, and 15 (22.1%) in Autumn ($p=0.03$). 75% of patients were non-Gulf nationals, of which 31.4% was originating from Western Asia/Levant, 25.5% from South-East Asia, and 23.5% from the Indian Subcontinent. Half of the patients were featured by low SES. In the low SES group, a lower rate of previously diagnosed connective tissue disease (0% vs 11.76%, $p=0.1$), higher rate of syncope on presentation (17.6% vs 2.9%, $p=0.1$), and a significant trend towards more complex aortic reconstruction (88.2% vs 67.6%, $p=0.08$) were discovered. Additionally, low SES was featured by longer ICU and hospital length of stay (Table 1). However, the rate of postoperative complications and in-hospital mortality were comparable between groups.Conclusion:We have identified significantly younger age at presentation in TAAD compared to Western data, with considerable seasonal variation in incidence. In addition, low SES was associated with a more extensive surgical procedure and delayed hospital stay.

Acute Type A Aortic Dissection 3

March 27, 2022 14:10-14:50 / Track 2

A-Ab6(m)-2 Surgical results of acute type A aortic dissection with neuropathy due to cerebral ischemia before surgery

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Purpose:
Surgical results for acute type A aortic dissection are becoming more stable year by year, but cases with brain damage still have a poor prognosis. We will investigate and report on acute type A aortic dissection with neurological symptoms due to cerebral ischemia.Patients and method:From January 2013 to August 2021, we performed 153 graft replacement for acute type A aortic dissection. Of these, 12 patients had neuropathy due to cerebral ischemia before surgery.
Result:
The average age was 68.9 years. There were 10 cases of preoperative paralysis. Of these, 8 cases had left hemiplegia and 2 cases had right hemiplegia. Eight patients had consciousness disorder, and of these, two patients had coma. Two cases required intubation before entering operating room. Preoperative images showed cerebral infarction in 5 cases. The median time from onset to the start of cerebral perfusion was 5 hours. We performed 7 hemiarch, 4 partial arch replacement, and a total arch replacement. No 30-day death or in-hospital death was observed.Three patients underwent decompression due to cerebral edema after surgery. One case whose preoperative imaging findings has no cerebral infarction recovered to a level where he could walk with a cane.Three patients' modified Rankin Scale at discharge was 3 or less, 7 cases were 4, and 2cases were 5.Of the 4 cases with no ischemic findings on preoperative imaging, 3 were able to be discharged with a modified Rankin Scale of 3 or less, but preoperative imaging showed ischemic findings. Of the 5 cases with ischemic findings, 4 had a modified Rankin Scale 4, and 1 had 5.
Conclusion:
The postoperative neurological prognosis is relatively good in cases with no cerebral infarction in preoperative image. But the treatment strategy for cases with cerebral infarction in preoperative image must be reconsidered.

A-Ab6(m)-3 Prognosis after medical therapy for acute type A aortic dissection

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OBJECTIVES: Basically, primary treatment option for Stanford type A acute aortic dissection (AAAD) is an emergency surgery to save life. However, limited patients were treated medically and prognosis of AAAD after medical therapy was examined.METHODS: Forty-six patients (age: 82.6 ± 11.0 years old, female: 31) who were treated medically after the diagnosis of AAAD were classified into three groups; 1) 8 patients who underwent CPR prior to hospital arrival were inoperable due to severe cerebral disorders (2) or severe cardiac dysfunction (6) (inoperable), 2) 11 patients whose contrast enhance CT revealed ascending aortic diameter <50mm and thrombosed false lumen <10mm were treated medically as no enlargement of false lumen was detected with CT follow-up, (thrombosed), 3) 27 patients refused surgical intervention despite definite indication of surgical therapy for mainly high age.RESULTS: In-hospital mortality was 39.1% (18/46) and 100% in inoperable, 0% in thrombosed and 38% in refusal. The cause of in-hospital mortalities in refusal were rupture in 4, cardiac tamponade in 5. The 1-year and 3-year survival rate of 28 hospital survivors were 80 ± 8% and 73 ± 10%. The causes of late death were malignancy in 3, sepsis in 1, aortic rupture in 1, pneumonia in 1, senility in 1, and unknown in 2. The freedom from aortic event was 93 ± 5% at 1 year and 3 years.CONCLUSIONS: Our decision would be justified for 100% death in inoperable and 0% mortality in thrombosed. In-hospital mortality of 40% after refusal of indication of surgical therapy was thought to be natural course of AAAD and long-term survival was acceptable. Based on these data, medical therapy for AAAD can be a choice of treatment in consideration with the patient's will.

Acute Type A Aortic Dissection 3

March 27, 2022 14:10-14:50 / Track 2

A-Ab6(m)-4 Hybrid Type II and Frozen Elephant Trunk in Acute Stanford Type A Aortic Dissections

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Introduction: Composite frozen elephant trunk is an increasingly popular solution for complex aortic pathologies. This review aims to compare outcomes of zone 0 type II hybrid (hybrid II) with the composite frozen elephant trunk (FET) technique in managing acute Stanford type A aortic dissections.**Methods:** PubMed and Embase were systematically searched using PRISMA protocol. 11 relevant studies describing the outcomes of hybrid II arch repair and FET techniques in patients with type A aortic dissection were included in the meta-analysis. The study focused on early post-operative 30-day outcomes analysing mortality, stroke, spinal cord injury, renal impairment requiring dialysis, bleeding and lung infection.**Results:** 1305 patients were included in the analysis - 343 receiving hybrid II repair and 962 treated with the FET. Meta-analysis of proportions showed Hybrid II was associated with less early mortality [5.0 (CI 3.1-7.8) vs 8.1 (CI 6.5-10.0) %], stroke [2.3 (CI 1.1-4.6) vs 7.0 (CI 5.5-8.8) %], spinal cord injury [2.0 (0.9-4.3) vs 3.8 (2.8-5.3) %], renal impairment requiring dialysis [7.9 (CI 5.5-11.2) vs 11.8 (CI 9.8-14.0) %], reoperation for bleeding [3.9 (1.8-8.4) vs 10.6 (8.1-13.8) %] and lung infection [14.8 (10.8-20.0) vs 20.7 (16.9-25.1) %].**Conclusion:** Hybrid II should be considered in favour of FET technique in acute Stanford Type A dissection patients who are at higher risk due to age and comorbidities.

A-Ab6(m)-5 Our examination of total arch replacement in acute aortic dissection with open stent graft insertion

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Since the availability of commercial based open stent grafts, we used open stent grafts on the distal side during total arch replacement for DeBakey type I acute aortic dissection, which has residual dissection on the distal side. We examined our surgical results for the technique inserting the open stent graft.The subjects were 177 patients with acute aortic dissection of type A who underwent surgery from January 2014 to December 2019. First, we divided 44 patients who underwent total arch replacement and 133 patients who considered ascending or partial arch replacement. And we compared these patients about their patient background and surgical results. Significant differences were found in the gender ratio, age and smoking history, preoperative shock status, and the presence or absence of preoperative consciousness disorder. Postoperative results showed that total arch replacement was longer operation time, but there was no significant difference between 30-day death (9.1%: 5.3%) and the presence or absence of paraplegia (0%: 1.5%). Furthermore, we examined the two subgroup of the total arch replacement, 28 patients with an opens stent graft and 16 patients without an open stent graft. There was no significant difference in preoperative factors and there was no significant difference in intraoperative surgery time. No paraplegia was observed in either group, and 30-day deaths were 10.1% and 6.3%, showing no statistically significant difference.There was no paraplegia due to the insertion of the open stent graft, and we believe that there is no problem with our surgical policy. Further studies are needed for the occurrence of paraplegia due to the insertion of an open stent graft. In addition, this time, we did not report the results in the remote period by inserting an open stent graft. We think that further study is necessary for late survival and reoperation.

Acute Type A Aortic Dissection 3

March 27, 2022 14:10-14:50 / Track 2

A-Ab6(m)-6 Surgical experience of one-stage hybrid aortic repair using frozen elephant trunk technique for Kommerell diverticulum and aberrant subclavian artery

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Background: Kommerell diverticulum is often associated with aberrant subclavian artery (SCA) and may require surgical repair due to its own aneurysmal change or compressive symptom of adjacent structures. In such complicated situation, various surgical approaches and techniques have been reported, but optimal surgical treatment is yet to be established.Patients: From April 2020 to October 2021, three patients underwent surgical repair of aneurysmal change of Kommerell diverticulum and aberrant subclavian artery at our hospitals.All patients received one stage hybrid repair consisting of total arch replacement, arch branch reconstruction and frozen elephant trunk technique (FET) for sealing the diverticulum through only a median sternotomy. Patient No.1 was a 70-year-old woman with a right aortic arch and an aberrant left SCA, and had dysphagia due to esophageal compression by the diverticulum. Patient No.2 was a 28-year-old woman with marfan syndrome who had a left-sided aortic arch and had an aberrant right SCA and annuloaortic ectasia, and she underwent valve sparing root replacement as well as hybrid arch repair. Patient No.3 was a 75-year-old man with a right aortic arch and an aberrant left SCA.Results: No mortality was observed, and also there are no stroke and spinal cord injury. Hoarseness developed only in patient No.3 with the right-sided aortic arch. All patients were discharged home in an average of 25 days after surgery. In patient No. 2, additional thoracic endovascular aortic repair was performed one month after the hybrid arch repair due to the kinking of the FET, which was resolved by this endovascular treatment.Conclusion: One-stage hybrid aortic repair using FET for the patients with Kommerell diverticulum and aberrant SCA were successfully performed through only a median sternotomy. This technique may be a new surgical option for such patients.

A-Ab6(m)-7 Standardization of Total aortic arch replacement with Frozen elephant trunk: Comparison of surgical outcomes between attending surgeons and trainees

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Background: In total aortic arch replacement (TAR) for the distal aortic arch aneurysm, the distal anastomosis is difficult, and time is consuming. In addition, recurrent laryngeal nerve palsy or respiratory complications sometimes develops.The use of Frozen elephant trunk (FET) makes distal anastomosis ease and reduce complications. The purpose of this study is to determine whether TAR+FET could be safely performed even by young surgeons.**Methods:**From April 2018 to September 2021, 19 of 50 patients with TAR underwent elective isolated TAR+FET. 6 cases (Group T) were performed by trainees (postgraduate years 11years or less). Other 13 cases (group A) performed by attending surgeons (more than 20 years). We compared surgical outcome with both groups.**Results:**One case in Group T was subacute type B dissection, the other 18cases were true aneurysms. There were no significant differences between groups in operative time, cardiopulmonary bypass time, aortic cross-clamp time, circulatory arrest time, and bleeding volume. The length of ICU stay and postoperative hospital stay are also similar. One case had a paraparesis, and one case had a mediastinitis were observed in Group A. Minor recurrent laryngeal nerve palsy was observed in 2 cases in Group A. Postoperative atrial fibrillation was observed in 5 cases (3 in Group A vs 2 in Group T). No respiratory complications requiring mechanical ventilation were found.**Conclusions:**The surgical outcome of trainee was not inferior. Standardization of TAR+FET made surgical repair for distal aortic arch aneurysms safe and ease.

A-Ab6(m)-8 Frozen elephant trunk for the patients with aortic dissection -Experience of use in our hospital-

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<Objective>A Frozen elephant trunk (FET) may be useful in total arch replacement (TAR) for acute aortic dissection. We report our experience of use in our hospital.<Patients and Method>From April 2012 to April 2021, 136 patients with acute type A aortic dissection were operated in our department. Eighty-five patients were underwent hemiarch replacement, 9 were semiarch replacement, and 42 were TAR. Among patients with TAR, 37patients was used FET. A mean age of the patients is 57.4 (34-92) and 31 patients were male. There were 3 patients with retrograde type A dissection and a patient with acute type B dissection with aortic arch aneurysm at proximal side of the dissection. Translocate TAR was underwent in 13patients. The concomitant procedures were 3 CABG, 4 aortic root operation and 3 aortic valve surgery.<Result>The operation time, cardiopulmonary bypass time, and deep hypothermia cardiac arrest time were 363 ± 45min, 228 ± 39 min, 61 ± 4min respectively. Distal anastomosis were at zone 3 (n=24), at zone 2 (n=4), at zone1 (n=8) and at zone0 (n=1). The sizes of FET were 21mm (n=9), 23mm (n=11), 25mm (n=12), 27mm (n=3), 29mm (n=1) and 31mm (n=1) and the length of FET were 60mm (n=29), 90mm (n=7), 120mm (n=1). In-hospital death were 3 (8.1%), because of a coronary malperfusion and 2 central nervous diseases. There are 2 cases of new onset permanent neurological deficit (5.4%) and a case of paraplegia (2.7%). There are 2 cases of stentgraft-induced new entry. Two patients needed additional distal intervention; a rupture of residual dissection 8months after primary operation and an aortobronchealpulmonary fistula. Aortic remodeling were progressing until FET in 11 patients, while over FET in 26patients(70.3%).<Comment>The FET was useful in TAR for the aortic dissection in terms of aortic remodeling , however there were some postoperative problems particular to FET.

A-Ab7-1 Utility of Abdominal Aortic Duplex in the Management of Visceral Malperfusion in Acute Type-A Aortic Dissection

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PURPOSETimely intervention of visceral malperfusion significantly improves immediate post-operative outcomes in acute type-A aortic dissection (ATAAD). We assess the feasibility of on-table abdominal aortic duplex scan, pre and post ATAAD repair to identify persistent organ malperfusion and predict the need for early or delayed intervention.METHODSThe most commonly used diagnostic modalities are intraoperative angiogram and diagnostic laparoscopy or post operative CT angiogram. These modalities have limitations of access, invasiveness and contrast injury. Intraoperative abdominal ultrasound was performed on ATAAD patients with high suspicion of visceral malperfusion, pre and post-ascending aortic dissection repair. Initial exam was obtained during anesthesia induction and the conclusion study as soon as the chest was closed. The abdominal aorta and the four major visceral vessels and both kidneys were assessed with B mode ultrasound and spectral doppler flows.RESULTSTotal of 7 consecutive patients were scanned. We successfully assessed for static and dynamic malperfusion of visceral vessels and organ perfusion in real time in all patients. Three patients had either left or right renal artery obstruction with loss of renal echo-density. In one patient the dissection was found to be extending into the SMA with no flow limitations. Post ascending aortic repair 3 patients showed improved blood flow in renal arteries despite persistence of dissection flap. None of the patients required acute intervention for visceral malperfusion.CONCLUSIONIntraoperative abdominal duplex can provide time sensitive information, regarding the aortic dissection flap, the nature of visceral artery obstruction and perfusion of the organs. Routine use of on-table abdominal duplex may prove to be an economical and useful non-invasive tool to expedite the diagnosis of acute malperfusion syndrome and the need for revascularization especially in centres not equipped with hybrid lab facilities.KEYWORDS- Aortic dissection, malperfusion, abdominal duplex

A-Ab7-2 Searching the optimal strategy for coronary malperfusion in type A aortic dissection

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ObjectiveCoronary malperfusion is a life-threatening complication of type A acute aortic dissection (AAAD). Because of the time-sensitive nature of myocardial ischemia, difficult clinical scenario such as early coronary reperfusion prior to central aortic repair should be sometimes considered. However, the optimal case scenario for which we have to consider emergency PCI has not been well known. For the optimal patient's selection, this study assessed an effective strategy for coronary malperfusion.
Methods
Fifty-seven patients (72 ± 13 year-old, 30 males) in last 23 years who underwent emergency surgery for AAAD complicated with coronary malperfusion were retrospectively reviewed. Seventeen patients were directly transferred, and 40 were via referral hospitals. The presentations on arrival were shock in 36 (63%) and with cardiac tamponade in 8 (14%). On ECG, the culprit of left coronary artery was suspected in 28. CAG prior to central operation for AAAD were carried out in 16, and 5 patients underwent successful PCI simultaneously.
Results
Flow of patients and mortality in relation with referral and CAG/PCI are shown in Table. In-hospital mortality was 39% (20/57). In univariable analysis, the culprit of left coronary, shock, and the postoperative maximum of CKMB ≥180mg/dL were risk factors for in-hospital mortality. In subgroup analysis for 49 patients without cardiac tamponade, diagnostic CAG without simultaneous PCI was also a risk factor for in-hospital mortality (p=0.05).
Conclusions
Preoperative PCI might contribute to survival. In contrast, time-consuming only diagnostic CAG without coronary reperfusion was a risk factor for in-hospital mortality. In hemodynamically stable patients with suspected culprit of left coronary, CAG and completion of PCI might be desirable.

A-Ab7-3 Surgical outcomes of acute type-A aortic dissection complicated with malperfusion syndrome.

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Introduction: To elucidate whether timing of operation might be one of the most important factors for surgical outcomes of acute type A aortic dissection (AADA), we analyzed our experience managing AADA complicated by malperfusion syndrome (MPS).Method: Between Aug 2003 and Nov 2021, 400 patients with AADA were treated surgically, including 125 (31.2%) presented with MPS. The mean age of the patient was 70.6 (range 23-93) and female was 212(53.0%). Prevalence of MPS of brain, coronary, kidney, intestine, and extremities were 60.8% (76/125), 10.4 % (13/125), 16.0 % (20/125), 6.4% (8/125), and 32.0% (40/125), respectively. 125 patients (31.3 %) received total arch replacement, and 275 patients (68.7 %) received hemiarch replacement. In the patients with MPS, 85 patients had immediate aortic repair. To analyze the effect of immediate aortic repair (within 5 hours from onset) and MPS on surgical outcomes, we compared the immediate repair group (Group I) with the late repair group (Group L).Results: The 30-days mortality rate was significantly higher in patients with MPS (2.9% vs. 15.2%, $p<0.001$). Cumulative survival rate in 5-years was significantly lower in patients with MPS (80.9% vs 67.7%, $p=0.006$). Multivariate analysis suggested preoperative shock and malperfusion were independent risk factors of 30-days mortality. In patients with MPS, immediate aortic repair did not improve early mortality (Group I 15.3 % vs. Group L 15.0 %, $p=0.96$). On the other hand, immediate aortic repair improved late survival (Cumulative survival rate in 5-years was 75.8% in the Group I and 51.3% in the Group L, $p = 0.01$).Conclusion: Malperfusion syndrome was an independent risk factor for aortic repairs of acute type-A aortic dissection. Time from onset to operation was not directly related to better short-outcomes, but it was related to long-term outcomes in this patient cohort.

Acute Type A Aortic Dissection 4

March 27, 2022 15:00-15:50 / Track 2

A-Ab7-4 Clinical outcomes after optimal medical treatment for acute type A aortic dissection with thrombosed false lumen

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[Objectives]
Therapeutic strategy for acute type A aortic dissection with thrombosed false lumen (AAAD with T-FL), better known as intramural hematoma (IMH), still remains controversial. The clinical outcomes of patients with AAAD with T-FL who initially received optimal medical treatment (OMT) were evaluated.
[Methods]
Twenty-eight consecutive patients (77 ± 14 years, 11 male) who initially received OMT for AAAD with T-FL between September 2016 and October 2021 were retrospectively reviewed. As the basic institutional policy for AAAD was "false lumen oriented" replacement of ascending aorta to arch, OMT was limitedly indicated in patients who were hemodynamically stable without complications (i.e., cardiac tamponade, shock, malperfusion) and dissection pathology was as mild with ascending diameter < 50 mm and T-FL thickness ≤ 10 mm.
[Results]
The ascending diameter and T-FL thickness was 42 ± 6 mm and 7 ± 3 mm at admission. Ulcer like projection (ULP) lesion, limited false lumen patency, was detected by contrast enhanced CT in 16 patients (7 in ascending aorta and 9 in aortic arch or descending aorta) and new ULP lesions appeared in the follow-up CT in 4 patients (2 in ascending aorta and 2 in aortic arch or descending aorta). One patient (3.6%) who rejected surgery died due to rupture and 14 patients (50.0%) required emergency or urgent surgery (total/partial arch replacement in 8 and TEVAR in 5) during OMT because of progression to patent false lumen, enlargement of T-FL or ULP, but no operative mortality was observed. Uni-variate analysis showed that existence or appearance of ULP lesion was a significant risk factor of surgical conversion during OMT ($p = 0.020$).
[Conclusions]
In patients with AAAD with T-FL medically managed first, early surgery could be performed safely when appearance of patency of FL including ULP or FL enlargement was detected.

Thoracic aorta 4

March 27, 2022 9:00-10:00 / Track 3

A-Ab8(m)-1 Successful ascending aorta replacement using intermittent pressure-augmented retrograde cerebral perfusion (IPA-RCP) for acute aortic dissection type A coexistent brain infarction

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Objective: Surgical treatment of acute aortic dissection type A (AAD-A) coexistent dissected aortic arch vessels is associated with higher peri- and postoperative mortality and morbidity. Clinical effectiveness of intermittent pressure-augmented retrograde cerebral perfusion (IPA-RCP) for brain protection has been reported in previous studies. We report a woman with AAD-A coexistent dissected brachiocephalic trunk, brain infarction, and chronic aortic dissection Type B treated successfully with surgical treatment using IPA-RCP.METHODS (IPA-RCP protocol): Body temperature was cooled down to 18 degree centigrade. Open distal anastomosis using open stentgraft was performed with IPA-RCP. The oxygenated blood was perfused through SVC cannula at base line pressure of 15mmHg. The pressure augmented at 45 mmHg was attempted and was then lowered. The duration of the augmentation was 30 seconds.Case presentation: A 87-year-old woman was referred to our hospital for brain infarction. MRI revealed right brain infarction. CT scan revealed the brachiocephalic trunk was dissected and AAD-A and chronic aortic dissection Type B. Therefore, we decided to perform ascending aorta replacement under IPA-RCP in order to avoid aortic arch vessels' cannulations.RESULTS: Circulatory arrest time was 43 min. IPA-RCP time was 39 min. The clinical data were shown as time to regain consciousness, 12 hours; mechanical ventilation time, 37 hours. She could speak articulately and transferred to a rehabilitation hospital in a wheelchair on 22nd post- operative day.CONCLUSIONS: IPA-RCP was effective and safe for brain protection of AAD-A surgical treatment in a patient who even if had dissected aortic arch vessels and brain infarction.

Thoracic aorta 4

March 27, 2022 9:00-10:00 / Track 3

A-Ab8(m)-2 One stage hybrid total aortic arch repair for extended aortic arch and descending thoracic aortic disease

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Background: Various surgical procedures, including 2 stage surgery with open surgery via sternotomy and thoracotomy, frozen elephant trunk, hybrid aortic repair, total endovascular repair, have been devised for extended total aortic arch and descending thoracic aortic disease. We recently implemented a hybrid total aortic arch and descending thoracic aortic repair (HAR) as endovascular therapy to reduce postoperative complications. In this study, we assessed whether HAR could be a less invasive and more secure alternative to other procedures. Methods: HAR consisted of three procedures: replacement of the aorta (Type I, preserved aorta; Type II, ascending aorta and partial aortic arch replacement; and Type III, total arch replacement), debranching of all arch vessels, and thoracic endovascular aortic repair (TEVAR) from Zone 0 to the descending aorta under off-pump conditions in one stage. From 2007 to 2021, 185 patients underwent aortic arch surgery at our institution. Of them, 66 patients with extended aortic arch disease underwent HAR. We investigated the outcomes of HAR. Results. Type I, Type II, and Type III HAR procedures were performed in 6, 58, and 2 patients, respectively. The median follow-up period was 36 months. In HAR, the operative mortality, in-hospital mortality, and postoperative permanent neurological deficit were null. The mean height of the distal end of the stent grafts was located at Th8.6 (Th7 to 11), and the paraplegia rate was 1.5%. One of the six patients who underwent Type I HAR had aortic dissection, and the ascending aorta was replaced. Endoleak was observed in 8 patients (Type I: 1, Type II: 6, Type III: 1). Additional TEVAR was performed in 2 patients for Type I and Type III endoleak and dilating residual descending aortic aneurysm. Conclusions: HAR can treat extended aortic arch disease without thoracotomy and provides acceptable early and mid-term outcomes with a low reintervention rate.

A-Ab8(m)-3 Open surgery for thoracoabdominal aortic aneurysm with the deep hypothermic circulatory arrest at our institution

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(Background)Recently, although stent grafting has become one of the choices of treatment for thoracoabdominal aortic aneurysms (TAAA), it's no doubt that open surgery is mainstream. Open surgery is still challenging for TAAA.At our institution, we adopt a deep hypothermic circulatory arrest (DHCA) for thoracoabdominal aortic grafting diligently and believe DHCA has various advantages including superiority in spinal cord protection. In this report, we describe our strategy of surgery for TAAA including DHCA and results.(Methods)Between March 2019 and October 2021, six patients who underwent open surgery for thoracoabdominal aortic aneurysms at our hospital were evaluated.The mean age was 51" ± "17, male: female ratio was 1:5, hypertension was 3, diabetes mellitus was 0, chronic renal dysfunction was 1, and dialysis patients were 0. The preoperative status was a true aneurysm in 1 case and dissecting aneurysm in 5 cases.(Results)Four patients underwent surgery with partial abdominal reconstruction and two patients without reconstruction. The mean operative time was 587" ± "79 min, the mean cardiopulmonary time was 254" ± "40 min, and the mean circulatory arrest time was 69" ± "61 min. The mean intraoperative minimum body temperature was 19.1" ± "4" ° "C. Postoperatively, there were no in-hospital deaths, no strokes, and no cases of spinal cord ischemia. The mean ICU stay was 6.8" ± "1.4 days, the mean hospital stay was 27" ± "11 days, and the mean intubation time was 2.3" ± "1.6 days.(Discussion)The results of open surgery for thoracoabdominal aortic aneurysm using the deep hypothermic circulatory arrest method at our hospital were acceptable. The majority of cases were dissecting aneurysms, but there were no cases of spinal cord injury.

Thoracic aorta 4

March 27, 2022 9:00-10:00 / Track 3

A-Ab8(m)-4 Straight incision with rib-cross (SIRC) approach for extended thoracic aortic aneurysm

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(Introduction) Surgery for extended thoracic/thoracoabdominal aortic aneurysm is still challenging. We have adopted SIRC approach for extended aneurysm of thoracic aorta to thoracoabdominal aorta that need left thoracotomy.(Methods/Patients) Chest cavity and/or retroperitoneal space is opened through skin incision from axilla to the left umbilical lesion. The chest cavity is opened through the 6th intercostal space and exposed along the straight skin incision combined with transection of the 5th and 6th rib. The diaphragma is incised circumferentially and the abdominal aorta is exposed thorough retroperitoneal space. In cases those need entire thoracic aortic grafting or Crawford type 1, 2 thoracoabdominal aorta grafting, we usually perform surgery under deep hypocermic circulatory arrest (DHCA). From April 2019 to June 2021, 11 patients underwent surgery for thoracic/thoracoabdominal aortic aneurysm. Among them, we adopted SIRC approach for 6 patients.(Result) There was 3 cases of Marfan syndrome, 1 case of Loeys-Dietz syndrome. Crawford type was type1 : 2 cases, type2 : 3 cases, type3 : 1 case. We performed surgery under DHCA for 5 cases. There was neither operative death, spinal cord injury nor cerebral infarction.(Conclusion) SIRC approach is safe and effective for surgery for thoracic/thoracoabdominal aortic aneurysm.

A-Ab8(m)-5 Total Endovascular versus Hybrid Repair for the Treatment of Thoracoabdominal Aortic Aneurysms: A Systematic Review and Meta-Analysis

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Introduction
Open repair remains the gold standard therapy for thoracoabdominal aortic aneurysms (TAAAs). Recently, techniques such as total endovascular repair (TER) and hybrid repair (HR) have gained in popularity. Thus, we aimed to compare the primary outcomes of in-hospital/30-day mortality, as well as secondary outcomes of spinal cord ischaemia (SCI), acute myocardial infarction (AMI), pulmonary, need for renal replacement therapy (RRT), bowel ischemia and lower limb ischemia between TER vs. HR for treatment of TAAAs.
Hypothesis
TER was associated with lower in-hospital/30-day mortality and postoperative complication rates, as compared to HR.
Methods
Four scientific databases were searched from inception to November 19, 2021. Random effects meta-analysis was performed. Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines were adhered to.
Results
Our search yielded 3312 articles. After a two-stage selection process, six articles were included for final analysis. The in-hospital/30-day mortality rate for TER was significantly lower compared to HR (4.2% vs. 10.2%, OR 0.34, 95% CI 0.22 - 0.54). TER was also associated with reduced pulmonary complications (9.2% vs. 26.7%, OR 0.27, 95% CI 0.09 - 0.81), bowel ischemia (3.0% vs. 12.2%, OR 0.22, 95% CI 0.14 - 0.35) and need for RRT (8.3% vs. 26.7%, OR 0.22, 95% CI 0.16 - 0.29). There was however no difference in the incidence of spinal cord ischaemia (8.0% vs. 5.7%, OR 1.38, 95% CI 0.84 - 2.27), lower limb ischaemia (5.7% vs. 9.2%, OR 0.67, 95% CI 0.29 - 1.55) and AMI (3.1% vs. 3.7%, OR 0.60, 95% CI 0.17 -2.05) between TER and HR. Most study outcomes had low heterogeneity. Findings were robust to sensitivity analyses in the form of leave-one-out analyses.
Conclusions: TER of TAAAs were associated with lower in-hospital/30-day mortality, pulmonary complications, bowel ischaemia and need for renal replacement therapy, as compared to HR.

Thoracic aorta 4

March 27, 2022 9:00-10:00 / Track 3

A-Ab8(m)-6 Outcomes of Abdominal aortic aneurysm repair in patients aged over 85 years old with complications of sarcopenia

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Introduction: We examined the complication rate of abdominal aortic aneurysm repair in patients aged over 85 with sarcopenia.

Subjects and method: The subjects were 39 patients aged over 85 years old with abdominal aortic aneurysms who underwent elective surgery from 2004 to 2021 (25 males, 14 females). Regarding the sarcopenia index, the value of the total muscle cross-sectional area (mm^2) of the bilateral psoas major muscles divided by the square of the height (m^2) (psoas muscle mass index [PMI]) was used. The sarcopenia group was defined as individuals with a PMI of <600 mm^2/m^2. We examined the length of hospital stay as well as long-term results in the sarcopenia group (SG) and normal group (NG).

Results: The mean PMI for all patients aged over 85 years old was 588.5 ± 141.0 mm^2/m^2. No deaths occurred during hospitalization. There were 21 cases in the SG (6 cases of open surgery, 15 cases of EVAR) and 18 in the NG (3 cases of open surgery, 15 cases of EVAR). The hospitalization period was EVAR: NG: 4.2 ± 1.6 days, SG: 6.3 ± 3.1 days P <0.05 and Open surgery : NG: 13.7 ± 6.4 days, SG: 22.5 ± 13.5 days, P <0.05. We examined 39 cases in which we were able to conduct follow-up (mean follow-up period: 34.9 months). During follow-up, 10 cases of remote death were found. No significant differences were found between the two groups using the Kaplan-Meier method, in terms of the 3-year survival rate (SG: 71.4%, NG: 80.9%).

Discussion: Treatment of abdominal aortic aneurysms in patients with sarcopenia only led to an extended hospital stay. Furthermore, acceptable long-term results of abdominal aortic repair were deemed expectable in patients aged over 85 years, even among those with sarcopenia.

A-Ab8(m)-7 Two-stage Technique of Aorto-bi-iliac Stent-graft Implantation Performed in a Patient with an Abdominal Aortic Aneurysm and Iliac Artery Occlusion

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Introduction:We present a novel technique of aorto-bi-iliac stent-graft implantation (ABIS) following endovascular treatment (EVT) that we performed in a patient with an abdominal aortic aneurysm (AAA) and long-segment iliac artery occlusion.Case:A 76-year-old man was referred to our department for AAA with left common iliac artery (CIA) occlusion treatment. Considering the substantial risk of perioperative complications with open surgery, we decided to perform a two-stage procedure of ABIS implantation following EVT to open the left CIA. The main body of the ABIS (Zenith Alpha) was deployed via right open femoral access with an ipsilateral iliac extension (Zenigh Alpha, ZISL limb), and extensions were added to the right iliac limb (Viabahn VBX and Luminexx). No complications occurred during ABIS deployment. Angiography performed after ballooning revealed no endoleak, and CT revealed no endoleak and good patency. He was discharged from our hospital 13 days postoperatively.Discussion:He was not eligible for open surgery using a bifurcated graft because he had multiple comorbidities. We used a Zenith Alpha stent-graft with a short main body because the site of deployment in the contralateral leg had to be more proximal than the proximal site of confluence of the arteries that underwent EVT. If we had used a posterior approach, the proximal confluence of the arteries that underwent EVT might have been proximal to the normal site of the termination of the aorta. The left CIA thrombus can become unstable immediately after EVT, leading to distal embolization. However, since a two-stage procedure was used, distal embolization did not occur in this case. Therefore, a two-stage procedure is considered safer than a one-stage procedure.Conclusion:In patients with an AAA and long-segment iliac artery occlusion, ABIS implantation after EVT should be considered for opening the left CIA.

Thoracic aorta 4

March 27, 2022 9:00-10:00 / Track 3

A-Ab8(m)-8 Mid-term outcome of endovascular repair for aorto-iliac aneurysm with the Gore Excluder iliac branch endoprothesis; multi center study

Yasuko Gotake[1)], Hiroaki Takahashi[1)], Jiro Matsuo[1)], Takaki Sugimoto[1)], Kensuke Uotani[2)], Taro Hayashi[3)], Masato Yamaguchi[4)], Kenji Okada[5)]

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Objective: The Excluder iliac branch endoprothesis (IBE) is designed to exclude a common iliac artery aneurysm (CIAA), preserving internal iliac artery during endovascular aortic repair (EVAR). The objective of this study was to assess outcomes of technique with IBE in aortoiliac aneurysm repair.Methods: We retrospectively evaluated 52 patients (42 men, mean age:76.3 ± 7.7 years old) treated with Gore Excluder IBE between September 2017 and September 2021 in three cardiovascular surgery departments. Indications included unilateral or bilateral common iliac artery aneurysms combined with abdominal aneurysms. Follow-up data and morphological follow-up assessment was evaluated by clinical assessment and by computed tomography (CT), respectively. Buttock claudication after IBE device implantation was clinically evaluated by comparing with patients treated with EVAR concomitantly with embolization of internal iliac artery (210 patients, mean age: 77.2 ± 7.6 years old).Results: Technical success was achieved in all patients treated with IBE. Fourty-five (86.5%) and 7 (13.5%) patients underwent unilateral and bilateral IBE, respectively. Preoperative CT showed mean CIAA diameter was 35.7 ± 11.1mm. Intra-operative type III endoleaks were observed in 10 patients (19%), but postoperative CT showed no type III endoleak within 1 months after EVAR. After a mean follow-up of 22.5 months, internal iliac limb occlusions occurred in 3 patients (5%). Internal iliac limb patency was 93% at 12 and 36months. Freedom from reintervension rate was 92% at 1year and 83% at 3years. Buttock claudication and colonic ischemia was not exhibited in patients treated with IBE, however, those occurred in 59 patients (28%) of the group of EVAR concomitantly with embolization of internal iliac arteryConclusions: Gore Excluder IBE was implanted safety and effectively with no occurrence of postoperative buttock claudication.

A-Ab8(m)-9 Strategies for prevention of paraplegia in thoracoabdominal aortic aneurysm repair

Go Kuwahara, Hideichi Wada, Hitoshi Matsumura, Yoshio Hayashida, Hiromitsu Teratani, Masayuki Shimizu, Mitsuru Fujii, Yuichi Morita, Yuki Kunitomo, Michihiro Noma

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Thoracoabdominal aortic aneurysm(TAAA) repair has been regarded as one of the most invasive procedures in cardiovascular surgery. Although outcomes from experienced centers have improved markedly in recent years, ischemic spinal cord injury remains a devastating complication after TAAA repair. Our strategies for prevention of paraplegia are as follows; 1. CSF drainage, 2. Distal aortic perfusion, 3. MEP monitoring, 4. Maintenance of mean blood pressure more than 80mmHg, 5. Reconstruction of intercostal artery, 6. Hemostasis using LigaSure vessel sealing system. The purpose of this study was to evaluate the effectiveness of adjuncts currently used in TAAA repair. This is a single-center retrospective study of 40 patients undergoing TAAA repair at our institution from 2012 to 2021. There were 27 (67%) males, and the average age was 67 ± 10. Indication was aneurysm (55%) and dissection (45%). Marfan syndrome was found in 3 patients. There were 4 patients with a type I TAAA, 17 with a type II, 11 with a type III, and 8 with a type IV. There were 2 hospital deaths (5%), of which one was NOMI and another one was cardiac death due to acute mitral regurgitation. Spinal cord injury occurred in 2 patients (5%). Two patients (5%) suffered cerebral infarction. Two patients (5%) had renal failure, but none of the patient was needed permanent hemodialysis.Overall survival rate at 1, 3, and 7 years were 92.4%, 89%, and 70.7%, respectively. Results of TAAA repair at our institution was acceptable compared with recent report of meta-analysis. In this study, no method has been universally effective in prevention of paraplegia. While no single method has been able to eliminate or even significantly reduce the incidence of spinal cord ischemia during TAAA repair, a multimodal approach may be pursued.

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A-Ab8(m)-10 Endovascular Repair of subclavian artery dissection Involving the right Vertebral Artery after Carotid-vertebral artery bypass

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We report a 72-year-old man who had endovascular repair of right subclavian artery dissection involving the right vertebral artery after carotid-vertebral artery bypass with saphenous vein graft was performed. Two months ago, single-vessel debranching thoracic endovascular aortic repair was performed for ruptured type B aortic dissection. Intraoperatively, right subclavian artery dissection was occurred and observed because of preservation of blood flow. One month later, aneurysm of the origin of dissected right subclavian artery appeared. Enhanced computed tomography revealed left vertebral artery was hypoplastic, so right vertebral artery was needed to preserved. As a two-stage surgery, carotid-vertebral artery bypass with saphenous vein graft was performed. With help from brain surgeons, right common carotid artery and vertebral artery were exposed. The vertebral vein was incised and then anastomosed with the saphenous vein graft in a side-to-end fashion. Then the other side of the saphenous vein graft was anastomosed to the common carotid artery in the same manner. Intraoperatively, patency and route of the graft was confirmed by means of enhanced computed tomography, then proximal part of the vertebral artery was clipped. 5 days later, endovascular repair of right subclavian artery was performed using a leg of stent graft. Endoleak was not revealed. After a year, his postoperative process is going well.

A-Ab8(m)-11 Early and mid-term outcomes of open surgery after thoracic endovascular aortic repair

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Cardiovascular Surgery, National Cerebral and Cardiovascular Surgery

OBJECTIVES: This study evaluated the early and mid-term outcomes of open surgery after thoracic endovascular aortic repair (TEVAR).METHODS: Retrospective review of 36 patients (Age: 71.7 ± 11.9 years old, Male: 23(63.9%)) who underwent open surgery after TEVAR was conducted. Primary indications of TEVAR were aneurysm in 19, acute type B aortic dissection in 10, chronic aortic dissection in 5 and pseudoaneurysm in 2. Indication of open surgeries were aneurysm of downstream aorta in 15, endoleak in 12 (type Ia : 4, Ib : 4, II : 2, III : 2), graft infection in 6, retrograde type A aortic dissection in 3. The interval from TEVAR to open surgery was 3.2 ± 2.0 years and 4 of them were emergencies.RESULTS: Open surgery was carried out for arch in 5, descending aorta in 15, and thoracoabdominal aorta in 16 (Extension I: 2, III: 7, IV: 7). Removal of stentgraft was whole in 6 (16.7%), partial in 6 (16.7%) and none in 24 (66.6%). One (2.8%) 30-days mortality was encountered due to sepsis after thoracoabdominal aortic replacement for stentgraft infection. During the follow-up period (2.2 ± 1.9 years), The 3-year survival rate was 53.1 ± 11.7%. Freedom from reintervention was 80.4 ± 10.4%. Re-interventions were descending replacement for type Ib endoleak of preserved stentgraft (n=2), TEVAR (n=1), abdominal aortic replacement (n=1), pseudoaneurysm of anastomotic site (n=1), intercostal artery ligation for type II endoleak (n=1). No aorta-related death has been encountered.CONCLUSIONS: Early and mid-term outcomes of open surgical procedures after TEVAR were acceptable. However, even after re-intervention is still critical.

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A-Ab8(m)-12 Long Term Results of Late Open Conversion after Thoracic Endovascular Aortic Repair by Etiology

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[Purpose]Recently, the complications related with TEVAR for thoracic aortic aneurysms(TAA) and type B aortic dissection(TBAD)are increasing, and invasive treatment are required, resulting in poor long term outcomes. In this study, we reviewed our experience with late open conversion(LOC) after TEVAR by the etiology.[Methods]TEVAR due to TAA and TBAD was performed in 476 patients between 2008 and 2020. A total of 24 patients required late conversion to open repair, 13 patients of TAA and 11 in TBAD. The mean interval between initial TEVAR and Open Conversion was 48 months. The mean observation period was 75 ± 22 months. The basic technique was resection of the enlarged aneurysm, possible stent graft removal, and graft replacement.[Results]Hospital deaths were observed in 3 patients which were in TAA, and postoperative cerebral infarction was observed 3 patients. The indications for open conversion were enlarged aneurysm diameter in 9 cases (5 of TAA, 4 of TBAD), endoleak in 9 cases (5 of TAA, 4 of TBAD), retrograde type A aortic dissection (RTAD) in 4 cases of TBAD, aortoesophageal fistula (AEF) in 1 case of TBAD, and infection in 1 case of TAA. Urgent treatment due to aneurysm rupture was required in 7 cases. The operation was performed in 13 cases of arch replacement, 6 of thoracoabdominal replacement, 4 of descending replacement, and 1 of ascending replacement. The mortality was observed in 4 cases: rupture in 1, renal failure in 1, cancer in 1, and pneumonia in 1.[Conclusion]LOC after TEVAR is performed in the long term, and it has specific by etiology and catastrophic complications. The operation has an urgency and complexity of the procedure, as well as excessive invasion such as opening the left thoracotomy. As a result, the operation takes a long time and the results are not satisfactory.

C-V1-1 Reoperative Aortic Valve Replacement After Bio-Bentall using a Double Sawing Ring Technique in a Very Elderly Patient with Hemodialysis

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The biological Bentall has been justified by the growing aging population to lessen the burden of lifetime anticoagulation. However, the extended life expectancy of patients has exceeded the demonstrated durability of bioprostheses. Therefore, preparing for structural valve deterioration (SVD) is essential at the initial bioprosthesis implantation. The double sawing ring technique (DSR), which was advocated by Albertini, has a potential advantage that redo complete root replacement can be avoided by an isolated prosthetic valve, though no studies have demonstrated the benefit.We report a case of an 89-year-old man who received bio-Bentall (Magna Ease 23 mm, Gelweave Valsalva 26 mm) using a DSR technique for severe aortic regurgitation due to infective endocarditis and annuloaortic ectasia when he was 80 years old. He introduced hemodialysis three years ago. Although asymptomatic, transthoracic echocardiography revealed a very severe prosthetic valve stenosis (aortic valve flow 5.1 m/s, effective orifice area (EOA) 0.75 cm2, and mean pressure gradient 67 mmHg). Deliberate heart team discussion indicated redo surgical aortic valve replacement (AVR).After cardiac arrest, the prosthetic valve was exposed by the U-shape incision 7 mm above the bulb of the previous Valsalva graft. All leaflets of the bioprosthesis were severely calcified. The 5-0 polypropylene suture fixing the bioprosthesis was confirmed, and there was no pannus growth over the suture line. The valve was extracted easily by cutting the sutures. A 23 mm sutureless bioprosthetic valve (Edwards INTUITY Elite valve system) was implanted to reduce clamp time (62 minutes). Postoperative echocardiography showed no perivalvular leakage and satisfactory EOA (1.5 cm2). The patient was discharged to home without any complications.Reoperative AVR after bio-Bentall with a DSR technique was performed satisfactorily without decreasing bioprosthetic size for a high-risk patient. A DSR technique can be an attractive option from a viewpoint of reoperation in an aging society.

Adult Cardiac Video 1

March 27, 2022 10:10-11:10 / Track 3

C-V1-2 Ascending aortic cannulation in totally endoscopic valve surgery

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<Purpose> In totally endoscopic cardiac surgery, cardiac pulmonary bypass (CPB) is usually established with femoral arterial cannulation. Retrograde femoral arterial perfusion may increase risk of stroke. In our institution, additional ascending aortic perfusion is utilized in cases with severe atherosclerotic burden. The aim of this study is to evaluate the result of this technique.<Method> From January 2009 to January 2021,737 patients (64 ± 14 year old, 413 male) underwent totally endoscopic valve surgery in our hospital (130 aortic valve, 586 mitral valve, 21 aortic and mitral valve cases). Indications of additional ascending aortic perfusion were over either 70 year old, patients with circumference abdominal aortic calcification, or with iliac or femoral arterial calcification.<Operative technique> The patient was placed in a partial left lateral position with the right upper arm fixed over the head.10 mm-port for 3D endoscope and 3 cm-skin incision were made in the 4th intercostal space. 15 mm incision for second port was made in the 2nd intercostal space. A CPB was established through right groin cannulation with perfusion index at 1.3 L/min. The additional ascending aortic cannula was placed through second port. Antegrade blood flow at the level of descending aorta during the CPB was confirmed with transesophageal echocardiography.<Result> 40 patients(74 ± 10 year old, 22 male) underwent additional ascending aortic perfusion (20 aortic, 19 mitral, 1 aortic and mitral). No stroke/TIA was observed. One mortality (2.5%) was seen. One patient was required re-exploration for bleeding (2.5%) .<Conclusion> Ascending aortic cannulation in endoscopic valve surgery is a safe and reproducible technique to avoid neurological complications.

C-V1-3 Totally endoscopic aortic valve replacement using, bioprosthetic and mechanical valves. Tips, tricks and caveats

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Background: Totally endoscopic aortic valve replacement (TEAVR) surgery is the least invasive form of minimally invasive aortic valve procedures. It is important to know pros and cons of existing prostheses in facilitating TEAVR.Methods: Here, we demonstrate tips, tricks and caveats for TEAVR and the implantation characteristics of favoured biological and mechanical prosthesis types, with surgical life-in-a-box videos.Results: Certain favourable design features of the current Medtronic Avalus and the Cryolife ON-X prostheses facilitate the transition from a mini-J sternotomy through right anterior mini-thoracotomy (RAT) to TEAVR. The Totally Endoscopic approach using a 30-degree scope can bypass relative or strict exclusion criteria for a RAT or mini-AVR, such as distance from the chest wall and relative position of the Aorta to the sternum. Nothing can replace meticulous retraction and exposure, for both pericardium and aortic wall. Avoiding incising the aorta too far towards the pulmonary artery is key as this is where the surgeon will have less control when coming off CPB and performing haemostasis. The Chittwood clamp works better than any other, because it can be used to pull the aorta towards the surgeon, through the chest wall, further improving exposure. There are certain advantages using the Medtronic Avalus bioprosthesis, due its forgiving, slightly flexible annulus, thin cuff, flexible stents, and one-cut holder-release mechanism, which facilitate easier handling through the endoscopic incision. Similarly, for the ON-X mechanical prosthesis by Cryolife, one single cut facilitates collapse of the holder, while the long collar determines secure positioning. The Cor-Knot (LSI, NJ, USA) device is a key instrument in such procedures.Conclusions: Modern tools and prosthesis facilitate the transition to TEAVR greatly, as do simple tricks and techniques. Respective live-in-a-box clips demonstrate our totally endoscopic approach, that may lower the threshold for any surgeon to adopt this technique.

Adult Cardiac Video 1

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C-V1-4 Valve Plasty for Barlow like anterior mitral leaflet and P3 (jet lesion) adhesion to the left ventricular wall

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A 66 y-o male was admitted to our clinic to treat severe mitral regurgitation. Echocardiogram showed Barlow like large anterior leaflet was prolapsed, and P3 was adheded to the left ventriclear wall because of a healed endocarditis. In the operation, firstly triangular resection was adopted to the anterior leaflet. Then the adheded P3 was devided in the center of the leaflet, and cut from the annulus. Cut line was inverted T shape.Then the adhesion between the posterior leaflet and left ventricular wall was detached using scissors. The cut annulus was sutured together. Then the cut leaflet egdes were sutured together and we made a P3 leaflet. Water leakage test rivealed no regurgitation. We put commissure bands on both commissures as an annuloplasty. No mitral regurgitation was found after the operation.Now 10 years later, we followed him yearly and examined echocardiograf hy.No mitral regurgitation was found and anterior leaflet and P3 was well coaputated. LVDd was 39.3mm, EF was 68.7%, LA diameter was 33.1mm.ConclusionMaterial of the leaflet tissue such as pericardium would degenerate larer more than 10 years. Even if it was adheded to left ventricule, after detached from the ventricular wall, mitral valve tissue itself could not change and work normaly. This technique is called adverse hourglass resection.We will show you the pre-operative echocardiogram and the operation video prescisely, and the echocardiogram 10 years post operation.

C-V1-5 A Case Report of Double Valve Replacement for the Patient with Degenerative Mitral Valve Stenosis and Aortic Valve Stenosis

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Heart Valve Center, Midori Hospital

We report a case of a 73-years old woman who underwent double valve replacement for degenerative mitral valve stenosis (DMS) with mitral annular calcification (MAC) and aortic valve stenosis (AS). The patient was transferred to our hospital due to congestive heart failure. A transthoracic echocardiography (TTE) revealed AS (Vmax 3.9 m/s) and MS (MVA 0.81 cm ², mPG 15 mmHg, PHT 270 msec) with MAC. LVEDD was 35 mm and LVESD was 15 mm. After medical treatment for heart failure, transesophageal echocardiography (TEE) demonstrated that aortic annulus diameter of 21 mm and severe anterior leaflet calcification of mitral valve associated with MAC. Double valve replacement using mechanical valves was planned. At operation, mechanical valve of 21 mm was selected after aortic valvectomy. MAC was removed completely and annulus was reconstructed with an autologous pericardium. After reconstruction of the mitral annulus, 25 mm mechanical valve was implanted successfully. Intraoperative TEE demonstrated good LV functions without perivalvular leakage. The postoperative course was favorable, and the patient was discharged. Echocardiography and operative video will be demonstrated.

Adult Cardiac Video 1

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C-V1-6 PROCEDURE MODIFICATION FOR EASIER ROBOT ASSISTED MITRAL VALVE REPLACEMENT

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Background:
Although robotic mitral valve repair is a well-established procedure, replacement utilising robotic technology is infrequently carried out, since the robotic arms complicate the placement and arrangement of valve sutures. Therefore, we have modified the procedure to be more ergonomic and user-friendly. A corresponding video is presented as "live-in-a-box" case.

Methods:
A 51-year-old male presented with NYHA class III dyspnoea. He had undergone mitral valve clipping procedures five years and one year earlier for Barlow's disease. The echocardiogram on admission revealed two floating clips with concomitant severe mitral valve regurgitation, LVEF measured 57%. There were no significant comorbidities present; after sufficient preoperative assessment, we proceeded with robotic mitral valve replacement. A mini-thoracotomy allowing passage of a mitral valve prosthesis was placed on the right chest. Instrument and left atrial retractor ports were inserted into the usual intercostal spaces, and the robot was docked. Perfusion commenced via the groin, and a transthoracic clamp was applied. After robotic atriotomy, excision of the mitral valve and placement of pledgeted valve sutures, the left and right instrument arms were undocked, and the left atrial retractor was kept in place. This allowed comfortable placement of valve sutures through the sewing ring and easy anchoring of the prosthesis with the aid of a knotting device. Atriotomy closure was performed robotically again.

Results:
The course of the surgery was smooth, and no procedural complications occurred. The valve was well seated without a paravalvular leak. The patient was extubated on the same day and discharged on postoperative day four following an uneventful recovery and induction of oral anticoagulation. He fully resumed daily activities after four weeks.

Conclusions:
Our procedural modification facilitates management of valve sutures and anchoring of the prosthesis in robotic endoscopic fashion.

C-V1-7 Mitral valve repair for acute infective endocarditis with cavitron ultrasonic surgical aspirator

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(Introduction)
When mitral valve repair (MVr) is performed for native mitral valve infective endocarditis (IE), it is important to remove the infective leaflets and preserve the non-infective leaflets as far as possible. Conventionally, a resection of the infective leaflets is often performed. In our hospital, MVr for active IE is performed with the cavitron ultrasonic surgical aspirator. We investigated the results of intervention.
(Methods)
In our hospital, we performed 666 MV procedures with the endoscope from October, 2010 to November 2021. Of those, 11 cases underwent MVr for active IE, and 7 cases (64%) underwent MVr with the cavitron ultrasonic surgical aspirator (CUSA: Integra lifesciences Corporation, NJ, USA). Perioperative results were reviewed.
(Results)
In 7 patients (4 males: 57%) who have undergone MVr for active IE with the CUSA, the mean age was 54 " ± " 17 years (mean " ± " SD). The cause species of bacteria were methicillin-resistant staphylococcus aureus (MRSA) in 3 cases (43%), Streptococcus-group in 2 cases (29%), and Corynebacterium striatum in 1 case (14%). In-hospital mortality and stroke were not observed. The ICU stay was 1 (1-3) days and the hospital stay was 22 (15-61) days. No recurrence of IE was observed.
(Conclusions)
The vegetation removal with CUSA is a safe and feasible technique.

Adult Cardiac Video 1

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C-V1-8 Commando Operation for a Case of Extensive Infective Endocarditis Around the Aortomitral Continuity

Yasuyuki Bito, Takanobu Aoyama, Masanori Sakaguchi, Yuriko Kiriya, Akihiro Sumiya, Shotaro Doi, Takashi Murakami

Cardiovascular Surgery, Osaka City General Hospital

A 16-year-old male was referred with high fever, visual field disturbance, and heart murmur one week after the onset of his symptoms. We diagnosed him with aortic and mitral valve infective endocarditis spreading around the aortomitral continuity from the echocardiography showing. The operation was temporally postponed due to his cerebral bleeding detected by the computed tomography. However, since the heart tissue destruction was seriously progressing during the conservative antibiotic therapy, we could not help going forward to the operation 5 days after his admission.

In surgery, we transected the ascending aorta just above the sinotubular junction firstly, and identified that his aortic valve was a type 0 bicuspid valve. The subsequent tissue deteriorated from its right-sided commissure toward the ruptured mitral valve anterior annulus. We had to add the extended atrial septal incision to get the entire exposure of the massive vegetation attached widely to the left atrial wall. The infection seemed to be infiltrated deeply in the tissue around the intervaluvular fibrous body, and then we excised the vegetation with surrounding infective tissues radically.
After placing the horizontal mattress sutures on the posterior mitral annulus, we secured a bioprosthetic valve at the mitral position. The anterior mitral annulus was rebuilt using a folded bovine pericardium with several mattress sutures, which also covered the left atrium wall and the atrial septum. The counterpart of that pericardium was used for the reconstruction of the left ventricle outflow tract to the aortic annulus. The aortic root was replaced with the composite graft made by Gelweave Valsalva graft and a bioprosthetic valve.

The operation time was 7 hours and 49 minutes, and the cross-clump time was 262 minutes. His postoperative course was uneventful, and he was discharged home on foot after 6 weeks of iv antibiotic therapy.

C-V2-1 Cardiogenic shock during Hybrid Coronary Revascularization

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We present a 76 years old Thai male patient who admitted with NSTEMI ,Echocardiogram was unremarkable, electrocardiogram also normal and coronary artery angiogram demonstrated double-vessel disease (DVD) at LAD and RCA. Heart team concurred with hybrid revascularization technique.However, after uneventful surgery, one day after, the patient developed acute ST-Elevation myocardial infarction and collapsed. He was resuscitated and VA ECMO (Veno-Arterial Extracorporeal Membrane Oxygenator) was inserted. He regained both consciousness and hemodynamic. 48 hours later, PCI to mid RCA was done in CATHLAB successfully and LIMA to LAD patency was also guaranteed. 2 weeks later, patient can go back home without incident and still coming back for outpatient visit regularly.To summarize, HCR is not yet a standard of care for patients with coronary artery disease even though it appeared to be an attractive strategy to perform. For our particular case, horrendous complications occurred because we did not performed complete revascularization simultaneously such as PCI right away after moving the patient to CATHLAB or performing operation in Hybrid Operating Room.

Adult Cardiac Video 2

March 27, 2022 11:20-12:10 / Track 3

C-V2-2 3D-Endoscopic Internal Thoracic Artery Harvesting in Minimally Invasive CABG

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We perform minimally invasive coronary artery bypass grafting (MICS CABG) utilizing a 3D-endoscope for harvesting internal thoracic artery (ITA) on patients with single or multivessel disease. We describe our surgical technique of endoscopic ITA harvesting and MICS CABG. A patient is intubated with a double-lumen endotracheal tube for the decompression of the left lung under general anesthesia. The patient is positioned in 30 degree right lateral decubitus position. A 5-mm port is placed at the third intercostal space. A 10-mm port for the 3D-endoscope is placed at the fourth intercostal space at the anterior axillary line. Another 5-mm port for left hand instrument inserted at the fifth intercostal space on the mid-axillary line. The left ITA is harvested in a semi-skeletonized fashion under 3D-endoscopic vision. After the ITA harvesting, a 5-cm thoracotomy is made through the fourth intercostal space without rib-spreading. The ITA is hand-sewn to the left anterior descending artery through the thoracotomy in an off-pump fashion.Seven patients underwent this procedure in 2021 for single or multivessel bypass. Mean harvesting time was 68.3 ± 6.1 minutes, and mean total operation time was 19 ± 9 minutes for single vessel CABG. Median hospital stay and ICU stay were 6 (5-8) and 1 (1-2), respectively. There was no transfusion. No major complication was observed. No patient required narcotic agents after discharge to home. 3D-endoscopic left ITA harvesting is safe and reproducible.

C-V2-3 Minimally invasive coronary artery bypass grafting to the posterior descending artery combined with aortic valve replacement through right thoracotomy

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Cardiovascular Surgery, Yodogawa Christian Hospital

There are no reports of bypass to the periphery of the right coronary artery associated with valve surgery through right intercostal thoracotomy. We report a case of bypass to the posterior descending branch combined with aortic valve replacement through right small thoracotomy.A 82-year-old man had development of dyspnea due to severe aortic valve stenosis and right coronary disease. He has been pointed out asynergy of left ventricle and has a history of unsuccessful attempts at PCI to right coronary artery.The patient underwent minimally invasive aortic valve replacement and coronary artery bypass grafting to posterior descending artery. The right upper part of the patient's body was slightly bolstered, and the right arm was placed in front of the face. Under general anesthesia and one-lung ventilation, the pleural space was entered via the 4th intercostal space by cutting the 4th and 5th costal cartilage through 8cm right anterior thoracotomy. The great saphenous vein was harvested. Cardiopulmonary bypass was performed via femoral aorta cannulation, femoral drainage with two stage cannula (LivaNova), and 6Fr sheathe inserted into femoral artery toward the periphery. The blood temperature was cooled to 32 centigrade. A vent tube was inserted via the right upper pulmonary vein. Antegrade cardioplegic cannula was placed in the ascending aorta. The ascending aorta was clamped, and cardiac arrest was induced with cold antegrade cardioplegia.The great saphenous vein was anastomosed to posterior descending artery under direct vision using Tentacles NEO (Sumitomo Bakelite, Co. Ltd., Tokyo, Japan) which is a heart positioning device with three small suction cups and silicone tube.And then, a retrograde cardioplegic cannula was inserted into the coronary sinus with a purse-string suture. Aortic valve replacement was performed under endoscopic vision. Proximal anastomosis on aorta was performed.The resected costal cartilage was fixed with a monofilament absorbent suture.

Adult Cardiac Video 2

March 27, 2022 11:20-12:10 / Track 3

C-V2-4 Double-patch repair for blow-out type left ventricular free wall rupture after myocardial infarction

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Blow-out type left ventricular free wall rupture (LVFWR) is one of the most serious complications of acute myocardial infarction. Secure surgical repair is necessary for life saving. In the case of broad infarction area, suturless technique or direct closure are inadequate for their Fragile myocardium. We report a case of successful repair of blow-out type LVFWR using the double-patch technique.A 53-year-old man was diagnosed with LVFWR following acute myocardial infarction. Coronary angiography revealed total occlusion of circumflex artery. Extracorporeal membrane oxygenation (ECMO) was established for cardiogenic shock and transferred to our hospital for surgical repair. Emergency operation was performed. After median sternotomy, massive hematoma was detected. Fresh pulsatile blood was come out from the posterior myocardial wall. In view of the high risk associated with beating-heart repair, total cardiopulmonary bypass was established for cardiac standstill. The vulnerable tissue around the rupture site were trimmed. Two Dacron patches were placed inside and outside the LV wall to cover the rupture site (similar to a sandwich) using 10 mattress 4-0 polypropylene sutures. The patient was hemodynamically stable and was successfully weaned from cardiopulmonary bypass and ECMO. Inotropic agent administration was discontinued 2 days postoperatively. Finally, the patient was transferred to referred hospital 19 days after the operation.The high LV pressure pushed the inner Dacron patch covering the rupture site outwards without left ventricular volume reduction, which achieved excellent hemostasis and hemodynamics. Double-patch technique is a useful therapeutic approach for blow-out type LVFWR after myocardial infarction.

C-V2-5 The Case of Primary Cardiac Tumor Removal involving Right Ventricle Wall and Reconstruction

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The 33 years old woman who was incidentally diagnosed cardiac tumor admitted to undergo cardiac tumor removal surgery. In computed tomography(CT), there was 66x70x40 mm sized low-attenuation mass suspected liposarcoma at the inferior side of epicardial space and protruded to inferior wall of the right ventricle(RV). The mass encircled the left circumflex artery(LCx), posterior descending artery(PDA), and posterolateral(PL) branches. Before operation, a 3D printing heart model was produced and the surgical method was simulated.The cardiac tumor removal operation was performed via median sternotomy. The base of tumor was found at inferior side over the right atrioventricular groove and the part of interatrial septum. After right atriotomy, the extent of tumor invasion was confirmed. The cardiopulmonary bypass (CPB) was established to ascending aorta, superior vena cava(SVC), and right femoral vein, because the tumor extended to the inferior vena cava(IVC). Del Nido cardioplegia was infused and the tumor removal began in heart decompression state. The tumor dissection proceeded as if shaving along the margin. The posteroseptal commissure of tricuspid valve was partially excision, and fortunately, the coronary artery could save but only the branch of PDA was sacrificed. The atrial septal defect formed in the process of removing was closed direct suture. The defect of the RV was repaired internal and outer walls each using bovine pericardium. The coronary sinus was preserved connection to the right atrium(RA), and unroofing was performed to relieve narrowing ostium. After checking the function of the tricuspid valve by saline test, a stitch was performed at posteroseptal commissure. The defects of IVC and RA were reconstructed with bovine pericardium.No specific abnormalities were found on CT and transthoracic echocardiogram after surgery and the patient was discharged postoperative day 4. The biopsy result was confirmed as lipoma with no involvement of resection margin.

Adult Cardiac Video 2

March 27, 2022 11:20-12:10 / Track 3

C-V2-6 A rare case of metastatic osteosarcoma to the interventricular septum

Yosuke Takahashi, Akimasa Morisaki, Yoshito Sakon, Daisuke Kaku, Keiichi Itatani, Kenta Nishiya, Noriaki Kishimoto, Kokoro Yamane, Takumi Kawase, Yosuke Sumii, Hiromichi Fujii, Toshihiko Shibata

Cardiovascular surgery, Osaka CIty University

An 18-year-old boy who has no symptom referred to our department for treatment of metastatic osteosarcoma to the interventricular septum. He had repeated surgical history of metastatic osteosarcoma to lung. TTE showed 15 mm non-mobile mass in the inferior interventricular septum and protruded to the right ventricle. Due to the risk of gradual increase of tumor and embolism to the lung, we decided to perform resecting the tumor. Via median sternotomy, cardiopulmonary bypass was established from ascending aortic cannulation and bicaval venous return. After aortic cross clamping and total extracorporeal circulation, right inferior septum was opened to reveal tumor protruding the septum. The margin of the tumor was sufficiently taken about 5 mm and it was hollowed out from the interventricular septum. Since a hole of about 3 cm was formed at the interventricular septum, we decided to close it with a bovine pericardial patch from the left ventricular side and the right ventricular side with a double patch closure. First, a 5 cm bovine pericardial patch was applied to the left ventricular side with mattress sutures, and then a 7 cm large patch was applied from the right ventricular side. The space between the patches was filled with bioglue. The weaning from the cardiopulmonary bypass was no problem. Postoperative TTE and enhanced CT showed no shunt with normal cardiac function. He was discharged 14 days after operation. Herein, we report a successful surgical treatment of a very rare case of metastatic osteosarcoma to the interventricular septum.

C-V2-7 A Case of Completely Resected Cardiac Angiosarcoma

Shohei Okubo, Noriyuki Abe, Noriko Oyama, Takayuki Fujii, Takahiro Yamazato, Hiroshi Munakata

Department of cardiovascular Surgery, Okinawa Nanbu Prefectural Medical Center and Children's Medical Center

Cardiac malignancies were known as very rare tumor. Most of them were originating from the right atrium, which was needed an atypical procedure. In this case, we reported a case of completely resected malignant cardiac tumor in the right atrium.A 19-year-old female was naturally health. Three days before hospitalization, she was appeared malaise. A computed tomography and a cardiac echocardiography showed huge pericardial effusion. The pericardial fluid was drained with 850 ml of blood. In addition, A computed tomography and a cardiac echocardiography showed a mobile tumor in right atrium. It was suggested cardiac malignant tumors and lung metastases.We decided to have surgery for the purpose of diagnosis and resection of the right atrial tumor. The tumor invaded the tricuspid annulus and closely near the right coronary artery. The tumor in the right atrium was completely resected with extracorporeal circulation. The right atrium was reconstructed with two bovine pericardial patches and a prosthesis ring was attached to repair a tricuspid valve. Atrial and Ventricular leads placed in the epicardium for complete atrioventricular block. One week after surgery, she had a good course and was implanted with DDD-PM. she was discharged two weeks. Post operative echocardiography showed that cardiac function was well maintained without residual tumor in right atrium and intracardiac shunt was nothing.The tumor was diagnosis of angiosarcoma by the pathological examination. No malignancy was found at the edge of the area where the tumor was removed.In this case, we reported a case of completely resected malignant cardiac tumor in the right atrium.

Adult Cardiac mini Oral 3

March 27, 2022 13:20-14:00 / Track 3

C-mO3-1 FACTORS AFFECTING THE OUTCOME OF MITRAL VALVE SURGERY ON RHEUMATIC PATIENTS WITH SEVERE PULMONARY HYPERTENSION

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Introduction: Rheumatic mitral valve pathology presenting late will result in the development of pulmonary hypertension. Consequent surgical repair presents with risks that will affect outcome. The study aims to review the risks involved in the outcome of rheumatic patients with severe pulmonary hypertension undergoing mitral valve surgery. Methods: 103 participants underwent mitral valve surgery with or without tricuspid valve intervention for rheumatic heart disease with severe pulmonary hypertension (PAP 80mmHg) were studied. Demographic features, echocardiographic results and surgical technique were reviewed in relation to outcome after mitral valve surgery. Result: NYHA (p value 0.003 OR 4.51) status, co-morbid renal (p value 0.026) disease and pre-operative (p value 0.027; OR 3.97) arrhythmia were significant outcome variables. Conclusion: Preoperative arrHythmia and NYHA status significantly affects outcome patients with rheumatic valvular heart disease undergoing repair.

C-mO3-2 Midterm Outcome of Resection Versus Non-Resection Technique for Mitral Valve Repair of Isolated Posterior Mitral Leaflet Prolapse

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Background. There are many reparation techniques for mitral valve regurgitation specifically, the leaflet resection and leaflet respect. From many reported data, there were no significant postoperative differences between the two groups. Moreover, there were also no reported data on isolated P2 segment repair. Therefore, this research was conducted in order to gain more knowledge on the subject.Methods. An analysis was made on 96 patients with isolated P2 segment prolapse who underwent mitral valve repair between 1st January 2006 to 31st December 2013 at Central Chest Institute of Thailand. 49 (51%) patients underwent chordal replacement techniques (group NR) and 47 (49%) patients underwent leaflet resection techniques (group R). Post operative echocardiography parameters and reoperative rates were compared between the two groups.Results. During midterm follow up, the reoperative rate for group R and NR was 2.1%and 2%(p=0.976) respectively. LVEF was similar in both groups (65.07 ± 6.86 vs 66.09 ± 9.36 P=0.64). LVEDD and LVESD were smaller in group R (44.15 ± 5.36 vs 49.94 ± 7.12 P=0.001) and (28 ± 4.77 vs 31.76 ± 6.1 P ± 0.13). The rate of recurrent mitral regurgitation was not significantly lower in group R (2.1% vs 12.2% P=0.08). There was no difference in MV mean pressure gradient between the two groups (3.85 ± 2.05 vs 4.54 ± 1.67 P=0.196)Conclusions. At midterm results, there were no significant differences in reoperative rate and recurrent mitral regurgitation between the two groups. The leaflet resection technique was associated with a smaller LVEDD and LVESD.

C-mO3-3 Two cases of functional mitral regurgitation with low left ventricular function

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Kansai electric power hospital

Surgical approach for functional mitral regurgitation (FMR) with non-ischemic dilated cardiomyopathy (NIDCM) is controversial. Matsui and Shingu reported that the slope in the preload recruitable stroke work relationship (Mw) is a load- and left ventricular (LV) size-independent contractile functional parameter, and can be a predictor of survival after mitral valve surgery in end stage heart failure (HF). They emphasized that in patients with Mw>20, not surgical ventricular restoration (SVR) but papillary muscle tugging and approximation with mitral valve replacement (PMTA-MVR) is safe and feasible. Herein, we report two cases of PMTA-MVR in NIDCM patients.

Case 1

A 70-year-old man was started on medical therapy for HF 6 years ago. Despite maximal medication, HF exacerbated. Echocardiography revealed markedly dilatated LV [LV diastolic diameter (LVDd): 89 mm], low LV ejection fraction (LVEF: 9%), and severe FMR. Mw was calculated at 25. He was an unsuitable candidate for heart transplants (HT) in this country. PMTA-MVR was performed to regulate HF. The postoperative course was good, and he was discharged uneventfully. Echocardiography after 28 months revealed improved LV function (LVDd: 91 mm, LVEF: 16%). He was readmitted 22 months after surgery for HF and outpatient care was continued 27 months post-surgery.

Case 2

A 43-year-old man was diagnosed with HF, which exacerbated despite medical treatment. After readmission, the treatment with dobutamine could not be discontinued for HF. Echocardiography revealed dilatated LV (LVDd: 64 mm), low LV function (LVEF: 19%), and severe FMR. Mw was calculated at 33. He was an unsuitable candidate for HT and PMTA-MVR was performed. The postoperative course was uneventful, and he was discharged without any complications. Echocardiography after 20 months revealed improvement of LVDd and LVEF (LVDd: 56 mm, LVEF: 29%). No readmission was required 2 years post-surgery.

PMTA-MVR is a safe and feasible option for patients with low EF FMR.

C-mO3-4 Safe launch of robotically assisted mitral valve repair program: Experience of initial 27 cases under the Less Invasive Surgical Center

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Background: Recently, in the field of minimally invasive approach, robotic technology has represented the latest development. Robotic surgery has advantages against standard MICS in terms of greater visualization, enhanced dexterity, and greater precision. However, robotic surgery requires long learning curves and a dedicated heart team. The less invasive surgery center of Tottori University Hospital (LISC) is a multidisciplinary organization established in 2010, consisted of seven surgical departments. One of the commitments of the LISC is the safe introduction of new robotic procedures. In this study, we report strategies to improve safety through the LISC and early results of robotically assisted mitral valve plasty (R-MVP) at our hospital.Methods and Results: Before starting R-MVP, the LISC requires to set limit of the console time for switching to standard MICS or median sternotomy, as well as the risk managements through simulation trainings for the various mechanical troubles. So far, 27 cases of R-MVP have been performed since 2019. The median (interquartile rage, IQR) age was 68 (52-73) years. Two severe obese cases (BMI 31, 36) and two thin chest cases (sternum-vertebra distance:6.4, 6.8cm), which are considered difficult for direct-vision MICS, were recognized. The mitral pathology revealed 1 case of functional MR, 15 cases of posterior lesions, 9 cases of anterior lesions, and 3 cases of bileaflet lesions. Six cases of resection and suture, 19 cases of artificial chord reconstruction were performed. The average cross-clamp time was 133 ± 27 min. Intraoperative bleeding was averagely 125 ± 129ml. There was no hospital death. Twenty-three cases had trace MR postoperatively and 4 cases had mild MR. The median (IQR) postoperative hospital stay was 10 (8.5-12.5) days.Conclusion: R-MVP was performed safely through the multidisciplinary LISC and the early results were satisfactory without compromising the clinical outcomes, even for difficult cases for MICS.

C-mO3-5 Preliminary report of preoperative simulation using 3D printer heart model in mitral valve surgery.

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Objective: Recently, 3-dimensional (3D) organ replica model has been used for preoperative simulation in some surgeries. However, in cardiac surgery, there have been few reports. This is a preliminary report of preoperative simulation using patient specific 3D heart model in mitral valve surgery.Patients and Methods: Twenty-one patients whose 3D heart models made using 3D printer for preoperative simulation in mitral valve repair were reviewed retrospectively. The data to make 3D model was obtained from multi-detector-row computed tomography at systolic phase. In 13 patients, operation was performed through right mini-thoracotomy (MICS). The techniques used in these repairs were followings; artificial chordae in 9 patients, edge to edge in 8, resection and suture in 6, plication in 2, and secondary chordae cutting in 1. In 3 patients, only ring-annuloplasty was performed. As concomitant procedures, tricuspid valve repair was performed in 4 patients, aortic valve repair in 1, coronary artery bypass in 1, and septal anterior ventricular exclusion (SAVE) in 1.Results: The diseased lesions were able to be diagnosed preoperatively except for 1 case. The tethering lesion could not be detected. In 2 cases, diseased lesions were different in comparison with echocardiographic assessment, and diagnoses using 3D heart model were correct. In 4 patients, the artificial chord length was measured preoperatively. In one case, the chord length measured using 3D model was too long because of leaflet elongation. Expected annuloplasty ring size were same with the used size except for 5 patients. Used size (mm) = 0.86 × expected size (mm) + 3.7, $r^2 = 0.81$, $p<0.01$. Conclusions: A 3D heart model can be one of helpful information for preoperative simulation in mitral valve surgery. Some measurements were able to be performed preoperatively. There was no problem in identification of prolapse lesion except for the tethering lesion.

C-mO3-6 The Maze Procedure and Postoperative Pacemakers

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Background. The incidence of and causes for permanent pacemaker implantation (PPM) after surgical arrhythmia procedures remain poorly understood because of the varied lesion patterns and energy sources reported in small series. This study characterized the incidence, indications, and risk factors for PPM after the Maze procedure.Methods. A retrospective analysis of 391 patients undergoing cardiovascular surgery (2016-2019) including 75 patients (19%) with arrhythmia surgery (Maze:45 PVI:27) was conducted. The incidence, indication, and variables associated with PPM implantation were assessed. Results. The incidence of PPM was 4.6% (18/391). Patients with arrhythmia surgery had a nonsignificant increase in PPM insertion (8.0% vs 3.7%, p = 0.18) when compared to patients without arrhythmiasurgery. Of patients who required pacemakers, sinus node dysfunction was present in 72% (13/18) of patients. Univariate analysis identified age (p = 0.04) as the only variable associated with higher risk of a PPM. Conclusions. The risk of PPM implantation is 4.6% and increases with age not arrhythmia surgery. The need for a PPM is largely due to SA node dysfunction, which appears unlikely to recover.

C-mO3-7 The Impact of COVID-19 on the Delivery of Adult Cardiothoracic Surgery at a COVID-19 Centre in Australia

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IntroductionAt a global level, the response to the COVID-19 pandemic has resulted in deceased number of cardiac surgical procedures performed and an increase in the proportion of non-elective cases. The impact of COVID-19 on the provision of cardiac surgery in Australia has not previously been investigated.AimThe aim of this study was to evaluate the impact of the COVID-19 pandemic on the provision of cardiac surgery in a single, large, major cardiac centre and dedicated COVID-19 hospital. A retrospective cohort study was undertaken utilising prospectively collected data.MethodsProspectively collected patient and operative data was examined to assess whether 1) there was a reduction in the number of cases performed and 2) whether there was a difference in patient demographics, surgical procedures or case urgency. Data was examined for the time period of COVID-19 restrictions in 2020, and compared with data from the same time period in 2019.ResultsBetween 3 March 2020 and 30 June 2020, 136 adults underwent cardiac surgery at our institution, representing an overall reduction in operative caseload of 21% compared with the previous year. The greatest impact was observed in May and April, coinciding with state-wide restrictions on elective surgery. There was no significant change in the surgical acuity of cases performed, with 58% of operations classified as non-elective procedures performed during the index admission. A non-significant rise was observed in the proportion of isolated coronary artery bypass surgery and aortic valve surgeries performed.ConclusionBetween March and June 2020, our hospital's response to the COVID-19 pandemic resulted in a reduction in the delivery of cardiac surgery service delivery. No change was seen in either the surgical acuity or case mix of surgeries performed.

C-mO4-1 Routine Preoperative Screening Computed Tomography of the Thorax for Cardiac Surgery

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Introduction: This study aims to evaluate the role of screening computed tomography (CT) thorax in cardiac surgery by analysing presence of CT aortic calcifications in association with change of operative strategy and postoperative stroke, as well as CT features of emphysema with development of pneumonia.**Methods:** All patients who underwent cardiac surgery from January 2013 to October 2017 by a single surgeon were retrospectively studied. Patients who underwent screening CT thorax prior to cardiac surgery (CT group) were compared with those who did not (no CT group). Multivariate subgroup analyses were performed to determine significant association with postoperative outcomes.**Results:** 392 patients were included, of which 156 patients underwent preoperative screening CT thorax. Patients in the CT group were older (63.9 vs 59.0 years, p=0.001), had fewer recent myocardial infarction preoperatively (41 vs 56.4%, p=0.003) and better ejection fraction >30% (p=0.02). Operative strategy was changed in 4.3% of patients, and 4.9% suffered stroke postoperatively. Presence of CT aortic calcifications was significantly associated with change in operative strategy (OR 1.54, p=0.016) but not associated with postoperative stroke (OR 0.53, p=0.33). Age was an independent risk factor for change in operative strategy among patients with CT thorax (p=0.02). Multivariate age-adjusted analysis showed only palpable plaque to be significantly associated with change in operative strategy (p<0.001). None of the patients with CT emphysema features developed pneumonia.**Conclusion:** The results do not support routine use of preoperative screening CT thorax. Contrasted CT may be advisable in older patients and for other operative planning purposes.

Adult Cardiac mini Oral 4

March 27, 2022 14:10-14:50 / Track 3

C-mO4-2 A virtual-reality imaging analysis of the dynamic aortic root anatomy

Kenichi Kamiya[1,4], Yukihiro Nagatani[2], Shinya Terada[3], Yuji Matsubayashi[1], Shunta Miwa[1], Yotaro Mori[1], Masahide Enomoto[1], Naoshi Minamidate[1], Noriyuki Takashima[1], Taihei Fujii[4], Susumu Nakata[5], Tomoaki Suzuki[1]

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IntroductionRecent advances in virtual reality (VR) visualization allow three-dimensional (3D) reconstruction of computed tomography (CT) and other modalities, and VR is increasingly being used for diagnosis and preoperative planning in cardiac surgery. The Vesalius 3D system combines image processing software with optic-tracking navigation, allowing quick, easily accessible, and accurate 3D visual access for exploration and measurement of unimodal or multimodal images. We present a novel method of VR guided measurements elucidating dynamic aortic root anatomy under physiological conditions.**Methods**Based on electrocardiography-gated cardiac CT data at 30% and 75% of the R-R interval for mid-systole and mid-diastole, images of the aortic root in a normal healthy adult in DICOM format were transferred to Vesalius 3D software. Reconstructed images were viewed on a stereoscopic display with 3D glasses. The software facilitates semiautomatic and manual segmentation to distinguish aortic root and cusps, based on the optimum window level/width of volume-rendered images. The operator used virtual interaction tools to view the intracardiac structures, and manually plotted points on iso-surfaces in each 3D image to explore and measure the aortic root structures in systole and diastole.**Results**Virtually reconstructed images revealed the aortic root internal structures in exquisite detail. Highly accessible 3D interpretation promptly permitted precise measurements of repair-relevant anatomical parameters including geometrically complex curves of the aortic root wall and dynamic changes in the aortic valves. Each measurement described here was done in around 60 seconds or less. Measurement accuracy examined against a known prosthesis showed within 1mm of error (< 0.5%). **Conclusions**This technology offers enhanced insight into the anatomical and functional details of aortic valve and root diseases. This pairing of virtual imaging with optic tracking and navigation allows accurate 3D analysis of cardiac anatomy in vivo, and facilitates patient-specific preparation for valve-sparing surgery.

C-mO4-3 A case of early structural valve deterioration 2 years after aortic valve replacement.

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Cardiovascular surgery, Kitano Hospital

Structural valve deterioration (SVD) is known as a pathological state of bioprosthesic valve after aortic valve replacement (AVR). Though the number of AVR is increasing in patients with end-stage renal disease on HD, the rate of SVD was still unclear. Here, we report our experience in the patient who had early SVD.
83-year-old men performed aortic valve replacement (AVR) for severe aortic stenosis (AS) and was implanted 25mm bioprosthetic valve (the Inspiris Resilia) in supra-annular with normal matter. Before the surgery, echocardiogram showed low left ventricular function; Ejection fraction (EF): 31%, Aortic valvular area: 0.93 cm2, and flow: 3.83 m/s. After the surgery, he was followed as an outpatient, there were no problem in the prosthetic valve performance. But 2 years after the surgery, he presented dyspnea and both side of pleural effusion, then was diagnosed heart failure. The echocardiogram showed aortic valve was barely open; EF: 16%, flow: 3.95m/s, peak PG: 62mmHg, and mean PG: 38mmHg. These data indicated the bioprosthetic valve became structural valve deterioration (SVD). He was immediately hospitalized and started treatment, but only medical treatment wasn't effective. Because he had high surgical risk and frailty, he couldn't be taken surgical operation, and was performed transcatheter aortic valve replacement (TAVR). After the TAVR at another pospital, his heart failure improved and discharged home.
The Inspiris Resilia valve is created with a unique technology. The technology incorporates a stable capping anticalcification process, which blocks residual aldehyde groups that are known to bind with calcium. Even the Inspiris Resilia valves that have been treated with anticalcification need to be followed carefully in dialysis patients.

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C-mO4-4 Monozygotic twins in TAVI

Shigeaki Kaga, Hiroyuki Nakajima, Chie Ogiwara, Daichi Shikata, Yukiyo Yoshida, Koji Kawago, Satoshi Shiraiwa, Yoshihiro Honda, Kenji Sakakibara
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The indications for TAVI have been expanding for moderate risk patient in aortic stenosis with favorable midterm outcomes. There are no reports in the literature of TAVI performed in twins. We present a case of 87-year-old monozygotic twin sisters performed TAVI. The younger sister had dyspnea on effort and been diagnosed with aortic valve stenosis(AS) and coronary stenosis(CS). Her elder sister, who had been visiting a local doctor without chest symptoms, was examined and diagnosed with extremely similar AS and CS. TAVI was performed in the same way. Both sisters are doing well. The similarities observed in these cases are discussed and reported.

C-mO4-5 The determining of tricuspid valve plasty procedure for tricuspid valve insufficiency by intraoperative findings : only ring annuloplasty or not?

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Objective:Tricuspid regurgitation (TR) is secondary to annular dilatation and isolated ring annuloplasty represents the treatment of choice. However, for the treatment of complex forms of TR, additional procedure such as the clover technique is needed. The aim of this study is to report our strategy for tricuspid valve plasty by intraoperative findings. Methods:From January 2020 to October 2021, 60 patients underwent tricuspid valve plasty. The preoperative NYHA class was III in 47% and IV in 13%. The EuroSCORE2 was 9.7 ± 4.9. The preoperative TR severities were mild in 2(3%), moderate in 32(54%), and severe in 26(43%). Mitral valve disease and aortic valve disease were associated in 46(76%) and 16(26%), respectively. Atrial fibrillation (AF) was complicated in 28(46%). All patients underwent tricuspid valve ring annuloplasty (TAP) followed by water testing. Refer to those findings, we additionally performed clover technique (suturing together the middle point of the free edges of the tricuspid leaflets).Results:The ring size was 32 ± 1.4mm in all patients. Thirty-two patients (53%) additionally underwent clover technique. They had a significantly higher prevalence of AF (19cases, P= 0.042) and lager annular size (49.2mm, P=0.022) which was measured intraoperatively. The average period of postoperative monitoring was 267 ± 181 days. The 30-day mortality was 5%. There were no late deaths and readmissions due to heart failure during follow-up. All patients remained in NYHA I or II. At the lastest echocardiogram, no or mild TR was detected in 57 (95.1%) patients, moderate in 2 (3.3%) and severe in one patient (1.6%). The annulus diameter was more than 50mm in 3 cases which had moderate and severe regurgitation after surgery. All TAP alone cases had trace regurgitation.Conclusion:The procedure of TVP should be determined by intraoperative findings and TAP alone is unlikely to be successful for functional TR due to large annular dilatation.

C-mO4-6 Feasibility of del Nido Cardioplegia in Complex Valve Surgery

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Cardiac surgery, Kurashiki Central Hospital

Objectivedel Nido cardioplegia (DNCP) has been used for adult cardiac surgery. Several studies reported good results of DNCP in simple surgery. However, feasibility of DNCP in more complex surgery is not well studied.MethodsA total of 25 patients underwent valve surgery plus additional procedure(s) between 2020 and 2021. Regular cardioplegia was used in 20 cases (ST), while DNCP was used in 5 (DN). We compared the results of the two groups. ResultsMean age of the patients was 71.6 ± 7.3 years old and 10 patients were female. Mitral valve surgery was in 7 cases, and aortic valve was in 18. Concomitant procedures included CABG in 15, correction of left ventricular outflow obstruction in 1, aortic arch replacement in 2, tricuspid valve repair in 6, atrial septal defect repair in 1. Total dosage of cardioplegia was 3954 ± 1185 ml and 1200 ± 447 ml in ST and DN, respectively ($p<0.0001$). In and out balance during cardiopulmonary bypass was 1396 ± 1003 ml in ST and 1259 ± 1056 ml in DN ($p=0.79$). Longest interval between each cardioplegia infusion was 37 ± 6 minutes in ST and 59 ± 9minutes in DN ($p<0.0001$). Total cardiopulmonary bypass time was 182 ± 60 minutes in ST and 146 ± 45 minutes in DN ($p=0.22$). Cross clamp time was 125 ± 47 in ST and 79 ± 46 minutes in DN ($p=0.061$). Number of electric cardioversion after declamping the aorta was not statistically different (0.6 ± 1.1 in ST, 1.3 ± 2.2 in DN, $p=0.50$). Maximum creatinine kinase myocardial band was 45 ± 53 ng/mL in ST and 45 ± 26 ng/mL in DN. Left ventricular ejection fraction was 52 ± 10% in ST and 63 ± 3 in DN (p=NS).ConclusionsIn complex valve surgery, total dosage of cardioplegia was smaller in DN group than in ST group. DNCP could be a safe alternative even in adult complex valve surgery.

C-mO4-7 Pulmonary valve neocuspidization of a patient with pulmonary valvular and subvalvular stenose.

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Cardiovascular surgery, Central Hospital

Introduction. Aortic valve neocuspidization with glutaraldehide-treated autologous pericardium according to the Ozaki technique has been proven to be an effective therapy for the treatment of aortic valve diseases in adult and pediatric patients. We report a case where we performed this nouvel technique for reconstruction of pulmonary valve.Case report. A 33-year-old male patient was admitted to our hospital with shrotness of breath. Transthoracic echocardiography showed severely hypertrophic right ventricle and severe pulmonary valvular and subvalvular stenosis with maximum gradient of 150 mmHg. Pulmonary annusul was mesured 15.6 mm. After the heart valve team meeting, surgery was decided upon. After median sternotomy pericardium was excised and then was treated with a 0.6% glutaraldehyde solution for 10min and rinsed 3 times using a physiologic saline solution. Aortic-arterial and bicaval-venous cannulation was performed, then cardiopulmonary bypass (CPB) was initiated. When PA was opened, we found that pulmonary valve is monocusp. Pulmonary valve leaflet was resected, then subvalvular and infundibular hypertrophic tissues were resected. The distance between each commissure was mesured following Ozaki's recommendations. The sizes of mesured comissures were 25 mm, 27 mm and 29 mm. Appropriate size pericardial cusps were trimmed and sutured to each annulus, making a neotricuspidization of PV. Weaning from CPB was performed without complications. Post-operative trans-esophageal echocardiogram showed trivial pulmonary regurgitation and a maximum gradient across the pulmonary valve of 15 mmHg.The extubation was performed on the same day and the ICU stay was 2 days. The patient was discharged from hospital at 7-th postoperative day without complications. Post-operative follow-up transthoracic echocardiography showed the reconstructed PV with no residual regurgitation, good coaptation height and maximal pulmonary gradient was mesured 25 mmHg. At 1 year of followup, a favourable evolution was observed.

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C-mO4-8 Validation of virtual reality imaging accuracy of dynamic, functioning heart valves using an ex-vivo porcine heart.

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BackgroundVirtual reality (VR) imaging, achieved by three-dimensional reconstructions of volume rendered image datasets, is an innovative technology that permits visualization of cardiac anatomy in vivo. The feasibility of viewing in all planes relevant to surgeons makes VR useful for clinical diagnosis and preoperative planning. However, the accuracy of virtually reconstructed images remained unverified. In this study, we aimed at replicating systole and diastole model in an ex-vivo porcine heart and validated the virtual visualization quality and appropriate orientation in aortic root and mitral anatomy.**Methods**We established an ex-vivo cardiac platform using a swine heart activated by an external mechanical pump and reservoir, allowing simultaneous acquisition of endoscopic video recordings and computed tomography (CT) images of the aortic and the mitral valve. The scanned CT datasets were transferred to 3D-VR software: the Vesalius 3D. Virtual images of the aortic root and the mitral valve were reconstructed, and compared with visual images seen through a fiberoptic scope.**Results**The reconstructed VR images from sequential CT data revealed precisely the morphology of the aortic and mitral valve motion, while the simultaneous acquisition of high-quality endoscopic images also showed the valves. Superimposition of endoscopic and VR images on Vesalius 3D allowed a direct comparison between two fundamentally different modalities, showing a very high degree of congruence and visibly validating the VR imaging accuracy.**Conclusions**This study is the first, preliminary experiment to validate the real-time imaging accuracy of intracardiac structures produced by 3D-VR. In view of this demonstrated fidelity of virtual imaging, this technology may be of sufficiently high quality to be considered a gold standard for cardiac anatomy.

C-mO5-1 Atrial Fibrillation after Coronary Artery Bypass Grafting Surgery A Complication Beyond Electrolytes

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Introduction: Atrial fibrillation remains a recalcitrant complication after cardiac surgery affecting up to a third of patients. This study aims to evaluate the role of maintaining high K^+ and Mg^{2+} values, identify other contributing factors as well as assess the resource burden of post-operative atrial fibrillation (POAF) after coronary artery bypass grafting (CABG) surgery.**Methods:** 416 patients who underwent isolated CABG surgery over a period of 1 year (2017) at the National University Hospital were included in the study. Preoperative risk factors, medications, electrolyte monitoring and administration frequency and postoperative management were retrospectively compared between patients who did or did not develop POAF.**Results:** 26.2% of patients developed POAF with a median incidence at 43.4 hours postoperatively. Increased age (64.9 vs 61.5 years), Chinese race (76.1% vs 65.1%), preoperative renal impairment and end stage renal failure on dialysis were significantly associated with development of POAF ($p<0.05$). Longer mean postoperative duration on ventilator (23.2 vs 9.3 hours) was the only significant postoperative variable associated with POAF ($p=0.014$). POAF was associated with a significantly higher frequency of monitoring K^+ and Mg^{2+} levels, as well as intravenous replacement of K^+ and Mg^{2+} on 2^{nd} and 3^{rd} postoperative days to target higher lab values ($p<0.05$). POAF resulted in significantly longer median hospital (9 vs 7 days) and ICU (3 vs 2 days) stay ($p<0.001$). 84% of POAF patients reverted to sinus rhythm by 72 hours postoperatively, and 27.5% were anticoagulated. Novel anticoagulants (NOACs) shortened median hospitalization duration among anticoagulated patients (10 vs 13 days, $p=0.015$). Postoperative beta blockers were not associated with a reduction in POAF.**Conclusion:** POAF is common even after isolated CABG. A practice-based approach beyond supratherapeutic electrolyte targets is needed to alleviate the burden of this problem.

C-mO5-2 Evaluation of fully automated ventilation after off-pump coronary artery bypass grafting

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Objective: The study aimed to evaluate the effectiveness of a fully automated ventilator with a quick-wean option after off-pump coronary artery bypass grafting (OPCAB).Materials and Methods: We retrospectively reviewed 68 patients (16 women, mean age 72.0 ± 8.7 years) who were undergone OPCAB alone. Patients were divided into two groups; patients using fully automated ventilation with a quick-wean option after OPCAB (A group, n=51), patients using conventional synchronized intermittent mandatory ventilation + pressure support mode (M group, n=17), and the following data were analyzed and compared between two groups. We used the modified G5 fully automatic ventilator (INTELLiVENT-ASV mode with quick-wean option; Hamilton Medical, Rhazuns, Switzerland) as an automated ventilator.Results: There was no significant difference in preoperative and operative characteristics. Ventilation time after OPCAB was significantly shorter in the A group compared with the M group (A vs. M=16.57 ± 2.44 vs. 19.50 ± 5.80 hours, p=0.007). There was no patient with re-intubation in both groups after respiratory weaning. In the A group, the intensive care unit (ICU) stay was significantly shorter than in the M group (A vs. M=4.50 ± 1.04 vs. 5.41 ± 1.50 days, p=0.007).Conclusions: Fully automated ventilation with a quick-wean option may facilitate respiratory management after OPCAB.

C-mO5-4 Clinical evaluation of portable digitalized suction system after cardiovascular surgery

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Objective: The significant advantages in graphs displaying are (1) the provision of object data including trends of the progression of air leak and fluid drainage measurement, and (2) the monitored tubing with alarms presents the possibility of reduced tubing-related complications. In postoperative management, the advantages are (1) automatic flushing function which does not need milking the tube, (2) no need of water infection by which the system can roll onto its side, (3) low volume of the system, (4) small portable device which allows patients more mobility, and (5) the sanitation of the system waste. The purpose of this study was to investigate the clinical evaluation of portable digitalized suction system after cardiovascular surgery.Methods: We reviewed 202 patients including 70women (mean age 70.3 years) who underwent cardiovascular surgery at our hospital. Patients were categorized as those treated with digitalized chest drainage system (DCS group, n=40) or analog chest drainage system (ACS group, n=160). The digital system was Thopaz (Medela, Switzerland). The following data were analyzed and compared between two groups.Results: No significant intergroup difference was observed in total fluid amount (ACS vs. DCS=396.4 vs. 404.7ml, p=0.860). The incidence of re-thoracotomies was lesser, however, not significant (ACS vs. DCS=5.0 vs. 0.0 %, p=0.141). There were significant intergroup differences in the length of indwelling drain (ACS vs. DCS=107.2 vs. 89.7 hours, p=0.011), ICU stay (ACS vs. DCS=6.6 vs. 4.8 days, p=0.435) and hospitalization (ACS vs. DCS=23.9 vs. 19.4days, p=0.005).Conclusions: This study provided evidence that digital drainage system can be safely applied in patients who underwent cardiovascular surgery.

C-mO5-5 Postoperative Reverse Dipping of Mean Arterial Pressure and Mortality After Coronary Artery Bypass Grafting

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Background: Patients with abnormal blood pressure (BP) dipping patterns were classified into extreme dippers (i.e. a more than 20% BP fall in nighttime), reduced dippers (i.e. a less than 10% BP fall in nighttime) and reverse dippers (i.e. a rising nocturnal BP). The abnormal dipping patterns have long been considered to be associated with adverse events. Here, we aimed to investigate whether dipping patterns of postoperative mean arterial pressure (MAP) were associated with hospital mortality and whether reverse dipping had independent prognostic value in patients undergoing coronary artery bypass grafting (CABG).
Methods: Clinical variables and BP records within the first 24 hours in the postoperative intensive care unit from 4391 patients operated on between 2001 and 2012 were extracted from the Medical Information Mart for Intensive Care III database. Restricted cubic spline was applied to visualize the relationship between the night-day ratio of MAP and hospital mortality. Patients were divided into reverse dippers and non-reverse dippers and the association of reverse dipping and mortality was evaluated with logistic and cox regression models.
Results: A U-shape relationship between the night-day ratio of MAP and hospital mortality was demonstrated. Compared with non-reverse dippers, reverse dippers were at a higher risk of hospital mortality (adjusted odds ratio = 1.87, 95% CI: 1.14-3.08) and 90-day mortality (adjusted hazard ratio = 1.46, 95% CI: 1.06-2.02), but not 4-year mortality. Subgroup analyses indicated that the association between reverse dipping and hospital mortality appeared to be modified in patients with hypertension.
Conclusions: Our study indicated a U-shape relationship between the night-day ratio of postoperative MAP and hospital mortality in patients undergoing CABG. Patients with the reverse dipping pattern had a higher risk of hospital and 90-day mortality and this association was modified with the presence of hypertension.

C-mO5-6 Evaluation of lactate change for predicting VA-ECMO survival : A retrospective study of point of care Lactate and VIS

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Venous arterial extracorporeal membrane oxygenation is provided for patients with emergency cardiac arrest and shock. The lactate clearance rate is used to predict the survival rate of patients who have applied this venous arterial extracorporeal membrane oxygenation technique. Therefore, in this study, the lactate level and the amount of inotropic and vasopressor agents recommended for patients with cardiac arrest and shock were compared to predict the survival rate of patients treated with VA-ECMO. This retrospective analysis was performed with finally enrolled 119 patients receiving a VA ECMO between January 2014 and January 2021 in a Haeundae-paik hospital. Blood lactate and vasoactive inotropic scores were recorded before ECMO implantation and pre-specified time points of 6, 12, 24 and 48 hours, respectively. Data were analyzed for a total of 52 patients, excluding those who had transferred, did not collect data, or had ECMO removed within 48 hours after ECMO application. Among the analyzed VA-ECMO patients, 30 patients were classified into the survival group and 22 patients into the non-survival group. The lactate value was 6.3 ± 3.4 in the survival group at 6 hr after VA ECMO application, which was significantly lower than that of the non-survival group (10.1 ± 4.3). In addition, Change in lactate showed that the survival group was 2.5 ± 2.7, which was higher than that of the non-survival group (-0.5 ± 3.3). The VIS value was 26.1 ± 26.9 in the survival group at 6 hr, which was significantly lower than that of the non-survival group (45.3 ± 42.9), but the change in the VIS reduction value was not statistically significant with the patient's survival. It was confirmed that the dynamic change of lactate during the applied ecmo was valuable in evaluating effective circulation support as a predictive marker for survival, it is thought that using the VIS value together would help predict survival.

C-mO5-7 Impact of fresh autologous blood transfusion on blood coagulation during cardiovascular surgery: evaluated by thromboelastometry ROTEM

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Purpose

Fresh autologous blood transfusion (fABT), harvested just after anesthetic induction, has been used in our institution when cardiopulmonary bypass (CPB) is terminated to improve blood coagulation. In this study, the positive effects of fABT on blood coagulation during surgery were retrospectively evaluated.

Materials and methods

From January 2017 to March 2021, fABT was performed in 243 cases of cardiovascular surgeries with CPB. After excluding emergency surgery, single-valve replacement, and on-pump-beating coronary artery bypass surgery, this study included 114 cases who were divided into two groups; 51 patients were in a large amount of fABT (Large group) where they mainly underwent aortic repair and 63 patients were in a small amount of fABT (Small group) where they mainly underwent composite valve surgery. The main outcomes were clot formation time (CFT) and amplitude 10 min after clotting time (A10), which were evaluated by ROTEM EXTEM.

Results

There were no significant differences between the Large group and the Small group in mean age (68.5 vs. 69.1 years), male ratio (72.5% vs. 66.7%), and body surface area (1.62 vs. 1.57 m^2). The fABT amount was 1107 ± 238 vs. 686 ± 228 ml ($p<0.001$), and the lowest body temperature was 21.8 ± 2.6℃ vs. 31.5 ± 1.2℃ ($p<0.001$). After termination of CPB and heparin reversal, blood coagulation was more exacerbated in the Large group due to the lower body temperature (CFT 374 ± 270 vs. 315 ± 244; p=0.02 and A10 28.6 ± 8.6 vs. 33.0 ± 11.4; p=0.02). However, larger amounts of fABT improved blood coagulation in the Large group (improvement of CFT -145 ± 208 vs. -78 ± 117; p=0.03 and improvement of A10 8.8 ± 6.7 vs. 4.9 ± 6.5; p=0.002).

Conclusion

Although lower body temperature worsened blood coagulation after CPB, larger amounts of fABT significantly improved blood coagulation.