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ABSTRACTS

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Abstract 1

Right Atrial Appendage Neovalve for Pulmonary Reconstruction in Tetralogy-Type DORV and TOF: Early and Midterm Outcomes

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Abstract:
Objective: Transannular patch (TAP) repair remains a common technique for pulmonary artery (PA) reconstruction in pediatric cardiac surgery, but it is frequently associated with significant pulmonary valve (PV) regurgitation and right ventricular (RV) dysfunction. These limitations underscore the need for alternative approaches that preserve valve competence and improve postoperative outcomes.
Method: This retrospective cohort study analyzed 36 pediatric patients who underwent transannular pulmonary artery repair between February 2024 and May 2025. Patients were divided into two groups: right atrial appendage (RAA) neovalve (n=18) and traditional transannular patch (TAP) repair (n=18). Diagnoses included tetralogy-type double outlet right ventricle (DORV) and classical tetralogy of Fallot (TOF). Key intraoperative metrics, RV function, and early postoperative outcomes were compared. Among RAA patients, 8 completed 6-month follow-up, allowing assessment of midterm valve competence and RV performance via echocardiographic and clinical data. Standard statistical methods were used for comparisons.
Result: The RAA neovalve group demonstrated significantly less severe pulmonary valve regurgitation compared to the TAP group ($p < 0.001$). RV function was also better preserved in the RAA group, with a higher proportion of patients showing no RV dysfunction ($p = 0.014$). Additionally, the RAA group had shorter intensive care unit stays (3.88 ± 0.84 days vs. 6.13 ± 2.75 days, $p = 0.044$) and hospital stays (10.1 ± 1.25 days vs. 13.2 ± 3.19 days, $p = 0.029$). Among the 8 patients in the RAA group who completed 6-month follow-up, valve competence remained stable compared to early postoperative assessments ($p = 0.174$), with no significant increase in regurgitation. The right ventricular outflow tract (RVOT) mean gradient showed a non-significant increase from 25.3 mmHg to 32.4 mmHg ($p = 0.265$). RV function also remained unchanged at 6 months ($p = 0.785$), indicating sustained postoperative performance of the neovalve.
Conclusion: The RAA neovalve technique offers clear early advantages over traditional TAP, including reduced PV regurgitation, better RV function, and shorter recovery times. Six-month follow-up shows preserved valve competence and stable RV performance, supporting its potential as a promising alternative for pulmonary artery repair.
Keywords: Tetralogy of Fallot, Double Outlet of Right Ventricle, Transannular repair, Pulmonary neovalve, Right atrial appendage

Abstract 2

Results of Arterial Switch Operation for Patients with Complex Double Outlet Right Ventricle with Subpulmonary Ventricular Septal Defect and Malposition of Great Arteries

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Abstract:
Objective: DORV with subpulmonary VSD often presents with complex great artery relationships and coronary anomalies, requiring tailored techniques during arterial switch operation (ASO). We reviewed our surgical strategies and outcomes in those cases and would like to share our surgical movies for details in coronary transfer and PA reconstruction.
Method: We retrospectively analyzed 8 patients who underwent ASO for DORV with subpulmonary VSD between 2007 and 2024. Key strategies included: 1; selective use of bilateral PAB and staged repair for CoA, 2; VSD enlargement, 3; individualized coronary transfer using trap door, punched-out, or sinus pouch method as case-by-case basis, and 4; main PA rightward transfer to prevent LPA overstretching. Surgical findings and postoperative outcomes were assessed.
Result: Arterial relationship was side-by-side in three cases, while oblique antero-posterior in five. CoA was present in two patients. Coronary patterns included Shaher types 1, 4, 5, and 9 in 3, 1, 2, and 2 cases, respectively, with both type-5 cases showing intramural LCA. ASO was done at median age of 16 days, including two staged-repair cases. Intraventricular rerouting was completed through tricuspid valve in six cases, while right ventricular incision was added in two. Sinus pouch reconstruction of coronary artery was used in three cases. PA anastomosis was shifted rightward in four patients, whereas LeCompte maneuver was employed in six. Mean CPB and ACC time were 331 and 210 minutes, respectively. There were no operative nor late mortality. One case of intramural LCA with trap door transfer required ECMO, developing LV aneurysm. Otherwise, neither coronary events nor reinterventions were noted during a median follow-up of 3.6 years.
Conclusion: ASO for subpulmonary VSD-type DORV achieved favorable outcomes. We believe that coronary and PA reconstruction tailored to each case, including sinus pouch coronary reconstruction and rightward-shifted PA anastomosis, contributes to safe and reproducible repair and less late complications. Intramural coronary artery requires special attention.
Keywords: DORV, Arterial switch, Subpulmonary VSD, Intra-ventricular rerouting, MGA

Abstract 3

A tailored approach for partial anomalous pulmonary venous drainage to superior cava vein: an alternative to Warden procedure

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Abstract:
Background: Partial anomalous pulmonary venous drainage (PAPVD) is a rare congenital cardiac defect and associated with sinus venosus atrial septal defect (ASD). While most cases are asymptomatic and difficult to diagnose, pulmonary hypertension may develop. Surgical correction is indicated when significant shunting is present or if symptoms develop.
Objective: To report a successful management of a PAPVD case by an alternative (non-Warden) surgical procedure
Case: A moderately symptomatic 21-year-old male patient presented with a partial anomalous pulmonary vein (PV) connection of the right upper and middle veins into the middle segment of superior cava vein with a secundum ASD. His TTE showed 24 mm ASD sinus venosus with normal other cardiac valves. An elective surgical treatment was indicated. An incision from the base of orifice of PV to the right atrium was done to expose the PV and found that the orifices were in the

upper and middle segments. A pericardial baffle was done for re-routing the blood flow from anomalous PV to left atrium. Echocardiogram post-surgery showed no residual ASD; all PV drained to left atrium.
Conclusion: This case highlights the successful tailored approach in a PAPVD case as an alternative to Warden procedure.
Keywords: PAPVD, alternative Warden procedure

Abstract 4

Pulmonary Valve Reconstruction Using Autologous Right Atrial Appendage in a 3-Month-Old Infant with Double Outlet Right Ventricle and Severe Pulmonary Stenosis: A Case Report and Literature Review

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Abstract:
Objective: We report our center's first successful use of autologous right atrial appendage (RAA) tissue for neo-pulmonary valve reconstruction in a 3-month-old infant with double outlet right ventricle (DORV) and severe pulmonary stenosis (PS).
Method: A 3-month-old infant (weight: 5.2 kg) with DORV, subaortic ventricular septal defect (VSD), and severe pulmonary valve stenosis with hypoplastic pulmonary arteries (McGoon ratio = 0.93 on CTA) was admitted for corrective surgery. During the operation, the VSD was enlarged by resecting conal septal tissue beneath the aortic valve and closed via a right atriotomy using a bovine pericardial patch. Due to a markedly hypoplastic pulmonary annulus (native diameter: 4 mm), a transannular incision was required. V-Y plasty was performed bilaterally at the incision edges to lengthen the annulus. A neo-bicuspid pulmonary valve was then fashioned from autologous RAA tissue and implanted at the annular level. The pulmonary artery and right ventricular outflow tract were reconstructed using sequential fixed autologous pericardium and a 0.4 mm ePTFE patch (5-8 min video clip). Upon separation from cardiopulmonary bypass, direct pressure measurements indicated right ventricular pressure was 75% of systemic.
Result: The postoperative course was uneventful. Echocardiography on postoperative day 3 showed further reduction in right ventricular pressure. Only trivial pulmonary insufficiency (PI) was noted with patent forward flow. The infant remained in the ICU for seven days and was discharged in stable condition on postoperative day 13. At 3-month follow-up, echocardiography confirmed continued valve competence (trivial PI), with no evidence of obstruction or cusp restriction.
Conclusion: Pulmonary valve reconstruction using autologous RAA tissue is a feasible and promising technique for infants requiring transannular patch repair. Our early experience demonstrates safety, technical viability, and favorable functional outcomes, supporting its use as a valuable alternative in selected patients.
Keywords: Pulmonary valve reconstruction, right atrial appendage, transannular patch, double outlet right ventricle

Abstract 5

Reviving the Atrial Switch: A Viable Option for Older Infants with TGA and Intact IVS After Failed Arterial Switch or Palliation

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Abstract:
Objective: In patients with transposition of the great arteries (TGA) and intact ventricular septum (IVS), the arterial switch operation (ASO) is the standard approach during the neonatal period. In late presenters, however, ASO may carry high risk, and palliative procedures often prove insufficient. We report early outcomes of atrial switch (Senning or Mustard) in infants aged 5–6 months with TGA/IVS following unsuccessful ASO or palliation.
Method: Between January 2024 and June 2025, 8 patients (mean age: 5.4 ± 0.5 months) with TGA/IVS underwent atrial switch at our center. Prior attempts included ASO in 2 patients (100% mortality) and BT shunt + PA banding in 3 patients (66% mortality, persistent hypoxia). Of the 8 patients who underwent atrial switch, 6 had Senning and 2 had Mustard procedures. Mean cardiopulmonary bypass time was 94 ± 11 minutes, and cross-clamp time was 71 ± 9 minutes.
Result: There was one early mortality (12.5%, index case). The remaining 7 patients were extubated after 2.1 ± 0.6 days, stayed in CICU for 4.0 ± 1.2 days, and had a total hospital stay of 12.3 ± 2.1 days. Postoperative saturation improved to >95% in all survivors. Echocardiographic evaluation showed satisfactory baffle function and preserved biventricular performance.
Conclusion: In late-presenting infants with TGA/IVS, where ASO or palliation have failed or are contraindicated, the atrial switch procedure remains a valuable and effective surgical alternative. With proper patient selection and surgical expertise, outcomes can be excellent even beyond the neonatal period.
Keywords: Atrial Switch, Transposition of the Great Arteries, Intact Ventricular Septum, Senning Procedure, Mustard Procedure

Abstract 6

Mid-term clinical results of a novel fabric inducing autologous tissue in-growth in congenital heart surgery

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Abstract:
Objective: Preventing reoperations due to deterioration of surgical materials continues to be a challenge in surgical treatment for congenital heart disease. To solve this problem, efforts are being made worldwide to develop surgical materials achieving in situ tissue regeneration. A synthetic hybrid fabric (SHF) with a new novel technology to induce autologous tissue in-growth was launched in Japan in June 2024 and has been implanted in more than 150 cases. The aim of this study was to evaluate the clinical efficacy and safety of the SHF in the mid-term postoperative course.
Method: A prospective, multi-center, observational study up to 5 years after surgery was conducted consecutively following the previous clinical trial (Ann Thorac Surg Short Rep 2024,2:804-809). Thirty-four patients (median age 1.92 years, IQR 4 months-58 years, median body weight 11.1 Kg, IQR 5.4-61.5) received SHF patch implantation and were followed up (study period from April 1, 2022 to May 31, 2025: median follow-up period 4.3 years, IQR 4-4.6). To evaluate efficacy, we investigated the event free rate of invasive reintervention due to failure of the hybrid patch and observed the implantation site by echocardiography. Safety was evaluated based on the occurrence of adverse events.
Result: The SHF was implanted in 41 anatomical locations: pulmonary artery 18, right ventricular outflow tract 12, atrial septum 7, and ventricular septum 4. There was no death and reoperation due to the SHF failure throughout the entire study. Except one successful balloon dilation for a stenosis at the left pulmonary artery bifurcation during the clinical trial, no invasive therapeutic interventions were required during the observation period (free-rate: 100%). Interestingly, a mild stenosis at the distal end of the transannular patch in the tetralogy of Fallot repair and a moderate flow acceleration at pulmonary bifurcation in the redo Rastelli operation occurred during the previous trial have improved and not worsen during this study period, respectively. No abnormal findings for the SHF on echocardiography was detected and no serious adverse events relating to the SHF occurred (free-rate: 100%).
Conclusion: The novel fabric promoting autologous tissue in-growth could be a plausible new alternate for congenital heart surgery.
Keywords: Surgical material, Autologous tissue in-growth, Mid-term results, Synthetic hybrid fabric

Abstract 7

Improvement of Right Ventricular Development through Early Neonatal Intervention for Pulmonary Stenosis or Pulmonary Atresia with Right Ventricular Hypoplasia

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Abstract:
Objective: This study aimed to evaluate the effectiveness of early neonatal interventions in promoting right ventricular (RV) development among neonates with pulmonary stenosis (PS) or pulmonary atresia with intact ventricular septum (PA/IVS) associated with right ventricular hypoplasia (RVH).

Method: We retrospectively reviewed neonates diagnosed with PS/PA-IVS-RVH who underwent pulmonary valvuloplasty and right ventricular outflow tract reconstruction. Primary outcome measures included RV-to-left ventricular (LV) length ratio, tricuspid valve Z-scores, and the ratio of tricuspid valve annulus to mitral valve annulus.
Result: Eight neonates (age at intervention: 2.1±1.1 days) underwent successful biventricular correction between May 2022 and December 2024 at our center. All patients survived and were discharged despite prolonged intensive care unit (ICU) stays (35±21 days) and overall hospital stays. Postoperative complications included oliguria requiring peritoneal dialysis (2 cases), poor wound healing (1 case), transient hypoxia lasting 4.1±1.8 days (all cases), and mild anastomotic stenosis (2 cases). All patients recovered without severe long-term sequelae. Early intervention significantly enhanced RV growth parameters, as evidenced by increases in RV/LV length ratio from 0.6 (range: 0.5–0.8) preoperatively to 0.8 (range: 0.6–0.9) at discharge ($P<0.05$), tricuspid valve Z-scores from –0.8 to 0.4 ($P<0.05$), and tricuspid-to-mitral valve annulus ratio from 0.67±0.09 to 0.88±0.13. During a median follow-up period of 1.5 years, the RV developed favorably with no signs of right heart failure or complications necessitating further surgical intervention.
Conclusion: Early neonatal biventricular correction effectively promotes RV growth in neonates with PS/PA-IVS and RVH, facilitating successful establishment of biventricular circulation. However, the extended postoperative recovery period indicates the need for further optimization of perioperative management strategies.
Keywords: Right ventricular hypoplasia, pulmonary stenosis, pulmonary atresia, surgical correction

Abstract 8

PDA Single Chip Technique for Neonatal Aortic Arch Interruption: A Surgical Exploration
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Abstract:
Background: Aortic arch interruption (IAA) is a rare congenital heart defect (accounting for 1%-1.5% of all congenital heart diseases), characterized by the complete absence of a segment of the aortic arch, resulting in the discontinuity of blood flow between the ascending and descending aorta. Classification (Celoria-Patton): Type A (30%), Type B (65%), Type C (5%). Surgical Approaches for Aortic Arch Reconstruction in IAA: Direct anastomosis carries a risk of anastomotic stenosis under tension. Prosthetic grafts require reoperation due to patient growth mismatch. Autologous repair (PDA + pulmonary patch) is technically complex, with concerns for late calcification.
Objective: To assess outcomes of autologous aortic arch reconstruction using PDA (posterior wall) and pulmonary artery patch (anterior wall), focusing on surgical feasibility, freedom from reintervention, and late calcification. To assess the procedural feasibility, perioperative safety, and midterm therapeutic efficacy of ductal unifocalization in neonatal IAA repair.
Method: A retrospective analysis was conducted on four neonates diagnosed with IAA over the past two years. This study included four neonates born at our center (August 2023–May 2025), with three admitted post-August 2024. Standardized follow-up occurred at 1, 3, and 6 months post-discharge. All neonates underwent primary complete repair, utilizing ductal tissue and an autologous pulmonary artery patch for transverse aortic arch reconstruction. PDA was fully

mobilized, trimmed into a patch, and anastomosed end-to-side to reconstruct the aortic arch under tension-free conditions (7-0 Prolene continuous suture). Concurrent ventricular septal defect (VSD) closure was performed in a single-stage procedure.
Result: The arterial duct unifocalization technique is applicable for anatomical reconstruction of IAA in neonates, demonstrating significant short-term efficacy. Midterm follow-up demonstrates no significant calcification or contracture in autologous tissue patches.
Conclusion: This approach provides a novel "autologous vessel-preserving" option for IAA surgery.
Keywords: Aortic arch interruption, PDA, autologous reconstruction, neonate

Abstract 9

Single-center experience of pulmonary valve stenosis dilation through femoral vein balloon under esophageal ultrasound guidance
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Abstract:
Objective: Exploring the effect of balloon dilation through femoral vein guided by transesophageal echocardiography (TEE) in the treatment of pediatric pulmonary valve stenosis(PS), as well as the results of mid-term follow-up.
Method: A retrospective analysis was conducted on 54 children with PS (26 males, 28 females; age range: 10 months~12 years 9 months, mean 3.64±2.63 years; weight 16.29±8.84 kg) and treated with TEE-guided balloon dilation for pulmonary valve stenosis at our institution since 2022. Procedural success and follow-up hemodynamic outcomes were assessed.
Result: All 54 patients underwent successful procedures with favorable postoperative recovery. The mean transvalvular pressure gradient (ΔP) significantly decreased from 52.34±15.41mm Hg preoperatively to 12.73±5.43mmHg immediately post- procedure ($P < 0.01$). Follow-up ΔP remained stable at 1 month (15.75 ± 9.08 mmHg), 3 months (14.52 ± 7.01 mmHg), 6 months (17.28 ± 6.20 mmHg), and 1 year (19.27 ± 7.10 mmHg).
Conclusion: Balloon dilation for pulmonary valve stenosis by TEE-guided is a safe, effective, and radiation-free technique, offering advantages such as minimal invasiveness, excellent cosmetic results, reduced costs, and rapid recovery. Short-to-midterm follow-up confirms sustained hemodynamic improvement, supporting its adoption as a first-line intervention.
Keywords: Pulmonary valve stenosis, Esophageal ultrasound guidance, Balloon dilation

Abstract 10

Cardiopulmonary bypass may increase microplastic exposure in children with congenital heart disease: A prospective observational study
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Abstract:
Objective: Cardiopulmonary bypass (CPB) is widely used in cardiac operations. However, it

remains unclear whether a CPB circuit, which is mainly made of plastics, can release micromanoplastics (MNPs) into the bloodstream.
Method: We conducted a prospective observational study involving children undergoing congenital heart disease repair with CPB support. Blood samples were collected before and after CPB and analyzed using pyrolysis-gas chromatography/mass spectrometry (Py-GC/MS) and laser direct infrared spectroscopy (LDIR) in combination with scanning electron microscopy.
Result: A total of 22 patients were involved in this study. The Py-GC/MS analysis revealed a significant increase in total MNPs after CPB support ($p<0.0001$). Notably, CPB support significantly increased the levels of polystyrene ($p=0.046$), polyethylene ($p=0.038$), polypropylene ($p<0.0001$), polyvinyl chloride ($p<0.0001$), and polyamide 6 ($p=0.027$). CPB time was positively correlated to MNP exposure ($r=0.43$, $p=0.047$). Increases in MNP exposure were positively correlated to an increase in white blood cells ($r=0.52$, $p=0.013$) and neutrophils ($r=0.46$, $p=0.029$). The LDIR analysis found that the post-CPB count of MNPs was significantly higher than the pre-CPB count ($p=0.015$).
Conclusion: In conclusion, CPB support significantly increases exposure to MNP in children undergoing cardiac operations. Further investigations are warranted to clarify the long-term health risks of MNP exposure caused by CPB support.
Keywords: Microplastics, Children, Cardiopulmonary bypass, Congenital heart diseases

Abstract 11

Mid to Long-Term Outcomes and Risk Factor Analysis for Fontan Patients from single center study
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Abstract:
Objective: The study aims to evaluate the mid- and long-term outcomes of Fontan patients, with a focus on identifying contemporary risk factors for early mortality and Fontan failure.
Method: This study included 173 patients who underwent Fontan operation at the Children's Hospital of Fudan University. Clinical data were retrospectively collected, and long-term survival and complications were assessed through telephone or outpatient follow-up. Binary logistic regression was used to identify risk factors for early mortality and delayed drainage, while Cox regression models were employed to determine the risk factors for Fontan failure. Differences in mid- and long-term outcomes were analyzed based on patient characteristics, including dominant right ventricle, intracardiac versus extracardiac conduit Fontan, fenestration status, significant preoperative atrioventricular valve regurgitation, heterotaxy syndrome, and delayed postoperative drainage.
Result: Among the cohort, 59 patients (34.1%) were female, with a median age at Fontan surgery of 52 months (44-72.3 months) and a median follow-up period of 7.8 years. Patients with dominant right ventricle morphology were more likely to present with heterotaxy syndrome and significant atrioventricular valve regurgitation. Intra-extracardiac Fontan procedures were more commonly applied in anatomically complex or hemodynamically unstable cases requiring fenestration. The 5-year, 10-year, and 15-year survival rates in this cohort were 90.1%, 88.0%, and 80.0%, respectively, with freedom from Fontan failure rates of 87.7%, 82.5%, and 73.0%. Pulmonary atresia with VSD or complete atrioventricular canal defect (OR = 13.3 [2.8-63.9], p = 0.001) and

delayed sternal closure (OR = 5.1 [1.0-24.7], p = 0.045) were identified as independent risk factors for early mortality. Intracardiac or extracardiac Fontan surgery (OR = 0.5 [0.2-1.1], p = 0.089) and fenestration (OR = 0.6 [0.3-1.1], p = 0.01) were associated with a reduced incidence of delayed drainage. History of Valve surgery (HR = 3.3 [1.0-11.0], p = 0.047), delayed sternal closure (HR = 3.5 [1.2-10.0], p = 0.017), and ICU stay ≥1 week (HR = 7.5 [2.4-23.4], p < 0.001) were significant risk factors for Fontan failure.

Conclusion: The outcomes of Fontan operations have improved significantly over the years, with a trend towards more frequent use of intra/extracardiac conduit fenestrated Fontan procedures. pulmonary atresia/VSD/AV canal, dominant RV, history of valve surgery seems to indicate poor prognosis.

Keywords: Congenital heart disease, Fontan procedure, Fontan failure, risk factor

Abstract 12

Computational Fluid Dynamics Study in Optimizing The Morphological Of Valves In ePTFE Valved Conduits

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Abstract:

Objective: This study aims to evaluate the impact of leaflet morphology on the hemodynamics of expanded polytetrafluoroethylene (ePTFE) valved conduits and to provide theoretical guidance for the clinical optimization of valved conduit designs using full-factor experimental design (DOE) and in vitro fluid dynamics experiments.

Method: An in vitro dynamic experiment was conducted to test the hemodynamic performance of ePTFE valved conduits based on current template. A computational simulation model of the valved conduit was established. DOE was employed to optimize leaflet trimming parameters, iterating three key parameters: leaflet height, commissure height, and free-edge length. The optimization objective was to maximize the valve orifice area and minimize regurgitation.

Result: A 22 mm ePTFE valved conduit was fabricated following the current surgical template. In vitro pulsatile flow testing showed an average effective orifice area (EOA) of 1.077 cm22, a regurgitation fraction of 7.86%, and a mean transvalvular pressure gradient of 18.64 mmHg. High-resolution imaging revealed twisted and overlapping leaflets during diastole. Fluid-structure interaction (FSI) simulations indicated a significant correlation between leaflet trimming parameters and the hemodynamic performance of the valved conduit prosthesis. Reducing leaflet height improved hemodynamic performance, with the optimized parameters set as follows: free-edge length at 1/3 of the conduit circumference(C), leaflet height at approximately 0.012 diameter(D), and commissure height at about 0.24D (Table 1). Under a cardiac output of 3.5 L/min, the optimized valve exhibited a 3.79% reduction in peak flow velocity, a 45.18% decrease in maximum equivalent strain, and a 66.57% reduction in leaflet coaptation area (Table 2).

Conclusion: Proportionally reducing the free-edge length and appropriately controlling the leaflet height can effectively decrease regurgitation caused by redundant leaflets overlap during diastole. Additionally, this optimization helps reduce leaflet strain, thereby improving the durability of the valved conduit.

Keywords: ePTFE, Valved Conduit, Hemodynamics, Leaflet Optimization, Computational Fluid Dynamics

Abstract 13

Do Bovine Jugular Vein Valved Conduits or ePTFE Conduits Demonstrate Comparable Performance to Homografts in Right Ventricular Outflow Tract Reconstruction?

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Abstract:
Objective: Homograft, bovine jugular vein (BJV) and expanded polytetrafluoroethylene (ePTFE) valved conduits are most common valved conduits for reconstructing right ventricular outflow tracts (RVOT), we aimed to compare the performance of those three valved conduits
Method: We searched Ovid MEDLINE, Ovid Embase as well as Chinese databases of SinoMed, CNKI and Wanfang from January 1st, 2000 to August 26th, 2024 to identify studies on RVOT reconstruction with homograft, BJV and ePTFE valved conduits. We included studies reporting the outcomes of mortality, replacement rate, and the incidence of infective endocarditis (IE). The "meta" and "metafor" packages in R version 4.2.1 were used for evidence synthesis. ROBINS-I tool was used for assessing the risk of bias. This study is registered on PROSPERO
Result: According to 28 retrospective cohort studies (n=3,966), there was no significant difference in mortality and replacement rate between homograft, BJV and ePTFE. However, the IE incidence in BJV was significantly higher than that in homograft (RR = 3.63, 95% CI: 1.69–7.83, P < 0.01). Based on the pooled results of 113 case-series reports (n=16,367), the total mortality of homograft, BJV and ePTFE was 8% (95% CI: 6%-9%), 5% (95% CI: 4%-7%), and 3% (95% CI: 3%-4%) respectively. The replacement rate of homograft, BJV and ePTFE was 9% (95% CI: 6%-13%), 9% (95% CI:6%-12%) and 4% (95% CI: 2%-9%) respectively. The IE incidence of homograft, BJV and ePTFE was 2% (95% CI: 1%-4%), 6% (95% CI: 3%-10%), and 1% (95% CI: 1%-2%).
Conclusion: BJV and ePTFE valved conduits are both good substitutes for the homograft, but the patients with BJV should be closely monitored to prevent the occurrence of IE.
Keywords: Right ventricular outflow tract reconstruction, Homograft, Bovine jugular vein conduits, Polytetrafluoroethylene valved conduits, Prognosis

Abstract 14

Device closure versus surgical repair for doubly committed subarterial ventricular septal defect

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Abstract:
Objective: Device closure for doubly committed subarterial ventricular septal defect (dcsVSD) has been applied in the past decade. However, studies on dcsVSD device closure are largely small-sample, single-arm studies, with inconsistent outcomes. This study aimed to demonstrate

that dcsVSD device closure and surgical repair could achieve similar mid-term results.
Method: This was a single-center, retrospective comparative study. The primary endpoint was a hierarchical composite comprising new-onset aortic regurgitation (AR) during follow-up, residual shunt at the last follow-up, and cardiovascular event-related or procedure-related readmission within four weeks after discharge.
Result: From 2013 to 2023, 553 dcsVSD patients were included. There were 244 in the device closure group, and 309 in the surgical repair group. The procedural success rates were 97.1% and 100.0% for each group (P=0.003*P*=0.003). The overall median follow-up time was 48.0 (18.0−76.018.0−76.0) months. Regarding our primary endpoint, the win ratio comparing device closure with surgical repair was 1.11 (95% confidence interval: 0.63 - 1.98, P=0.716*P*=0.716). The risk of new-onset AR was similar between the two groups (5.5% vs 4.0%; log-rank P=0.474*P*=0.474). Residual shunt rates at the last follow-up and four-week readmission rates were also comparable (3.0% vs 3.6%, P=0.664*P*=0.664; and 0.8% vs 2.3%, P=0.326*P*=0.326).
Conclusion: Based on our retrospective data, dcsVSD device closure had both satisfactory success rate and low incidence of postoperative adverse events. During the mid-term follow-up, results for our primary endpoint were comparable between dcsVSD device closure and surgical repair.
Keywords: Device closure, surgical repair, doubly committed subarterial ventricular septal defect
Note: This study has been accepted by the TJCVS on Apr 23, 2025. (DOI: 10.1016/j.jtcvs.2025.04.038.)

Abstract 15

Analysis of Surgical Outcomes in 58 Cases of Unilateral Pulmonary Artery of Ductal Origin
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Abstract:
Objective: Unilateral pulmonary artery of ductal origin (DOPA) is a rare congenital heart disease. This study summarizes the clinical outcomes of surgical treatment at our center.
Method: A retrospective analysis was conducted on the clinical data of 56 pediatric patients (58 cases) with DOPA who underwent surgical treatment at our center from January 2009 to December 2024 (33 males, 23 females; 15 left-sided, 41 right-sided). Preoperative evaluation with CTA or retrograde pulmonary venous angiography confirmed the presence of pulmonary artery (PA) remnants at the hilum. The median age was 6.9 months (range: 11 days–12 years and 7 months), and the median weight was 6.30 kg (range: 2.09–39.3 kg).
Result: Surgical techniques included conduit implantation (3 Gore-Tex conduits, 9 autologous pericardial conduits), direct anastomosis (11 cases), and PA flap augmentation (35 cases). Except for one early death due to respiratory infection, all other patients survived. Eleven patients were extubated in the operating room, with a median ventilator time of 28 hours (range: 2–390 hours), median ICU stay of 3 days (range: 1–87 days). Postoperative aspirin anticoagulation was administered for 6 months. Follow-up ranged from 1 month to 8.4 years, with no mid- or long-term deaths or occurrences of respiratory symptoms or cardiac dysfunction. Two patients with Gore-Tex conduit implantation to the branch PA underwent flap augmentation using the main pulmonary

artery after 6 and 9 years, respectively. Eleven patients underwent balloon dilation for stenotic neo-PAs. At the last follow-up, the hilar diameter (mm) (Z-score) of the affected neo-PA was 5.89±1.89,−2.135.89±1.89,−2.13 (range: -10.36 to 1.39), showing significant improvement compared to preoperative values (3.42±1.12,−4.513.42±1.12,−4.51 (range: -8.98 to -0.21)). Increased blood flow velocity of neo-PA was observed in 5 cases, five showed no improvement in Z-scores, and one case developed occlusion. All other patients had patent blood flow without pulmonary hypertension.

Conclusion: For DOPA patients, early and aggressive surgical intervention to reconstruct pulmonary blood supply effectively restores normal blood flow and promotes PA growth. Neo-PA stenosis is the primary reason for long-term reintervention. Aggressive cardiac catheterization leads to better prognosis.

Keywords: unilateral pulmonary artery of ductal origin, pulmonary artery flap, surgery

Abstract 16

Early Outcomes of Neopulmonary Valve Reconstruction Using Right Atrial Appendage Tissue

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Abstract:

Objective: To evaluate the surgical techniques and early clinical outcomes of pulmonary valve reconstruction using autologous right atrial appendage (RAA) tissue in right ventricular outflow tract (RVOT) repair.

Method: This retrospective study analyzed 28 congenital heart disease patients who underwent RAA-based pulmonary valve reconstruction between March 2023 and April 2025. Cases included Ross procedure (n=7), pulmonary atresia with ventricular septal defect (PA/VSD, n=3), pulmonary atresia with intact ventricular septum (PA/IVS, n=4), severe pulmonary stenosis (n=8), and tetralogy of Fallot (TOF, n=6). Bileaflet valves were constructed in 26 patients and monocuspid valves in 2. For anterior RVOT reconstruction, autologous pericardium was used in 13 cases, bovine pericardium in 13, and Gore-Tex conduits in 2; the posterior wall utilized native pulmonary artery tissue in 20 cases and Gore-Tex in 2.

Result: Mean operative time was 307.67±12.9 minutes, with cardiopulmonary bypass duration of 176.5±77.89 minutes and aortic cross-clamp time of 94.21±43.28 minutes. Postoperative outcomes included mechanical ventilation duration (2.96±2.73 days), CICU stay (5.12±3.33 days), and hospitalization (17.88±11.4 days). Complications comprised delayed sternal closure (n=5), diaphragmatic plication (n=1), pneumothorax (n=2), and cerebral injury (n=1). One PA/IVS patient died from low cardiac output. Echocardiography demonstrated pulmonary annulus diameter of 13.7±4.71 mm and peak velocity of 1.58±0.68 m/s. At median 6-month pulmonary annulus diameter was 14.5±3.36 mm and peak velocity was 1.74±0.82 m/s with regurgitant area of 1.51±0.94 cm². No RVOT reinterventions were required.

Conclusion: RAA-based pulmonary valve reconstruction demonstrates feasibility for RVOT repair with acceptable early outcomes. Long-term evaluation of valve durability remains necessary.

Keywords: Right atrial appendage; Pulmonary valve reconstruction; Right ventricular outflow tract; Congenital heart defects.

Abstract 17

Recurrent RV-PA Conduit Compression After Modified Nikaidoh in TGA/DORV: Surgical Lessons

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Abstract:
Case Report: We report a patient with transposition of the great arteries (TGA), double outlet right ventricle (DORV), and right aortic arch who underwent a left modified Blalock-Taussig shunt at 11 days of age, followed by a modified Nikaidoh procedure at 11 months. The operation included aortic root translocation with Lecompte maneuver and placement of a 14 mm pulmonary homograft as a right ventricle-to-pulmonary artery (RV-PA) conduit. At age 3, the conduit was upsized to an 18 mm Contegra graft due to progressive RV outflow tract obstruction (RVOTO). However, at age 7, the patient presented again with significant RVOTO: echocardiography revealed peak/mean conduit gradients of 77/39 mmHg, and catheterization showed a gradient of 58 mmHg with notable conduit calcification. Intraoperatively, severe retrosternal adhesions and mechanical compression of the conduit between the sternum and aorta were observed. To relieve the compression, a left pleural release was performed to allow leftward cardiac shift, and a Gore-Tex membrane was placed beneath the sternum to prevent further adhesion. Valve upsizing was deferred due to anticipated space limitation. Postoperatively, imaging confirmed decompression of the conduit's thin segment. Given the evident anterior compression from the aorta, aortic plication may be considered in similar cases to reduce conduit impingement. This strategy, in conjunction with spatial optimization and adhesion prevention, may help prevent recurrent RVOTO. This case highlights the importance of anticipating both sternal and aortic compression after Lecompte maneuver in complex conotruncal repairs, underscoring the need for individualized surgical planning.
Keywords: RV-PA Conduit Compression, DORV/TGA

Abstract 18

An Innovative "Percoronary Puncture" Technique for Device Occlusion of Coronary Artery Fistula in Infant

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Abstract:
Objective: Coronary artery fistula (CAF) is a rare congenital anomaly. Closure of large, tortuous, aneurysmal, and distal located CAFs in infants presents challenges; Traditional surgical ligation via sternotomy carries significant morbidity, while percutaneous approaches face technical difficulties with femoral access and device delivery. We describe a novel "percoronary puncture device occlusion" technique designed to avoid the substantial trauma of open surgery and overcome the limitations of percutaneous closure.This retrospective study aimed to evaluate the feasibility and efficacy of the "percoronary puncture technique" for transcatheter device occlusion of CAF in infants.
Method: Symptomatic infants with large, tortuous, aneurysmal distal CAFs were included. Under transesophageal echocardiography (TEE) guidance, a small incision was made via lower

mini-sternotomy or parasternotomy. Purse-string sutures were secured on the dilated segment of the fistula. Direct puncture of the coronary artery fistula was performed, and a guidewire was advanced into the termination chamber under TEE guidance. Occluder devices were then deployed at the fistula outlet or mid-portion.

Result: Eight patients underwent percoronary device occlusion. Median age was 11 months (range: 2-12 months), and median weight was 9.5 kg (range: 7.5-12 kg). The mean fistula outlet diameter was 4.09 mm (range: 3-5 mm), and the mean dilated segment diameter was 12.8 mm (range: 8-17 mm). The fistula originated from the right coronary artery in 7/8 patients (87.5%). Drainage sites were the right ventricle (n=4, 50%), right atrium (n=3, 37.5%), and left ventricle (n=1, 12.5%). Ventricular septal defect (VSD) occluders were deployed in all infants, with a mean device diameter of 4.88 mm (range: 4-6 mm). Deployment was successful at the fistula termination in 7/8 patients and within the fistula vessel in 1/8 patient. Complete occlusion was achieved in all cases (100%), with no residual shunt detected at the 3-month follow-up. No major adverse events occurred perioperatively or during follow-up.

Conclusion: The percoronary puncture technique for CAF closure is a safe and highly effective approach for managing large, tortuous, aneurysmal fistulas in infants. We recommend this technique as a valuable alternative to traditional surgical ligation or percutaneous closure in selected cases.

Keywords: Coronary artery fistula; Percoronary puncture; Device occlusion; Infant; Transesophageal Echocardiography guided

Abstract 19

A Novel Transthoracic Balloon Valvuloplasty Technique for Severe Pulmonary Valve Stenosis in Low-Weight Infants under TEE Guidance

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Abstract:

Objective: To evaluate the clinical feasibility and mid-term outcomes of a novel transthoracic balloon pulmonary valvuloplasty (BPV) under transesophageal echocardiography (TEE) guidance in critically ill infants with severe pulmonary valve stenosis (PS) and low body weight.

Method: A retrospective analysis was performed on 32 infants (mean age and weight below standard thresholds) who underwent TEE-guided transthoracic BPV at our center between May 2015 and June 2022. Through a small right thoracic or subxyphoid incision (2-3 cm), direct cardiac access was achieved for balloon delivery across the pulmonary valve. Preoperative, intraoperative, and follow-up echocardiographic parameters–including transvalvular pressure gradient (PvG), right ventricular morphology, and valvular regurgitation–were analyzed.

Result: The procedure achieved a 100% technical success rate without major intraoperative complications. Mean PvG decreased significantly from (91.2±16.4) mmHg preoperatively to (17.5±7.1) mmHg immediately postoperatively ($P<0.001$), and remained consistently low over 12 months. Right ventricular hypertrophy and tricuspid regurgitation also improved. No patients required cardiopulmonary bypass or cardiac arrest. Only one patient (3.1%) required late surgical reintervention due to restenosis; one postoperative death occurred due to low cardiac output. Mild-to-moderate pulmonary regurgitation increased gradually but remained clinically acceptable.

Conclusion: TEE-guided transthoracic BPV represents an innovative, minimally invasive alternative for treating severe PS in infants with fragile peripheral vasculature, for whom traditional

percutaneous or open-heart surgery is high-risk. This technique combines the precision of direct cardiac access with reduced procedural trauma, showing promising mid-term efficacy and safety. Further validation in larger, prospective cohorts is warranted.

Keywords: Pulmonary Valve Stenosis; Transthoracic Balloon Valvuloplasty; Low-Weight Infants; Transesophageal Echocardiography guided

Abstract 20

Three Dimensional Technology Aiding Complete Repair In Criss Cross Heart With Remote Ventricular Septal Defect

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Abstract:
Objective: Two ventricular repair in criss cross heart with complex congenital heart defect is often not attempted due to complexity of the lesion. We describe such a case where a meticulous preoperative evaluation and discussion enabled a surgical plan for a complex repair
Method: A 7 year old child was diagnosed to have a complex CHD ,Dextrocardia , criss cross heart with atrioventricular concordance with DORV, L posed aorta, remote VSD, straddling tricuspid valve and left juxtaposed atrial appendage. Child underwent Pulmonary artery banding followed by Glenn shunt with MPA interruption in infancy. Echocardiography done at admission revealed a remote VSD with no clear pathway for routing.
Result: Cardiac CT images were post processed to create a 3 D reconstruction of the heart . which revealed a potential complex routing pathway for the remote VSD to the aorta where by the patch will need to be sutured to the inferior border of VSD and will pass over the superior aspect of the tricuspid valve over its anterior leaflet to the posterior aspect of the aortic valve. The resultant pathway will have an unusual posterior course for tricuspid valve to pulmonary valve blood flow and an anterior course for mitral valve to aortic valve blood flow via VSD within right ventricle. Intraoperatively the same surgical plan was executed without any deviation from the preoperative planning.
Conclusion: Imaging in criss cross heart is challenging and 3 D virtual imaging helps in understanding the anatomy and planning a complex repair in such a scenario

Keywords: Criss Cross, Intraventricular tunneling, Doubleoutlet right ventricle

Abstract 21

3D Virtual Reality Based Intraventricular Tunneling Planning In Complex Congenital Heart Surgery: - A Feasibility Study

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Abstract:
Objective: Intraventricular tunneling is a critical step in complex CHD surgeries, feasibility of which

will determine the chances for a biventricular repair. The study was aimed in understanding the contribution of 3D virtual reality in favoring biventricular repair in such a scenario.
Method: Complex CHD where intraventricular tunneling was involved as part of biventricular repair where prospectively analyzed by 3DVR Medical modelling techniques (Using cardiac CT data and simulation software). Main part of study involved in identifying the best possible route for tunneling with least propensity for obstruction, analyzing the adequacy of ventricular septal defect and simulating left ventricle to great vessel baffle. Digitally designed baffle was analyzed for morphometrics and 3D printed into templates for guiding intraoperative baffle creation. Adherence to simulation based surgical plan and ease of baffle creation were assessed in operating theatre.
Result: 17 complex cases (Median age 6.8 years) included, DORV (n=10,3 with superoinferior ventricles), DOBV =1, CCTGA=4, DTGA=2. Situs abnormalities 6/17, Dextrocardia7/16 and additional cardiac defects added to the complexity. 14/17 were previously surgically palliated. Intraoperative findings were concurrent in all and in 16/17 predicted pathway was utilized. Intraoperative patch was cut with 15 % excess to the printed template in all dimensions to accommodate for variability. 3 D printed baffle helped in creating an unobstructed pathway with minimal judgement involved in creation of baffle. Deviation from predicted morphometrics was 10%
Conclusion: Advanced 3D technology, 3DVR simulation and predictive baffle modelling helps in planning and executing intraoperative tunneling in complex heart surgeries improving efficacy, accuracy and predictability.
Keywords: Virtual imaging, Intraventricular tunneling, Double outlet right ventricle

Abstract 22

Dextro-Transposition of the Great Arteries with Ebstein Anomaly in a Newborn: Surgical Strategy Dilemma

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Abstract:
Introduction: Transposition of the great arteries (TGA) is a life-threatening congenital heart defect (CHD). Ebstein anomaly, a rare tricuspid valve malformation, is most often associated with congenitally corrected TGA, but extremely rare with dextro-TGA (d-TGA). This rare combination poses unique diagnostic and surgical challenges. A thorough evaluation is needed in determining the feasibility of arterial switch operation (ASO) or the need for left ventricular (LV) training through pulmonary artery (PA) banding.
Case Presentation: A 16-day-old neonate with d-TGA and Ebstein anomaly presented in severe cyanosis. Echocardiography revealed d-TGA with intact ventricular septum and Ebstein anomaly with moderate-to-severe tricuspid regurgitation. A large atrial septal defect post-balloon atrial septectomy, patent ductus arteriosus, and hyperdynamic left ventricle with left ventricle mass index (LVMI) of 41 g/m² were also noted. Intraoperative catheterisation showed a pulmonary-to-systemic pressure ratio of 0.5, rising to >0.67 with PA banding, suggesting LV preparedness. The patient underwent ASO on day 24 but ultimately failed to wean from cardiopulmonary bypass due to biventricular failure.
Discussion: This case highlights the limitations of current criteria for assessing LV preparedness

in the setting of complex CHD. Despite meeting standard objective criteria, severe intraoperative failure may still occur when d-TGA is complicated by Ebstein anomaly. This case suggests that more conservative thresholds may be considered in such complex anatomical and physiological settings.
Conclusion: This is the first reported case of d-TGA with Ebstein anomaly undergoing single-stage ASO. This report emphasizes the urgent need to develop refined guidelines that specifically address the challenges posed by rare CHD combinations.
Keywords: Transposition of the great arteries, Ebstein anomaly, Arterial switch operation, Congenital heart disease

Abstract 23

Late Presentation of Transposition of Great Arteries with Ventricular Septal Defect and Arch Obstruction: Successful Single-Stage Surgical Correction
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Abstract:
Objective: Transposition of great arteries (TGA) and aortic arch obstruction (hypoplastic aortic arch, coarctation of aorta, and interrupted aortic arch) is a rare and complex congenital heart defect. The estimated prevalence of this combination, particularly when associated with severe pulmonary hypertension is approximately 0.06 per 10,000 liver births, making it an extremely uncommon clinical scenario. When diagnosis and treatment are delayed, surgical correction becomes increasingly challenging due to progressive pulmonary vascular disease and disproportionate growth of great arteries, especially in resource-limited settings.
Method: We present two cases of late-presenting TGA-VSD and aortic arch obstruction, the first patient has a hypoplastic aortic arch identified at 6 months old, while the second patient has an interrupted aortic arch identified at 1 year old. Both patients underwent single-stage surgical repair consisting of VSD closure with perforated patch, aortic arch and coarctation of aorta reconstruction, and arterial switch operation (ASO) with LeCompte maneuver.
Result: Postoperative echocardiography evaluation in both cases showed satisfactory anatomical and functional outcomes.
Conclusion: A single-stage repair approach can be a safe and effective strategy in selected patients with late-presenting TGA-VSD and aortic arch obstruction. This technique allows for simultaneous correction of a complex cardiac defect and may improve surgical outcome in this challenging population.
Keywords: Transposition of great arteries, aortic arch obstruction, single-stage surgical repair

Abstract 24

Clinical spectrum of congenital heart disease (CHD) surgery in children at a tertiary referral center in Indonesia: a retrospective 4 years-experience analysis
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Abstract:
Objective: To evaluate the clinical characteristics in children underwent CHD surgery procedures during the period of 2021 to 2025 in our center
Method: A retrospective data was collected from medical records of children underwent CHD surgery between January 1, 2021 to July 10, 2025 in Dr. Soetomo General Academic Hospital, Surabaya, Indonesia
Result: A total of 853 children with CHD underwent surgery with 10 died due to complications. Male children (52.52%) and children below 5 years (54.87%) presented with higher frequency. Cyanotic CHD were dominant as primary etiology with total repair in tetralogy of Fallot (TOF) being the most common (30.13%), followed by double outlet right ventricle (DORV) (5.28%). Acyanotic CHD procedures were mostly ventricular septal defect (VSD) closure (22.27%) and atrial septal defect (ASD) closure (9.97%) being the simplest singular CHD procedures. Most cases were being elective surgery (81.24%) compared to emergency surgery. Mortality rate was low (0.11%) due to cardiac failure and infection.
Conclusion: CHD surgery can be safely performed in most CHD cases in children. TOF repair and VSD closure were the most common procedures in cyanotic and acyanotic CHD lesions, respectively, with low mortality rate.
Keywords: Congenital heart disease surgery, children, Indonesia

Abstract 25

Aortic Root Translocation (Modified Nikaidoh Procedure) for DORV with Remote VSD and PS in an Infant Patient

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Abstract:
In this case of DORV with remote non-committed VSD, aortic translocation is technically feasible and may be the only option for anatomical repair. The long LVOT may still entail a risk of development of LVOTO.
Keywords: DORV, Modified Nikaidoh Procedure, VSD

Abstract 26

Case Report: Staged One-and-a-Half Ventricular Repair for a Patient with Double Outlet Right Ventricle and Remote Ventricular Septal Defect

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Abstract:
Case: An 2-month-old boy (3.8 kg) with double outlet right ventricle (DORV) and a remote

ventricular septal defect (VSD) was referred for surgical management. The great arteries were arranged side-by-side, and preoperative computed tomography (CT) with three-dimensional(3D) reconstruction revealed that the VSD was remote but extending to both the subpulmonic and subaortic regions but closer to the subpulmonic outflow. The subaortic conus was prominent, making direct VSD-to-aortic valve (AV) baffling technically challenging. Although anatomical repair was considered, the final decision was deliberately deferred, and pulmonary artery banding was performed as an initial step. At 9 months of age, follow-up cardiac CT demonstrated a prominent subaortic conus with mild subaortic stenosis. However, due to concerns regarding potential right ventricular volume reduction and RV inflow disturbance caused by the LVOT baffle, anatomical repair was further deferred by performing subaortic conus resection, tightening of the pulmonary artery, and bidirectional Glenn. The patient was followed-up until the age of three years, when repeat cardiac CT and 3D modeling were reviewed in a multidisciplinary conference. It was concluded that the VSD was restrictive but could be safely extended to allow direct baffling to the AV for anatomical repair. At 3 years and 4 months (16.2kg), the patient underwent VSD baffling, LVOT relief with subaortic conus resection and VSD extension, and right ventricular outflow tract and main pulmonary artery patch widening using a PTFE patch, achieving a one-and-a-half ventricular repair. Postoperative echocardiography showed no residual LVOT obstruction.

Keywords: Double outlet right ventricle, Remote ventricular septal defect, One-and-a-half ventricular repair, Ventricular septal defect extension, Staged repair

Abstract 27

Neonatal Repair of Isolated Ventricular Septal Defects

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Abstract:
Objective: The aim of the study was to investigate outcomes of surgical closure of isolated VSD in neonates and to identified factors associated with mortality and early major adverse events.
Method: This retrospective study included all patients who underwent isolated ventricular septal defect (VSD) closure at our institution from January 1995 to December 2024. Of 3,911 patients, 57 neonates (1.46%) underwent repair during the neonatal period. The median age at surgery was 21 days (IQR, 18–25), and median body weight was 3.03 kg (IQR, 2.61–3.50). Associated cardiac lesions included atrial septal defect (n=57), patent ductus arteriosus (n=21), and other anomalies such as ventricular outflow tract obstruction, vascular ring, or partial anomalous pulmonary venous return. Primary outcomes were mortality and early major adverse events. Statistical analyses included Kaplan–Meier survival analysis, logistic regression for in-hospital mortality and early adverse events, and Cox proportional hazards for overall mortality.
Result: Among the 57 neonates who underwent isolated VSD closure, the overall mortality rate was 9.1% (n=5), including in-hospital mortality of 5.3% (n=3) and late mortality of 3.5% (n=2). The median follow-up duration was 11.1 years (range, 4.1–17.8 years). Early major adverse events occurred in eight patients (12.4%), which included tracheostomy in three patients (5.5%), use of mechanical circulatory support in two (3.6%), sepsis in two (3.6%), reoperation due to residual VSD in one (1.8%), and acute kidney injury requiring dialysis in one (1.8%). In the logistic regression analysis, total circulatory arrest (OR 26.5, 95% CI 1.18–595, p=0.039) and longer cardiopulmonary

bypass time (per hour, OR 4.46, 95% CI 1.05–18.9, p=0.042) were associated with increased risk of in-hospital mortality. For early major adverse events, extra-cardiac anomalies were identified as a significant risk factor in both univariable (OR 19.4, 95% CI 2.17–173.0, p=0.008) and multivariable analysis (OR 22.3, 95% CI 2.87–583, p=0.012).
Conclusion: Neonatal Isolated VSD closure showed higher risk of mortality and morbidity. Longer bypass time and total circulatory arrest may be related to in-hospital mortality, and extracardiac anomalies to early adverse events. Staged repair strategies may be reasonable in selected patients, but further studies are needed.
Keywords: Ventricular septal defect, Neonate

Abstract 28

Contemporary outcomes of Systemic to Pulmonary Shunt in Patients with Congenital Heart Disease: A Single-Center Retrospective Study
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Abstract:
Objective: Despite advances in surgical techniques and postoperative management, SPS is still associated with significant mortality and morbidity, particularly during the interstage period. This study aimed to evaluate contemporary outcomes of systemic-to-pulmonary shunt (SPS) procedures in patients with congenital heart disease.
Method: This retrospective study included 565 patients who underwent modified Blalock-Taussig shunt procedures using Polytetrafluoroethylene grafts between 2008 and 2023. Patients with prior/concomitant bidirectional Glenn shunt, Sano shunt, or reverse BTS were excluded. Patients were grouped into three surgical eras to evaluate temporal changes. Aspirin dosage was increased from 5 to 10 mg/kg/day since October 2012. Kaplan-Meier survival analysis with log-rank testing and Bonferroni correction was used to compare outcomes across eras. Logistic regression was performed to identify risk factors for early and interstage mortality.
Result: Among 565 patients (median age 25 days; median weight 3.44 kg) who underwent SPS, overall mortality was 16.5%, with early and interstage mortality rates of 4.2% and 12.4%. Mortality outcomes improved significantly over time, with 6-month interstage survival increasing from 82.5% to 93.5% (P=0.008). In multivariable analysis, early mortality was associated with single ventricle physiology (OR 3.32, P=0.011), lower body weight (per kg, OR 0.23, P=0.003), and use of cardiopulmonary bypass (OR 4.28, P=0.001). Interstage mortality was linked to single ventricle physiology (OR 3.54, P<0.001), pulmonary atresia (OR 2.31, P=0.008), female sex (OR 1.87, P=0.027), pre-SPS intervention (OR 2.85, P=0.040), and concomitant procedures (OR 2.39, P=0.001). A double-dose aspirin regimen (10 mg/kg/day) was significantly associated with reduced interstage mortality (OR 0.44, P=0.008). 122
Conclusion: SPS outcomes have improved in the contemporary era. Early mortality was associated with single ventricle palliation, low body weight, and cardiopulmonary bypass. Interstage mortality was linked to single ventricle palliation, pulmonary atresia, female sex, pre-SPS surgery, and concomitant procedures, while doubled Aspirin dosage (10mg/kg/day) was protective.
Keywords: Systemic-to-pulmonary shunt, BT shunt

Abstract 29

3D Printing in Double Outlet Right Ventricle with Remote interventricular communication : A Tool for Better Management

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Abstract:
Objective: To evaluate the role of three-dimensional (3D) printed heart models in improving surgical planning and enabling biventricular or one-and-a-half ventricle repair in patients with double outlet right ventricle (DORV) and remote interventricular communication
Method: We reviewed four complex cases of DORV with remote interventricular communication managed between 2022 and 2024. All patients underwent standard imaging, followed by 3D printing to assess detailed intracardiac spatial relationships. The anatomical insights gained were used to guide and, in several cases, modify the initial surgical strategy
Result: ● Case 1: A 5-year-old boy with DORV and remote interventricular communication was initially planned for a single-ventricle pathway. 3D modelling revealed the feasibility of enlarging the communication and routing the left ventricle to the aorta, leading to a successful one-and-a-half ventricle repair. ● Case 2: A neonate with DORV, remote interventricular communication, and interrupted aortic arch underwent staged repair, culminating in successful biventricular repair at one year using 3D-guided surgical planning. ● Case 3: A 20-month-old girl with superior-inferior ventricles, atrioventricular discordance, and DORV was considered for palliation. 3D modelling supported biventricular repair via complex intraventricular tunneling. ● Case 4: A 5-year-old with criss-cross heart, DORV, and remote interventricular communication underwent Glenn shunt. 3D evaluation enabled rerouting toward a successful one-and-a-half ventricle repair.
Conclusion: 3D printing significantly enhances understanding of spatial cardiac anatomy in complex DORV with remote interventricular communication. It allows reconsideration of surgical strategies, often shifting from univentricular palliation to more physiological repair options, improving patient outcomes.
Keywords: 3D printing, Double outlet right ventricle, Remote interventricular communication , Surgical planning

Abstract 30

Multimodal Imaging in Assessing the Impact of Cyanotic Congenital Heart Disease on Fetal Brain Development

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Abstract:
Objective: To investigate the effects of cyanotic congenital heart disease (CCHD) on fetal brain development using multimodal imaging techniques.
Method: A total of 54 CCHD fetuses (observation group) and 60 normal fetuses (control group)

were enrolled from May 2023 to April 2025 at Hainan Women and children's medical center. All fetuses underwent multimodal imaging. The ultrasound was used to measured biparietal diameter (BPD), head circumference (HC), abdominal circumference (AC), estimated fetal weight (EFW), femur length, humerus length, peak systolic velocity (PSV) of the middle cerebral artery, resistance index (RI), pulsatility index (PI) and cerebroplacental Doppler ratio (CPR). The magnetic resonance imaging(MRI) was used to measured gray and white matter volume, fractional anisotropy (FA) and apparent diffusion coefficient (ADC).

Result: In 54 cases CCHD fetuses, 11 cases (20.37%) tetralogy of fallot, 9 cases (16.67%) transposition of the great arteries, 9 cases (16.67%) aortic coarctation, 7 cases (12.96%) interrupted aortic arch, 6 cases (11.11%) pulmonary atresia, 6 cases (11.11%) tricuspid atresia, 4 cases (7.41%) total anomalous pulmonary venous connection, 2 cases (3.70%) hypoplastic left heart syndrome. Compared with the control group, the BPD, HC, AC, EFW, RI, PI, CPR, frontal lobe volume, thalamic volume, gray matter volume, white matter volume and FA in the observation group were all significantly reduced($P<0.05$*P*<0.05), while PS, Tei index and middle cerebral artery PSV were all significantly increased($P<0.05$*P*<0.05). There was no statistical difference in femur length and humerus length between 2 groups($P>0.05$*P*>0.05).

Conclusion: Fetal growth restriction and abnormal brain development are significant in CCHD fetuses, with significant reductions in BPD, HC, AC, and EFW. Ultrasound can be used to assess overall development and cerebral blood flow early, while MRI can accurately quantify brain volume and microscopic structural changes. Ultrasound combined with MRI can improve the predictive value of fetal neurodevelopmental risks.

Keywords: Multimodal imaging techniques; Magnetic resonance imaging; Cyanotic congenital heart disease; Fetus; Brain development

Abstract 31

Neonatal Left Ventricular Developmental Trajectory Altered by Progressive Pressure Overload

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Abstract:

Objective: Progressive pressure overload (PPO), a hallmark hemodynamic feature in pediatric aortic valve stenosis and hypertension, significantly compromises left ventricular (LV) function and long-term outcomes. Despite its clinical importance, the impact of PPO on neonatal LV development—a period of remarkable cardiac plasticity—remains poorly understood due to the lack of appropriate neonatal models. Elucidating the molecular mechanisms underlying PPO-induced developmental alterations could enable earlier therapeutic interventions.

Method: We established a neonatal PPO model via abdominal aorta banding (AAB) in P1 rats, with hemodynamic validation by ultrasound, echocardiography, and histopathology at P7 and P21.

Result: Transcriptomic profiling (RNA-seq) of P3 and P7 LV tissues revealed that physiological development (P7_Sham vs P3_Sham) was enriched in cellular responses to external stimuli, membrane repolarization, and cardiomyocyte action potential regulation, alongside acute myeloid leukemia, lysosome, and branched-chain amino acid degradation pathways. In contrast, PPO-induced divergence (P7_AAB vs P3_AAB) shifted toward vascular morphogenesis, cell cycle activation, and migratory signaling, with dominant pathways including DNA replication, cell cycle progression, and small cell lung cancer-associated oncogenic signaling. Key findings were further

validated through molecular markers of vascular remodeling and cell cycle dysregulation.
Conclusion: This study pioneers a developmentally relevant P1-PPO model and reveals fundamental transcriptomic reprogramming in neonatal LV adaptation to PPO. The findings demonstrate pathological diversion from normal electrophysiological maturation toward aberrant proliferative signaling, providing mechanistic insights for early intervention strategies.
Keywords: Cardiomyocyte ; proliferation ; left ventricle ; RNA sequencing ; pressure overload

Abstract 32

Proximity barcoding assay reveals dynamic plasma exosome protein profiles and subpopulation characteristics in patients undergoing transcatheter pulmonary valve replacement

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Abstract:
Objective: Patients with congenital heart disease complicated by right ventricular outflow tract obstruction (RVOTO) often develop secondary pulmonary regurgitation (PR) after corrective surgery, necessitating pulmonary valve replacement (PVR). This study employed proximity barcoding assay (PBA) to dynamically monitor changes in plasma exosome protein profiles and subpopulation characteristics during the perioperative period of transcatheter pulmonary valve replacement (TPVR).
Method: This study collected 120 human plasma samples from 10 patients undergoing TPVR at three stages, preoperative (T1 group), 1 day postoperative (T2 group), and 1 week postoperative (T3 group), as well as 10 healthy individuals (N group). Single-exosome analysis was performed using PBA. We performed combinatorial analysis and functional analysis of membrane proteins on single exosomes across different groups and evaluated their predictive performance as biomarkers using Receiver Operating Characteristic (ROC) curves. Exosome subpopulations were clustered and characterized.
Result: Compared to the control group, the disease group exhibited significant downregulation of the protein combination DSCAML1 + ALCAM + ITGA1 + CR1 ($P<0.05$; AUC=1) and upregulation of BCAM + CD36 + DSCAML1 + ITGB1 ($P<0.05$; AUC>0.82). Gene Ontology (GO) analysis indicated that the proteins are associated with pathways related to response to stress, membrane side, and protein binding, while Kyoto Encyclopedia of Genes and Genomes (KEGG) analysis revealed enrichment in the Hematopoietic cell lineage pathway. Subpopulation analysis revealed increased cluster 1 and decreased cluster 2 proportions in T1-T3 groups compared to the N group. Subpopulation markers showed CD8A dominance in cluster 1, while DSCAML1 predominated in cluster 2.
Conclusion: This study pioneers PBA-based dynamic monitoring of plasma exosomes in patients with TPVR, identifying novel diagnostic protein signatures and disease-specific subpopulation redistribution patterns.

Keywords: Proximity barcoding assay, exosome, protein, transcatheter pulmonary valve replacement

Abstract 33

Mid-term outcomes of mechanical pulmonary valve replacement in Patients with Congenital heart Malformations

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Abstract:

Objective: To evaluate the mid-term outcomes of mechanical pulmonary valve replacement (PVR) in pediatric patients with congenital heart malformations.

Method: From January 2007 to January 2024, 19 pediatric patients who underwent mechanical PVR at our center were included. The cohort comprised 10 males and 9 females, with a mean age of 19.4 ± 12.9 years, median height of 158.5 cm (IQR: 117.5, 163.8), and mean weight of 40.8 ± 20.4 kg. Comprehensive clinical data spanning preoperative evaluation through postoperative follow-up were analyzed.

Result: All patients successfully underwent mechanical PVR, with a mean operative time of 381.3 ± 110.7 min, mean cardiopulmonary bypass time of 208.4 ± 83.18 min, and mean aortic cross-clamp time of 127.5 ± 59.93 min. Postoperative outcomes demonstrated a median mechanical ventilation duration of 27.0 hours (IQR 14.3-123.5), mean ICU stay of 6.0 ± 4.71 days, and median hospitalization period of 11.5 days (IQR 8.0-24.0), with a median follow-up duration of 40.0 months (IQR 9.0-97.5). One pediatric patient died due to heart failure during hospitalization. The remaining pediatric patients had no deaths during follow-up and no moderate or severe pulmonary valve regurgitation occurred. Compared to preoperative levels, postoperative follow-up echocardiography showed that the pulmonary valve transvalvular gradient (P=0.02), tricuspid regurgitant area index (P=0.03), and pulmonary regurgitant area index (P=0.008) all significantly decreased. During follow-up, one pediatric patient developed mechanical valve stenosis 10 years after surgery and underwent pulmonary valve bioprosthesis replacement again. One pediatric patient presented with subvalvular thrombosis, while the remaining pediatric patients had no complications.

Conclusion: The mid-term outcomes of mechanical pulmonary valve replacement in pediatric patients are favorable, but strict anticoagulation management is required to reduce the occurrence of complications.

Keywords: Pulmonary Regurgitation, Pulmonary valve Replacement, Mechanical valve, Congenital heart Malformations, Anticoagulation

Abstract 34

Analysis and Summary of the Efficacy of Surgery for Anomalous Origin of Right Pulmonary Artery from the Ascending Aorta

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Abstract:
Objective: Unilateral anomalous origin of the pulmonary artery from the ascending aorta is a rare congenital heart disease. This paper summarizes the surgical results and experience of 5 cases of anomalous origin of the right pulmonary artery from the ascending aorta in infants at a single center.
Method: A retrospective analysis of the clinical data of 5 patients treated for right pulmonary artery originating from the ascending aorta at our hospital from 2000 to 2023 was conducted to summarize the surgical outcomes. The patients ranged in age from 12 days to 1 year, with 4 newborns. Their average weight was 3.0-9.0kg(4.44±2.57 kg). All 5 patients had congenital heart defects, including 4 with atrial septal defect (ASD), 4 with patent ductus arteriosus (PDA), 1 with ventricular septal defect (VSD), and 1 with partial anomalous pulmonary venous connection (PAPVC). All patients had severe pulmonary hypertension before surgery, and one patient was in a critical condition preoperatively, with sepsis, infectious shock, and underwent cardiopulmonary resuscitation.
Result: All five patients underwent surgical treatment, during which the associated cardiac malformations were also corrected simultaneously. The extracorporeal circulation time ranged from 84 to 190 minutes, with an average of 141.2±46.17 minutes; the aortic cross-clamping time ranged from 40 to 131 minutes, with an average of 76.0±34.02 minutes. Postoperatively, patients were intubated and admitted to the ICU for monitoring. Two patients had delayed thoracotomy, two required postoperative peritoneal dialysis, and one received ECMO support. All five patients survived. Follow-up periods ranged from 8 to 47 months, with an average of 29.4±17.21 months. During the follow-up, one patient developed pulmonary artery anastomosis stenosis, and two patients developed aortic stenosis, both of which were surgically treated (with interventional balloon dilation or surgery).
Conclusion: Anomalous origin of the pulmonary artery is a rare congenital heart diseases. Right pulmonary artery anomalies are more common and often co-occur with other cardiovascular malformations, such as patent ductus arteriosus and atrial septal defects. Early signs of congestive heart failure are common, and severe pulmonary hypertension is a significant feature. Infections can lead to a rapid deterioration of the condition. Once diagnosed, early surgery is recommended, as it results in good outcomes and high survival rates. Long-term complications after surgery primarily include stenosis at the pulmonary artery anastomosis and aortic stenosis.
Keywords: Anomalous Origin of the Pulmonary Artery, Congenital Heart Disease

Abstract 35

Long-term outcome of V-Shaped Double-Layer Patch Technique for Complete Atrioventricular Septal Defect Repair: A Multicenter Study

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Abstract:
Objective: From 2011 to 2025, 55 patients with complete atrioventricular septal defect (CAVSD) underwent repair using the V-shaped double-layer patch technique (Guangdong Maternal and Child Health Hospital: *n*-44; National Center for Cardiovascular Disease and Fuwai Hospital: N=9;

Gaozhou People's Hospital: N=2). This multicenter study aimed to evaluate the efficacy of this novel technique.

Methods: Fresh autologous pericardium was fashioned into two unequal-sized patches. The folded edge was sutured along the ventricular septal crest. The smaller left ventricular patch closed the left atrioventricular valve (LAVV) cleft and septal defects, restoring native LAVV anatomy and function. The larger right ventricular patch repaired atrial and ventricular septal defects, with the tricuspid valve anchored at its midpoint.Preoperative/postoperative echocardiography,valvular function assessments,and long-term clinical outcomes were analyzed.

Results: Based on intraoperative morphology and echocardiography,Rastelli classification included Type A (N=37,67.3%),Type B (N=6,10.9%),and Type C (N=12,21.8%).Associated cardiac anomalies included double-outlet right ventricle (DORV) in 2 cases,DORV with total anomalous pulmonary venous connection (TAPVC) in 1 case, persistent truncus arteriosus (PTA) in 1 case, tetralogy of Fallot (TOF) in 1 case, coarctation of the aorta CoA) in 1 case. Only one patient required reoperation on postoperative day 3 for LAVV cleft dehiscence; all others recovered uneventfully.During follow-up (1-15 years), there were no deaths, progressive ventricular dilation, left ventricular outflow tract obstruction (LVOTO), residual shunts,pulmonary hypertension, or atrioventricular block.Only two patients developed mild-to-moderate LAVV regurgitation without progression over 9-11 years; all others exhibited competent valves with <mild regurgitation.

Conclusions: The "V"-shaped technique preserves native atrioventricular valve geometry, expands LAVV surface area, maintains annulus dimensions and LV volume, and effectively prevents recurrent regurgitation and LVOTO. It demonstrates lower technical complexity than conventional methods-particularly in complex cases with DORV or TOF-by simplifying surgical steps.

Keywords: Complete atrioventricular septal defect,V-shaped double-layer pericardial patch technique, double-outlet right ventricle, tetralogy of Fallot

Abstract 36

Risk factors associated with decreased abdominal tissue oxygen saturation in children with congenital heart disease after cardiac surgery

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Abstract:

Objective: Given that children with congenital heart disease (CHD) is also a high-risk group with gastrointestinal dysfunction, monitoring the abdominal tissue oxygen saturation (StO22) by near infrared spectroscopy(NIRS) and exploring the risk factors for its decline in these patients may help to improve their clinical prognosis.

Method: From January 2024 to August 2024, this study prospectively enrolled infants who were transferred to the pediatric intensive care unit (PICU). The patients were divided into two groups according to whether the abdominal StO_2 was lower than 70%. The high risk factors of decreased abdominal StO_2 were explored by univariate and multivariate analysis.

Result: A cohort of 292 patients was enrolled, comprising 83 in the StO2 <70% group and 209 in the StO2≥70% group. The StO2<70% group exhibited significantly higher incidences of lower body weight, younger age (particularly among newborns and premature infants), lower oxygen saturation during anesthesia induction and immediately after surgery, as well as lower average blood pressure

and PaO2, spO2 (P<0.05). The vasoactive-inotropic score (VIS) in the StO2<70% group was higher than that in the normal group of abdominal oxygen group within 72 hours after surgery, and the VIS score of this group decreased very slowly, but there was no significant statistical difference between the two groups.Multivariate logistic regression analysis revealed that body weight (OR=0.44, 95% CI 0.32-0.6, P<0.01) and prematurity (OR=3.0, 95% CI 1.1-8.1, P=0.03) are independent risk factors for decreased abdominal tissue oxygen saturation in these children.
Conclusion: The Lower weight and preterm infants are more likely to experience a decrease in abdominal tissue oxygen saturation after congenital heart disease surgery, and the decrease in StO2 is significantly associated with poor prognosis.
Keywords: Congenital heart defect: Gastrointestinal dysfunction; near infrared spectroscopy; Abdominal tissue oxygen saturation

Abstract 37

A Case Report of DORV VSD type: The First Enlargement VSD Surgical Management
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Abstract:
Background: Double Outlet Right Ventricle (DORV) with VSD-type is a rare congenital cardiac malformation characterized by both great arteries arising from the right ventricle and a non-committed ventricular septal defect. In such cases, the left ventricle lacks a direct outlet, and systemic flow depends on the orientation and size of the VSD. When the VSD is non-committed and restrictive or malaligned, it may not permit adequate redirection of left ventricular outflow to the aorta. In these case, surgical enlargement of the VSD may be necessary to establish an effective tunnel. We report a case of DORV VSD-type in a toddler who underwent successful repair including VSD enlargement.
Case: A 1 year 6 month old boy presented with persistent tachypnea, poor weight gain, and recurrent respiratory infections. No cyanosis was observed. Physical exam revealed a pansystolic murmur. Transthoracic echocardiography revealed Moderate Mitral Regurgitation, Mild Tricuspid Regurgitation, PG 21 mmHg, Large Ventricular Septal Defect Perimembranous Outlet Seen, size 7 mm, L → R shunt, PG 53 mmHg with conclusion Large ventricle septal defect perimembrane outlet + moderate mitral regurgitation + mild tricuspid regurgitation. Intraoperatively, a subaortic VSD with a diameter of 10 mm was found and it was decided to surgically enlarge the VSD carefully avoiding the cardiac conduction area. After that, an intraventricular patch was made using a Goretex patch to direct blood flow from the left ventricle to the aorta. The patient showed clinical improvement postoperatively, with saturation of 96–100%, good heart conduction without arrhythmia or ventricular dysfunction. Postoperative echocardiography showed: no residual VSD, Mild Aortic regurgitation, Mild Mitral Regurgitation, Mild Tricuspid Regurgitation, TAPSE 10.6 mm EF 65.9%, FS 34.4%.
Discussion: In DORV VSD-type, the key to successful surgical correction lies in establishing a direct left ventricular outflow pathway to the systemic circulation. In some cases, the VSD may be too small, malpositioned, or misaligned, necessitating enlargement to allow adequate blood flow. Surgical enlargement of the VSD is technically challenging and must avoid injury to the conduction system. In our case, enlargement enabled successful redirection of LV output to the aorta,

preventing volume overload and preserving biventricular function. Early correction is critical to avoid irreversible pulmonary vascular disease. Our case highlights the importance of careful preoperative imaging and flexibility in surgical planning, especially in non-committed DORV VSD-type anatomy.
Conclusion: DORV type VSD requires an individual approach. Surgical VSD enlargement can be an effective solution to create a functional flow from the left ventricle to the aorta. Good results can be achieved if performed early and the surgical strategy is tailored to the patient's anatomy.
Keywords: DORV VSD type, Enlargement VSD

Abstract 38

Aortopexy for tracheal stenosis and the left pulmonary vein obstruction in patients with congenital heart diseases
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Abstract:
Objective: This report shows the use of aortopexy for relieving the tracheal stenosis as well as the left pulmonary venous obstruction (PVO).
Method: Three patients underwent aortopexy in the aim of releasing the tracheal stenosis and the left PVO. Computed tomography was performed to assess the left PV pre- and post-operation.
Result: Patient 1 was an 11-month-old male with ventricular septal defect. After total repair, he had recurrent respiratory infections due to tracheal stenosis caused by the main bronchus being sandwiched between the ascending and descending aorta. The tracheal stenosis was removed by relocation of the ascending aorta to the right cephalic side toward the sternum, which was performed through a median sternotomy. Patient 2 was a 1 year and 6 months old female with complete atrioventricular septal defect (CAVSD). The left PV was trapped between the enlarged left atrium and the descending aorta, resulting in the left PVO. After the chest was entered via 6th thoracotomy, the left atrial was pilcated, and the descending aorta was dissected and moved posteriorly to release the left PVO. Patient 3 was a 1 year and 4 months old male with CAVSD. The left PV was narrowed between the enlarged coronary sinus and the descending aorta. The chest was entered through the 5th intercostal space, and the descending aorta was dissected and fixed to the posterior wall pleura to release the left PVO.
Conclusion: Aortopexy is effective for tracheal stenosis and PVO caused by the aorta and its relation to the other structures.
Keywords: Aortopexy, Pulmonary venous obstruction, Tracheal stenosis

Abstract 39

Tunnel closure and aortic root plication for neonatal aorto-left ventricular tunnel
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Abstract:
Objective: A male infant was delivered via C-section at 37 weeks of gestation, weighing 2.4kg. Although prenatal echocardiography had suspected severe aortic regurgitation due to a dysplastic aortic valve, postnatal echocardiography revealed aorto-left ventricular tunnel (ALVT). Both the left ventricle and ascending aorta were dilated, with LVEF of 45%. Associated cardiac anomalies included small VSD, PDA, and PFO, with no extracardiac malformations.
Method: On the fourth day of life, he underwent surgical repair. Via median sternotomy, the heart was exposed, revealing dilation of the ascending aorta and an external bulge on the posterolateral side of the aorta. CPB was initiated, and cardiac arrest was achieved with antegrade cardioplegia. After transection of the aorta, the aortic orifice of the ALVT was identified on the lateral aspect of the left coronary sinus. A novel approach was attempted. The aortic root and tunnel were applied with suture plicated with interrupted sutures using pledgets to reinforce the aortic valve annulus and dilated aorta. The remnant tunnel was closed with a running suture from the left ventricle to the aorta. The aortic orifice of the tunnel was closed with interrupted sutures, taking care to avoid injury to LCA. CPB and ACC times were 117 and 68 minutes.
Result: Postoperative recovery was uneventful. During follow-up over 3 years and 4 months, no progression of aortic regurgitation was observed, with only mild regurgitation remaining.
Conclusion: This case report presents the successful neonatal repair of ALVT using tunnel closure and aortic root plication.
Keywords: aorto-left ventricular tunnel

Abstract 40

Long-term outcomes of biventricular repair in double outlet right ventricle: A network meta-analysis of multicenter studies

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Abstract:
Objective: Management of Double Outlet Right Ventricle (DORV), a difficult congenital cardiac anomaly, frequently necessitates biventricular repair interventions to get good long-term results. Four frequently employed surgical interventions for DORV include the Arterial Switch Operation (ASO), Nikaidoh procedure, Rastelli procedure, and Revised Procedure (REV). While clinical decisions rely on multiple criteria, such as surgical proficiency and patient-specific attributes, assessing the comparative efficacy of different treatments has proven difficult
Method: This study intends to perform a Network Meta-Analysis (NMA) to evaluate the long-term outcomes of these four surgical procedures utilizing a Bayesian hierarchical model. A comprehensive literature analysis was performed to identify studies that compared a minimum of two out of the four treatments for DORV and gave hazard ratios (HR) along with their 95% confidence intervals (CIs)
Result: The SUCRA scores indicated that ASO and Nikaidoh achieved the highest ratings, between 85-90%, signifying a greater likelihood of being the most effective interventions for DORV. Conversely, Rastelli and REV therapies exhibited lower SUCRA ratings of approximately 60-70%, indicating they were less probable to be the optimal selection. The forest plot of the hazard ratios

(HRs) revealed that although most comparisons exhibited HRs near 1, the 95% confidence intervals (CIs) for each research intersect with 1, indicating an absence of a significant statistical difference between the treatments. This discovery underscores the statistical ambiguity in the data. **Conclusion:** The NMA results show that ASO and Nikaidoh are the most advantageous interventions for DORV, as evidenced by elevated SUCRA scores; however, the absence of substantial differences between treatments, demonstrated by overlapping confidence intervals, underscores the statistical uncertainty inherent in the analysis. Additional extensive investigations with more substantial data are required to validate these conclusions. Clinical decision-making must consistently account for patient-specific characteristics and surgical proficiency when determining the most effective treatment.

Keywords: Double Outlet Right Ventricle , Biventricular repair, Congenital Heart Disease, Long-Term Outcome, Network Meta-Analysis

Abstract 41

Caught at the Transit: Right Coronary Artery Compression by RV-PA Conduit Post Senning-Rastelli

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Abstract:
Objective: Coronary artery compression by right ventricular to pulmonary artery (RV-PA) conduits is a rare but potentially life-threatening complication following Senning-Rastelli repair in patients with congenitally corrected transposition of the great arteries (ccTGA). We present a case of a 22 years old male with ccTGA who had undergone staged palliation in childhood, including PDA stenting and a left Blalock-Taussig shunt in infancy, followed by a definitive Senning-Rastelli repair at age 3. He later presented with recurrent syncope and exertional angina. A dual-chamber pacemaker was implanted for presumed arrhythmia, but symptoms of angina persisted.
Method: A cardiac CT angiography was performed which revealed an anomalous origin of the right coronary artery (RCA) from the left coronary sinus anteriorly with an intramural course. Furthermore, perfusion scan revealed reversible ischemia in the RCA territory worsened by compression of an anteriorly placed RV-PA conduit. The above findings warranted surgical intervention. The acute angulation of the RCA at the origin was corrected by excising the intramural segment at its origin. Furthermore, another ventriculotomy was performed laterally to move the conduit away to prevent compression of the right coronary artery.
Result: Postoperatively, patient experienced complete resolution of symptoms. Follow-up imaging confirmed decompression of the RCA and unobstructed conduit flow.
Conclusion: This case highlights the importance of recognizing anomalous coronary origins in ccTGA particularly when planning conduit placement during corrective surgery. Lateral placement of the RV-PA conduit, away from both the sternum and adjacent great vessels, is essential to prevent dynamic coronary compression and reduce the risk of future ischemic events.

Keywords: Congenitally corrected transposition of the great arteries (ccTGA), Senning-Rastelli repair, Anomalous right coronary artery, Right ventricle to pulmonary artery conduit, Coronary artery compression

Abstract 42

A Prospective Randomized Study on the Safety and Efficacy of CardioCel® for Reconstruction of Pulmonary Arteries and Right Ventricular Outflow Tract in Congenital Heart Disease

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Abstract:
Objective: Surgical reconstruction of the right ventricular outflow tract (RVOT) and pulmonary arteries (PA) is a critical procedure in pediatric patients with congenital heart disease (CHD). Various biological patch materials are utilized, including autologous pericardium, bovine pericardium, and CardioCel® which is an ADAPT® treated bovine pericardial patch designed to minimize calcification and inflammatory responses. Nevertheless, comparative data on the efficacy and safety of these materials remain limited.
Method: In this study, 150 pediatric patients aged 3 months to 12 years undergoing RVOT and PA reconstruction were enrolled between 2018 and 2021 at the National Heart Institute. Patients were randomized using a computer-generated random number sequence into 3 equal cohorts (n=50 each) receiving either CardioCel®, autologous pericardium, or bovine pericardium patches. The primary endpoint was freedom from patch-related reintervention at 1 year. Secondary endpoints included length of ICU and hospital stay, re-exploration for bleeding, incidence of acute kidney injury, and sepsis.
Result: Median followup was similar across groups (1.1-1.2 years, p=0.057). ICU stay (median 3.0-4.0 days, p=0.961) and hospital stay (median 11 days, p=0.837) showed no significant differences. Rates of reexploration for bleeding, AKI, and sepsis were uniformly low and comparable among cohorts (all $p > 0.19$). Freedom from patchrelated reintervention at 1 year was 100% in all groups.
Conclusion: CardioCel® demonstrates non-inferior short-term outcomes compared to autologous and bovine pericardial patches in the reconstruction of the RVOT and PA in pediatric CHD, confirming its safety and effectiveness as a reliable material for congenital heart repair.
Keywords: Right Ventricular Outflow Tract Reconstruction, Pulmonary Artery Reconstruction, CardioCel®, Congenital Heart Disease

Abstract 43

Outcome of Tricuspid Valve Detachment Technique in Ventricular Septal Defect Closure: A Systematic Review and Meta-analysis

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Abstract:
Objective: The closure of ventricular septal defects (VSDs) is one of the most common surgeries performed in infancy. VSD location are often difficult to expose due to obstruction from chordal attachments and leaflets of the tricuspid valve (TV). To systematically review the outcome of

tricuspid valve detachment (TVD) versus conventional surgical repair (non-TVD), a meta-analysis was performed to compare outcomes between tricuspid valve detachment and standard trans-atrial approach for VSD Closure.

Method: Electronic databases, including PubMed, Scopus, Google Scholar, and Cochrane Library from January 2000 to June 2024 were searched systematically for the literature which aimed mainly at comparing the outcome of those techniques. Cardiopulmonary bypass time, Cross-clamp time; postoperative complications including residual defect, postoperative atrioventricular block, implantation of pacemakers, tricuspid regurgitation; length of stay (LOS), length of intensive care unit (ICU) was analyzed

Result: Eighteen studies were included after selection, including total patient pool of 3046 patients with 1079 underwent TVD and 1967 underwent non-TVD procedures, met the inclusion criteria. Meta analysis has drawn to the following results. TVD prolongs CPB time (MD = 5.25, 95% confidence interval [CI] = 0.99-9.51, p = .002) and cross-clamp time (MD = 5.75, 95% CI = 2.91-8.06, p < .001) compared with non-TVD techniques in VSD repair surgeries. No significant difference exists in LOS, length of ICU, postoperative atrioventricular block, implantation of pacemakers, residual VSD, incidence of significant tricuspid valve regurgitation (TR) postoperatively, as well as the incidence of small and significant residual VSD after surgery and during follow-up (all p > .05).

Conclusion: TV detachment with leaflet augmentation for VSD closure is safe and effective and does not increase the incidence of TR in the short- and long-term follow-up.

Keywords: Congenital surgery; ventricular septal defect; tricuspid valve detachment

Abstract 44

A case of delayed arterial switch operation for 1.7-year-old boy with d-TGA with IVS

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Abstract:

Objective: Single-stage arterial switch operation (ASO) for transposition of d-great arteries with intact ventricular septum (TGA/IVS) is preferably performed in the first 2 weeks of life while the left ventricle (LV) is still trained to support systemic circulation. Our hospital is in a region where a significant number of late presenting congenital heart diseases are referred, and the recent median age of the single-stage ASO is about 39-day-old.

Case: We report our experience in 1.7-year-old boy with successful ASO via balloon atrial septectomy (BAS) on third day after birth and patent of ductus arteriosus (PDA) stent on 10-month-old. At performing BAS, left ventricular mass index (LVMI) by echocardiography was 12.6 g/m22. Through the placement of PDA stent, LVMI before ASO increased to 84.5 g/m22, and PA pressure and PVRI by the catheter exam was 30/15 (21) mmHg and 1.98 WU.m22, respectively. Coronary pattern was type 1 of Shaher's classification. ASO with Lecompte technique, mitral valvuloplasty, and creation of 5 mm atrial septal defect in diameter were performed. Postoperative systemic blood pressure (SBP) was 50-60 mmHg maintaining the lactate level at less than 3 mmol/L. From postoperative day (POD) 7th, SBP increased to 60-70 mmHg and continued to increase gradually. Peritoneal dialysis was stopped on POD 9th because of enough urine. The

patient was extubated on POD 15th and left from ICU on POD 23rd.
Conclusion: The postoperative condition was extremely critical, however careful postoperative management and the ability of recovering cardiac contractility led the successful of delayed ASO.
Keywords: Arterial switch operation, Transposition of great arteries, Left ventricular training, Late referral, Left ventricle smallish

Abstract 45

Surgical outcomes for two-stage arterial switch operation
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Abstract:
Objective: A two-stage arterial switch operation (ASO) is one of the surgical strategies for transposition of the great arteries with intact ventricular septum (TGA-IVS) in the late referral patients or patients with smallish left ventricular (LV). We retrospectively reviewed patients with TGA/IVS who underwent the first stage LV training procedure for the two-stage ASO.
Method: Between February 2018 and January 2025, 48 patients with TGA/IVS had the first stage procedure as followed: modified Bialock-Taussig shunt (BTS) (7), pulmonary artery banding (PAB) with patent ductus arteriosus (PDA) stent (4), PAB with BTS (37). We evaluated the surgical outcomes and achievement for ASO.
Result: Median age and body weight of the first stage procedure was 3 months old (range 25days-5years) and 4.8kg (range 3.0-13.5kg), respectively. The hospital mortality after the first stage procedure was 27.1% (PAB with PDA stent (2.1%), PAB with BTS (25.0%). Nineteen patients of 48 underwent the second stage ASO (39.4%). One hospital death (PAB with BTS) after ASO occurred related to fatal arrythmia. The median interval between the first stage procedure and second stage ASO was 43 days (range 1day-2 years). Ten of 19 (52.6%) underwent the 2-stage ASO with the interval of less than 50 days between first stage procedure and second stage ASO. LV mass index in patients with LV smallish increased from 33.7±11.6 g/m² before LV retraining to 71.9±28.5 g/m² before ASO ($p<0.01$).
Conclusion: The first stage LV training procedure contributed to increase the LV mass index and LV contractility, and the hospital survival rate after second stage ASO was satisfactory. However, the high risk of first stage LV-training procedure was noted.
Keywords: Arterial switch operation, Transposition of great arteries, Left ventricular training, late referral, Left ventricle smallish

Abstract 46

Disease Spectrum and Early Outcomes of Structural Heart Surgery in South Sumatra Regional Referral Center
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Abstract:
Objective: This study aimed to generate initial context-specific data highlights the achievements and challenges of pediatric heart surgery in Palembang, as a regional referral center for the wider population of South Sumatra and neighboring provinces—providing a foundation for future quality improvement, health policy, and clinical research initiatives which leads to improvement of equitable access to life-saving surgical treatment in Indonesia.
Method: We conducted a retrospective cohort study of pediatric patients aged 0 to 18 years undergoing surgery for structural heart disease (SHD) at a regional referral hospital in South Sumatra, Indonesia, from January 2022 to June 2025. Cases were identified through the hospital's cardiac surgery database and verified against surgical logs and medical records. Demographics, operative and postoperative details, and outcomes were analyzed by diagnosis group. The primary outcome was in-hospital mortality, defined as death from any cause before hospital discharge. Data analysis was conducted using SPSS.
Result: The diagnostic spectrum in this study was dominated by ventricular septal defect (VSD), which accounted for 84 cases (33.2%). The surgery duration for Tetralogy of Fallot (TOF) and VSD were generally longer (153 and 139 minutes), compared to 60 minutes for Patent Ductus Arteriosus (PDA) and 80.5 minutes for Atrial Septal Defect (ASD). This was in accordance with cardiopulmonary bypass (CPB) time and Aortic cross clamp time. Mechanical ventilation duration was substantial, which was most pronounced among TOF patients (1140 minutes), consistent with the more extensive nature of this surgery and the physiological challenges encountered during early recovery. Of the total sample, 212 patients (83.8%) were categorized as simple SHD, which with each mortality rate, including VSD (17.9%), ASD (3.8%), PDA (0%), Valve disease (25%), and Myxoma (25%). The remaining 41 patients (16.2%) were as complex SHD, including diagnosis such as TOF (n=37), TGA (n=3), and DORV (n=1). In-hospital mortality was 14.6% for the overall cohort. Notably, mortality rates were highest among patients with those Others category (50%) which were dominated by TGA (n=3) and DORV (n=1), followed by TOF (37.8%), and VSD (17.9%), likely reflecting the compounded effect of late referrals, case complexity, and resource limitations.
Conclusion: This study demonstrated regional referral center in South Sumatra can successfully deliver pediatric structural heart surgery for a diverse spectrum of diagnosis with early outcomes comparable to programs in similar resource-limited settings, while emphasizing the benefits and feasibility of decentralizing pediatric cardiac surgery. The size and granularity of this study make it a valuable contribution to the regional and national literature on pediatric heart surgery, providing valuable insights into both the achievements and ongoing limitations of pediatric cardiac care in a resource-constrained, decentralized setting. Continued investment in training, infrastructure, and robust referral systems is essential to further narrow the gap with more established metropolitan centers.
Keywords: Structural heart surgery, Regional hospital, Cohort

Abstract 47

Single-center Outcomes of Surgical Repair for Total Anomalous Pulmonary Venous Connection

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Abstract:
Objective: To describe current management strategies and outcomes of patients undergoing surgical repair of total anomalous pulmonary venous connection (TAPVC) through a single-center, large-scale case study.
Methods: This retrospective study included 523 patients with TAPVC who underwent surgical repair between April 2006 and October 2024. Of these patients, 477 underwent conventional repair, and 46 used the sutureless technique. Survival was analyzed using Kaplan-Meier curves, and the incidence of postoperative pulmonary venous obstruction (PVO) was analyzed using Nelson-Aalen cumulative risk curves. The Cox proportional risk regression model was used to analyze the risk factors associated with death, and competing risk analysis was used to analyze the risk factors associated with postoperative PVO.
Results: The median age and weight were 59 days (interquartile range [IQR], 22-120 days) and 4.2 kg (IQR, 3.5-5.5 kg), respectively. There were 21 early deaths and 31 late deaths. A lower weight (P=0.032), lower oxygen saturation (P=0.016), preoperative PVO (P=0.030), absence of preoperative computed tomography angiography (CTA) (P<0.001), prolonged cardiopulmonary bypass (CPB) time (P=0.001), and longer hospital stay (P=0.007) were independent risk factors for mortality. The median follow-up was 4.25 years (IQR: 1.90-6.83 years). Postoperative PVO occurred in 127 patients. Preoperative PVO (P=0.001), absence of preoperative CTA (P=0.047), intracardiac TAPVC (P<0.001), prolonged CPB time (P=0.003), the use of deep hypothermic circulatory arrest (P=0.008), and longer hospital stay (P<0.001) were independent risk factors for postoperative PVO. In patients with preoperative PVO (P=0.047) or intracardiac TAPVC (P=0.006), the sutureless technique effectively reduced the incidence of postoperative PVO compared with conventional repair. There was no significant difference in the incidence of postoperative PVO between sutureless technique and conventional repair in patients without preoperative PVO (P=0.750) or neonatal patients (P=0.097). Reoperation for postoperative PVO was performed in 31 patients.
Conclusions: Overall survival after surgical repair of TAPVC in children is high, but postoperative PVO remains a major complication affecting prognosis. Cardiac CTA plays an important role in the preoperative morphological assessment of TAPVC. The advantages of sutureless technique in reducing postoperative PVO need to be further investigated.
Keywords: Total anomalous pulmonary venous connection, TAPVC, sutureless technique, pulmonary venous obstruction

Abstract 48

A NIGHTMARE case of DORV (false Taussig-Bing anomaly) showing complicated late morbidities

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Abstract:
Case Report: Severe form of “false Taussig-Bing anomaly” associated with bicuspid pulmonary valve has several tough long-term morbidities even after successful neonatal Arterial switch through Lecompte’s modification. Here we experienced a “Nightmare case” with effort angina from late onset stenosis of the reimplanted left main coronary artery, combined with supravalvar, subvalvar aortic and multilevel pulmonary arterial stenoses from so-called progressively interlocking and axial torsion of neo-GAs related side-by-side spatial nature of the GA arrangement at his age of 6 years. Revision surgery consisted of patch enlargement of stenosed left main coronary trunk, complex LVOTO release by trans-neo-aortic VSD enlargement, sinus reduction plasty with supra-valvar angioplasty, and extensive RVOT to PA enlargement. Left PA reconstruction necessitated the use of interposition PTFE graft after 4 days’ support with ECMO for unusually prolonged CPB time at the complex revision repair Subsequent improvement was significant and his clinical course was satisfactory, however tachyarrhythmia(Atrial flutter) manifested at his age of 14 years. It was successfully controlled with catheter intervention. Although several minor but substantial problems persisting recent study showed stable and acceptable clinical picture with good physical activity and daily life so far at his age of 16.
Keywords: DORV, False Taussig-Bing anomaly, Angina pectoris, Outflow tract obstruction

Abstract 49

Pediatric Heart Transplantation: Single Experience in China

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Abstract:
Objective: Pediatric heart transplantation (HT) remains a crucial therapy for end-stage heart disease (ESHD) in children, yet faces challenges including donor shortage and complex conditions (e.g., Fontan failure). This study reviewed our 15-case experience to analyze outcomes and management strategies.
Method: A retrospective analysis was conducted on 15 pediatric HT patients at the Children's Hospital of Nanjing Medical University between August 2000 and March 2025. Data included demographics, indications, surgical techniques, bridge therapies (Extracorporeal membrane oxygenation (ECMO) and/or Ventricular assist device (VAD)), perioperative complications, and survival.
Result: The cohort comprised 15 patients (9 male, 6 female), aged 2.1-15.6 years (mean 121.6±44.8 months), weighing 9.5-53 kg (mean 35.9±14.1 kg), including 6 cases of dilated cardiomyopathy (DCM), 2 cases of hypertrophic cardiomyopathy (HCM), 1 case of restrictive cardiomyopathy (RCM), 2 cases of left ventricular non-compaction (LVNC) (including 1 with long QT syndrome), 3 case of complex congenital heart disease (including 1 with Fontan failure), and 1 case of fulminant myocarditis presenting with life-threatening ventricular arrhythmias. Surgical techniques included standard orthotopic HT using the biatrial technique in 1 case and bicaval technique in 12 cases. Bridge therapies included pre-HT ECMO (n=4) and VAD (n=1: LVAD+RVAD). Mean cold ischemia time was 371.6±108.5 min. Perioperative ECMO was required in 2 patients. One Fontan failure patient succumbed to sepsis-induced multi-organ failure post-HT. One patient

with fulminant giant cell myocarditis developed primary graft dysfunction (PGD), requiring re-transplantation on post-op day 35. One patient bridged with biventricular VAD underwent successfully HT. One long-term survivor died suddenly 11 years post-HT due to suspected non-adherence.

Conclusion: Our experience demonstrates the feasibility of pediatric HT for diverse ESHD etiologies, including cardiomyopathy, complex congenital heart disease (Fontan failure), and refractory arrhythmias. ECMO/VAD bridge strategies were vital, with first successful biventricular VAD applied in children. Re-transplantation effectively rescued severe PGD. Fontan circulation failure and infection were significant mortality risks, underscoring the need for rigorous post-HT follow-up, immunosuppression adherence, and infection control. Long-term survival and quality of life require further follow-up.

Keywords: Pediatric heart transplantation; End-stage heart disease; Extracorporeal membrane oxygenation; Ventricular assist device; Fontan failure; Re-transplantation

Abstract 50

Single-Center Evaluation of the Efficacy and Safety of Left Ventricular Assist Device Implantation in Pediatric Patients with End-Stage Heart Failure

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Abstract:

Objective: In children, end-stage heart failure is a life-threatening condition with limited therapeutic options. Left ventricular assist device (LVAD) are mechanical circulatory support systems designed to unload the failing left ventricle and maintain systemic perfusion, thereby improving survival and quality of life in patients with severe cardiac dysfunction. The aim of this study is to evaluate the clinical effectiveness of LVAD therapy in the pediatric population, with particular emphasis on its role as a bridge to cardiac transplantation (BTT) and as a platform for myocardial recovery (BTR).

Method: We performed a retrospective, single-center analysis of three pediatric patients who underwent LVAD implantation. All subjects had dilated cardiomyopathy that had progressed to end-stage heart failure, necessitating mechanical support. Comprehensive data were collected on baseline demographics, operative indications, timing of implantation, pump type, surgical strategy, and postoperative management. Detailed clinical records were reviewed and post-implantation outcomes systematically assessed.

Result: Our results indicate that LVAD therapy yielded satisfactory clinical outcomes in this pediatric cohort. When utilized as a bridge to cardiac transplantation (BTT), the device reliably stabilized hemodynamics and preserved end-organ function, providing crucial time until an appropriate donor organ became available. In this study, all 3 children underwent genetic testing and were diagnosed with dilated cardiomyopathy. Patient 1 heart transplantation registration was 1 year ago. After standardized anti-heart failure treatment, Patient 1 deteriorated to INTERMACS profile 1 and underwent ECMO assistance. With humanitarian exemption, LVAD implantation (Corheart 6) + right heart ECMO bridging was performed while waiting for heart transplantation.Persistent multi-organ failure and sepsis developed, and the patient died on post-operative day 10. Patient 2 presented with biventricular failure. Intra-operatively, a HeartCon LVAD plus temporary extracorporeal right ventricular assist device (EXTRA-RVAD) were implanted. Early post-operative bleeding and acute kidney injury required blood-product support and

continuous renal-replacement therapy. Hemodynamic status stabilized; the RVAD was explanted on day 14, and the patient underwent successful orthotopic heart transplantation on day 48, with excellent recovery. Patient 3 underwent isolated HeartCon LVAD implantation. At six-month follow-up, the child was NYHA class I, participating in age-appropriate physical activities, demonstrating the potential for myocardial recovery (bridge-to-recovery, BTR). Right ventricular failure, bleeding, thrombosis, and infection were the most common adverse events. Structured peri-operative protocols—including meticulous right-heart assessment, targeted inotrope and pulmonary vasodilator therapy, anticoagulation algorithms, and surveillance cultures—enabled early recognition and management of complications without compromising long-term prognosis.
Conclusion: LVAD plays a pivotal role in the management of pediatric end-stage heart failure. Beyond serving as an effective bridge to transplantation (BTT)—stabilizing hemodynamics and improving transplant candidacy—it can also facilitate myocardial recovery (BTR), thereby obviating the need for cardiac transplantation in select patients. Although device-related complications remain a concern, meticulous patient selection, refined surgical techniques, and vigilant post-operative care can substantially mitigate these risks and enhance therapeutic success. Continued technological advances and accruing clinical experience promise to extend the benefits of LVAD therapy to a broader pediatric population, ultimately improving both prognosis and quality of life for children with advanced heart failure.
Keywords: End-Stage Heart Failure; Left Ventricular Assist Device

Abstract 51

Preoperative serum cortisone levels are associated with cognition in preschool-aged children with tetralogy of Fallot after corrective surgery: new evidence from human populations and mice

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Abstract:
Objective: Tetralogy of Fallot (TOF) is the most common cyanotic congenital heart disease. Children with TOF would be confronted with neurological impairment across their lifetime. Our study aimed to identify the risk factors for cerebral morphology changes and cognition in postoperative preschool-aged children with TOF.
Method: We used mass spectrometry (MS) technology to assess the levels of serum metabolites, Wechsler preschool and primary scale of intelligence-Fourth edition (WPPSI-IV) index scores to evaluate neurodevelopmental levels and multimodal magnetic resonance imaging (MRI) to detect cortical morphological changes.
Result: Multiple linear regression showed that preoperative levels of serum cortisone were positively correlated with the gyrification index of the left inferior parietal gyrus in children with TOF and negatively related to their lower visual spaces index and nonverbal index. Meanwhile, preoperative SpO_2 was negatively correlated with levels of serum cortisone after adjusting for all

covariates. Furthermore, after intervening levels of cortisone in chronic hypoxic model mice, total brain volumes were reduced at both postnatal (P) 11.5 and P30 days.
Conclusion: Our results suggest that preoperative serum cortisone levels could be used as a biomarker of neurodevelopmental impairment in children with TOF. Our study findings emphasized that preoperative levels of cortisone could influence cerebral development and cognition abilities in children with TOF.
Keywords: Cognition, Cortisone, MRI, Neurodevelopment, Tetralogy of Fallot

Abstract 52

DORV: a case report
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Abstract:
Objective: To share the experiences of rectifying DORV in a 8 years old child
Method: Retrospectively analysis the progress of the 8 years old child from admission,diagnosis,undergoing surgery and recovery. After carefully examination and auxiliary check including ultrasound color doppler and contrast cardiac CT, a sound surgical plan individually set and completed.Because of the subtitle of this boy was VSD type, the operation become simple and just to repair the VSD enough.
Result: The boy after operation under CPB, recovered eventfully. The cardiac ultrasound color Doppler showed good hemodynamic conditions. There were no residual shunts or obstructions.
Conclusion: Dorv is a rare congenital heart disease that can be successfully repaired at maternal and chilren hospital in southwestern china
Keywords: Dorv;child

Abstract 53

Exploration of Thoracoscopic Minimally Invasive Surgery for Patent Ductus Arteriosus (Report of 62 Cases)
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Abstract:
Objective: To summarize the clinical experience of thoracoscopic minimally invasive surgery for patent ductus arteriosus (PDA) and evaluate its clinical efficacy and safety.
Method: A retrospective analysis was conducted on the clinical data of children who underwent thoracoscopy-assisted PDA ligation in the Department of Cardiothoracic Surgery at Chongqing Medical University Children's Hospital from October 2020 to March 2025. The study included 62 children, comprising 28 males and 34 females, aged 1–98 months (mean: 8.9 months), with weights ranging from 2.9 to 34 kg. The PDA diameter was 2.6–9.1 mm (mean: 3.8 mm). The PDA was dissected with care to protect the left vagus and recurrent laryngeal nerves. Traction sutures were placed if needed for better exposure. The PDA was occluded using Hemolock clips or absorbable ligation clips.

Result: Three children were converted to conventional open-chest PDA ligation due to intolerance to single-lung ventilation and artificial pneumothorax, resulting in poor surgical exposure. The remaining 40 children successfully underwent thoracoscopy-assisted PDA ligation. The operative time ranged from 28 to 145 minutes (mean: 61.8 minutes), intraoperative blood loss was 0–10 ml (mean: 2.85 ml), postoperative ICU stay was 1–4 days (mean: 2.2 days), and hospitalization duration was 5–27 days (mean: 11.5 days). Twenty-two children did not require postoperative closed thoracic drainage. Echocardiography before discharge showed no residual shunts in any case. All children were cured and discharged without severe complications, though two cases exhibited transient hoarseness. Two children who received biodegradable ligation clips experienced PDA recanalization one month postoperatively, with one successfully treated via repeat thoracoscopic surgery and the other under ongoing follow-up.
Conclusion: Thoracoscopy-assisted PDA ligation is characterized by short operative time, minimal blood loss, and preservation of chest wall muscles, often eliminating the need for postoperative closed thoracic drainage. Children recover quickly with brief ICU and hospital stays. This minimally invasive technique offers aesthetic incisions, safety, and efficacy, making it the recommended first-choice surgical approach for PDA.
Keywords: Patent ductus arteriosus, Thoracoscopy, Minimally invasive surgery

Abstract 54

Feasibility of Autologous Pulmonary Artery Patch for Neonatal Aortic Arch Reconstruction
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Abstract:
Introduction: The use of autologous pulmonary artery (PA) patch in aortic arch reconstruction for neonates with coarctation and arch hypoplasia offers potential benefits but requires validation of safety and effectiveness. This study evaluates outcomes with a focus on arch relief and pulmonary valve preservation.
Methods: From January 2022 to June 2025, 22 neonates underwent aortic arch reconstruction using autologous PA patches at our center. Median height and weight at surgery were 50.0 cm (IQR: 48.5–52.0) and 2.9 kg (IQR: 2.6–3.1). Echocardiography assessed peak systolic arch velocity and pressure gradient preoperatively and at 6 months. Pulmonary valve function and reinterventions were also evaluated.
Results: There were no operative mortalities. Preoperative peak systolic velocity averaged 2.5±0.4 m/s2.5±0.4m/s (pressure gradient 38±10 mmHg38±10mmHg), decreasing to 1.5±0.3 m/s1.5±0.3m/s (gradient 12±5 mmHg12±5mmHg) at 6 months, indicating significant relief of obstruction. Only one patient required balloon angioplasty. No significant pulmonary valve stenosis or regurgitation was observed.
Conclusion: Autologous PA patch is a feasible and effective material for neonatal aortic arch reconstruction, providing excellent relief of arch obstruction and preserving pulmonary valve function.
Keywords: Aortic arch reconstruction, Autologous patch, Pulmonary artery, Neonate

Abstract 55

Application and Follow-up Study of the Auricle-Combined Fish-Mouth Shaped Monocusp

Outflow Tract Patch in Right Ventricular Outflow Tract Reconstruction

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Abstract:

Objective: To analyze the clinical outcomes and mid-to-long-term follow-up data of the auricle-combined fish-mouth shaped monocusp outflow tract patch in the reconstruction of the right ventricular outflow tract (RVOT) in various types of complex congenital heart diseases, and to investigate pulmonary artery development, re-stenosis, and valve regurgitation after RVOT reconstruction with this technique.

Methods: A retrospective analysis was conducted on surgical patients who underwent RVOT reconstruction using the auricle-combined fish-mouth shaped monocusp outflow tract patch between October 2010 and May 2025. A total of 83 patients were included, comprising 58 males and 25 females. The median surgical age was 8 months (range: 0.4–360 months), and the median weight was 5.70 kg (range: 1.45–50 kg). After correcting intracardiac malformations, all patients underwent RVOT reconstruction with the auricle-combined fish-mouth shaped monocusp outflow tract patch, including 58 cases of PA, 9 cases of TOF, 9 cases of PTA, 6 cases of TGA, and 1 case of DOLV. The surgical method involved using the left or right auricle as the posterior wall of the pulmonary artery and reconstructing the RVOT with a fish-mouth shaped monocusp outflow tract patch for the anterior wall. Perioperative data such as hospital stay duration, ventilator support time, and postoperative complications were recorded. Follow-up echocardiographic indicators included EF, RVDD, pulmonary valve closure status, and pulmonary stenosis severity. Patients over 8 years old underwent cardiac magnetic resonance imaging to assess right heart function. Kaplan-Meier survival curves were used to evaluate survival rates and freedom from reintervention rates for the bovine pericardial monocusp outflow tract patch.

Results: Six patients (7.2%) died during the perioperative period. Seventy-five discharged patients were effectively followed up, with an average follow-up duration of 50.5 ± 35.4 months. One death (1.1%) occurred during follow-up. The 1-year, 5-year, and 10-year survival rates were 98.7%, 98.7%, and 98.7%, respectively. The 1-year, 5-year, and 10-year freedom from reintervention rates were 100%, 100%, and 100%, respectively.

Conclusions: The auricle-combined fish-mouth shaped monocusp outflow tract patch for RVOT reconstruction achieves favorable short- and long-term outcomes. The auricle, when used as a substitute for the posterior pulmonary artery wall, exhibits regenerative growth potential, significantly reducing the need for reoperation.

Keywords: Infants; fish-mouth shaped monocusp outflow tract patch; right ventricular outflow tract (RVOT); Barbero-Marcial; pulmonary stenosis; pulmonary valve insufficiency

Abstract 56

Case report: Early to Mid-term Outcomes of the Arterial Switch Operation for Transposition of the Great Arteries and Taussig-bing Anomaly with Aortic Arch Obstruction

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Abstract:
Objective: To evaluate the early- to mid-term outcomes of primary repair in patients with transposition of the great arteries (TGA) or Taussig-Bing anomaly (TBA) complicated by aortic arch obstruction (AAO).
Methods: A retrospective review was conducted on 11 patients (mean age: 35.73 ± 30.78 months [4–93 months]; mean weight: 3.56 ± 0.67 kg [2.73–4.95 kg]) who underwent arterial switch operation (ASO) and correction of AAO between January 2010 and June 2022. Primary diagnoses included TGA (n=2) and TBA (n=9). Associated anomalies included ventricular septal defect (VSD; n=11), diffuse hypoplasia of the aortic arch (n=7), coarctation of the aorta (n=2), and interrupted aortic arch (n=2). A mismatch in the diameters of the great arteries was observed in 5 patients (45.5%). All patients underwent primary repair with close follow-up.
Results: The mean follow-up duration was 6 years (1–12 years). One patient (9.1%) with a single coronary artery and parallel great arteries died of severe pneumonia and heart failure 7 years postoperatively. Two patients underwent balloon angioplasty at 6 months and 1 year postoperatively. Newly developed aortic root dilatation and aortic regurgitation were observed in 4 patients (36.4%). A pulmonary artery-to-aortic diameter ratio >1.5 was identified as a potential risk factor for both aortic root dilatation and new-onset aortic valve regurgitation ($P < 0.05$).
Conclusions: Primary repair is the preferred surgical approach for TGA or TBA with concomitant AAO, offering favorable mid-term survival. However, the relatively high incidence of reintervention, aortic root dilatation, and aortic regurgitation necessitate long-term follow-up.
Keywords: Arterial switch operation, Transposition of the great arteries, Taussig-Bing anomaly, Aortic arch obstruction

Abstract 57

Utility of inhaled nitric oxide for pulmonary hypertension in cyanotic congenital heart disease: a cohort study with propensity-score matching

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Abstract:
Purpose: Pulmonary hypertension can lead to hemodynamic instability and worsen the outcome after repair of cyanotic congenital heart disease with decreased pulmonary blood flow. However, the safety and effectiveness of targeted therapy remains controversial.
Methods: This was a retrospective analysis between 2014 and 2021, who underwent corrective repair for tetralogy of Fallot, double outlet right ventricle, or pulmonary atresia with ventricular septal defect with hypoplastic pulmonary vasculature. The inclusion criteria were mean pulmonary arterial pressure>20 mmHg and systolic pulmonary arterial pressure to systemic systolic pressure ≥0.75 and who presented with low cardiac output syndrome. Patients were divided into regular therapy group and combined therapy group depending on whether inhaled nitric oxide was prescribed. The improvement in low cardiac output syndrome within 24 hours after surgery and main clinical outcomes during hospitalization were compared between the two groups after 1:1 propensity-score matching.

Results: There were 30 matched pairs. In the combined treatment group, the incidence of low cardiac output syndrome was lower. Significant differences between low cardiac output syndrome recovery were found using both the log-rank test (P<0.001) and the Breslow test (p<0.001). The rate of renal replacement therapy (16.6% vs. 40%, P =0.047) were lower in the combined treatment.
Conclusion: The inhaled nitric oxide therapy is safe and effective in the treatment of patients with pulmonary hypertension after corrective repair of cyanotic congenital heart disease.
Keywords: Inhaled nitric oxide, pulmonary hypertension, cyanotic congenital heart disease, low cardiac output syndrome, clinical outcomes

Abstract 58

Postnatal Left Ventricular Developmental Track Changed by Pressure Overload
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Abstract:
Background: Current progressive left ventricular (LV) pressure overload (PO) is established in neonatal rats. But how PO affects postnatal LV development is largely unknown.
Methods and results: Neonatal PO was induced by the abdominal aorta banding on postnatal day 1 and confirmed by abdominal ultrasound, echocardiography, and hematoxylin and eosin staining. The RNA-sequencing results showed that the top 5 most enriched gene ontology terms in normal LV development were cellular response to external stimulus, regulation of membrane repolarization, regulation of cardiac muscle cell action potential, cellular response to extracellular stimulus, and cellular response to amino acid starvation. Under the influence of PO, the top 5 most enriched gene ontology terms were blood vessel morphogenesis, positive regulation of cellular component biogenesis, positive regulation of cell migration, cell cycle phase transition, and positive regulation of cell motility. The top 3 enriched signaling pathways for the normal LV development were acute myeloid leukemia, lysosome, and valine, leucine and isoleucine degradation. PO changed the signaling pathways to cell cycle, DNA replication, and small cell lung cancer. The RNA sequencing results were confirmed by the examination of the markers of blood vessel morphogenesis and the markers of cell cycle and cellular response to external stimulus.
Conclusions: The main processes of postnatal LV development were metabolic and cardiac muscle maturation, and PO changed that to blood vessel morphogenesis and cell cycle regulation.
Keywords: Cardiomyocyte ; proliferation ; left ventricle ; RNA sequencing ; pressure overload

Abstract 59

Application of ECMO in Pediatric Heart Failure – A Clinical Summary of 51 Cases
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Abstract:
Objective: To analyze the outcomes of extracorporeal membrane oxygenation (ECMO) in pediatric heart failure and summarize the clinical experience with extracorporeal life support.
Methods: We retrospectively analyzed clinical data from 51 pediatric patients with heart failure who received ECMO support in our hospital from December 2017 to March 2025.
Results: Among the 51 cases: Successful ECMO weaning: 36 cases (71%); Survival to discharge:

30 cases (59%); Median ECMO duration: 6.58 days.
Subgroup analysis: Higher success rates: Post-cardiac surgery myocardial stunning, fulminant myocarditis. Lower success rates: Hematologic diseases, cardiac/respiratory arrest.
Left heart decompression (14 cases): Femoral atrial septostomy: 4 cases; Surgical LV vent placement: 10 cases.
Complications: Thrombosis (17 cases); Bleeding (16 cases); Infection (12 cases); Hemolysis (7 cases).
Transition outcomes: Permanent pacemaker: 2 cases (both surviving); LVAD: 1 case (surviving).
Conclusions: ECMO demonstrates significant efficacy for post-cardiac surgery myocardial stunning with satisfactory anatomical correction and fulminant myocarditis. Early ECMO initiation and high-quality pre-ECMO CPR improve ECPR success. Timely left heart decompression promotes cardiac recovery. Right atrium/pulmonary artery cannulation effectively supports right heart dysfunction. Thrombosis and bleeding remain the most common complications. ECMO serves as temporary support for pediatric heart failure - patients without cardiac recovery should transition to pacemaker or LVAD.
Keywords: Extracorporeal membrane oxygenation, ECMO, Pediatric heart failure, Myocardial stunning, Fulminant myocarditis

Abstract 60

Partial anomalous pulmonary venous connection associated with ectopic drainage of inferior vena cava into left atrium: a rare case report
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Abstract:
Background: This case report described the surgical management of a 58-year-old woman with complex congenital heart disease. Initially diagnosed with symptomatic epilepsy and patent foramen ovale (PFO) managed medically, she presented to our hospital for further evaluation. Her history included prior brain abscess drainage without residual deficits.
Methods: Preoperative assessment included echocardiography and right heart catheterization. Echocardiography revealed a suspected inferior vena cava (IVC)-type atrial septal defect (ASD) and partial anomalous pulmonary venous connection. Intraoperative transesophageal echocardiography (TEE) confirmed a 22-mm posterior-inferior ASD near the IVC, anomalous drainage of the right upper and middle pulmonary veins (PVs) to the right atrium (RA), and anomalous drainage of IVC into the left atrium (LA). Surgical exploration identified a 3×2 cm IVC-type ASD, cor triatriatum (LA divided by a fibromuscular membrane), and anomalous drainage of the right lower PV into the IVC. The corrective procedure involved resection of the cor triatriatum membrane, ASD closure with a pericardial patch, rerouting of the IVC to the RA, and redirection of all anomalous PVs to the LA, along with tricuspid annuloplasty. Final diagnosis: IVC-type ASD, partial anomalous right PV drainage, congenital IVC-to-LA connection, and cor triatriatum.
Results: Postoperative echocardiography demonstrated significant improvement in cardiac structure and function.
Conclusion: This case provides valuable insights into the surgical management of complex congenital heart anomalies in adults.

Keywords: adult congenital heart disease, congenital atrial septal defect, anomalous drainage of pulmonary vein

Abstract 61

Surgical Treatment and Case Sharing of Criss-Cross Heart with Complex Congenital Heart Disease

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Abstract:
Objective: To summarize the clinical experience of surgical treatment in two cases of criss-cross heart with complex congenital heart disease and enhance the understanding of its diagnosis and surgical management through a literature review.
Methods: A retrospective analysis was conducted on two patients with criss-cross heart and complex congenital heart disease who underwent surgical treatment in 2023. The patients were aged 9 and 36 years, respectively. One case was diagnosed with criss-cross heart, atrial situs inversus, double-outlet right ventricle (DORV), pulmonary valve stenosis, and mitral regurgitation. The other case was diagnosed with criss-cross heart, DORV, and pulmonary valve stenosis. Both cases utilized 3D modeling and 3D-printed models to assist in preoperative diagnosis and surgical planning. Ultimately, an intracardiac tunnel technique was employed to achieve complete surgical repair.
Results: Both patients were discharged successfully, with an average follow-up period of 13 months. Postoperative recovery was favorable.
Conclusion: Criss-cross heart presents complex anatomical challenges, necessitating tailored surgical approaches based on individual anatomical variations. Accurate preoperative diagnosis is a prerequisite for optimizing surgical strategies. The use of computer-assisted 3D modeling and 3D-printed models aided in preoperative diagnosis and surgical planning, and the intracardiac tunnel repair yielded excellent outcomes.
Keywords: Criss-cross heart; Atrial situs inversus; Surgical treatment; 3D printing

Abstract 62

Surgical Treatment of Congenital Left Ventricular Outflow Tract Obstruction

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Abstract:
Objective: To retrospectively summarize the surgical experience in treating congenital left ventricular outflow tract obstruction (LVOTO) and analyze postoperative follow-up outcomes based on literature review.
Methods: From January 2016 to December 2023, 152 pediatric patients with congenital LVOTO were treated at our institution, including aortic valve stenosis, subaortic stenosis, and supravalvular aortic stenosis. The age range was 21 days to 46 years (mean age: 5.44±4.71 years), and the weight range was 2.6 kg to 73 kg (mean weight: 17.23±6.34 kg). The preoperative LVOT pressure gradient was 76 mmHg (49–118 mmHg). Cases with coarctation of the aorta, Shone syndrome, or hypoplastic left heart syndrome were excluded. All patients underwent corrective surgery for

LVOTO under general anesthesia with hypothermic cardiopulmonary bypass, with concurrent repair of other cardiac anomalies.
Results: All patients were discharged successfully. The mean follow-up duration was 6 years, with 3 cases requiring reoperation. At the last follow-up, the LVOT pressure gradient was 21 mmHg (8–32 mmHg).
Conclusion: Congenital LVOTO is a progressive disease that may lead to long-term complications such as aortic regurgitation and bacterial endocarditis, necessitating early surgical intervention. Selecting appropriate surgical approaches for different types of LVOTO, addressing concomitant anomalies simultaneously, and enhancing postoperative follow-up are key to improving surgical outcomes.
Keywords: Congenital heart disease; Left ventricular outflow tract obstruction; Surgery; Infants and young children

Abstract 63

Anticoagulation Management Strategies and Prevention/Treatment of Thromboembolism After Fontan Procedure

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Abstract:
Objective: The Fontan procedure is a collective term for surgical techniques that direct systemic venous blood flow directly into the pulmonary arteries, thereby reducing the volume load on a single functional ventricle and improving systemic oxygenation. Since its inception, this procedure has undergone multiple modifications and is now widely used to treat children with various forms of functionally univentricular complex cyanotic congenital heart disease. One of the most critical complications following the Fontan procedure is thromboembolism, which significantly impacts long-term patient outcomes. Despite the high incidence and severe clinical consequences of thrombosis and thromboembolism in Fontan patients, there remains ongoing controversy and no consensus regarding optimal postoperative prevention, diagnostic methods, and treatment strategies. This article reviews the etiology, prevention, diagnostic approaches, and treatment strategies for thromboembolic complications after the Fontan procedure, aiming to provide therapeutic references for improving the long-term quality of life in these patients.
Methods: Through literature review and case analysis, this study examines and explores the epidemiology, risk factors, diagnostic methods, preventive strategies, and treatment options for thromboembolism in Fontan patients, summarizing and discussing rational and effective approaches for its diagnosis, prevention, and management.
Results: Given the high prevalence and subsequent impact of thromboembolism in Fontan patients, its prevention is a crucial aspect of postoperative care. While the necessity of thromboprophylaxis is widely acknowledged, the optimal methods and strategies remain debated. The American Heart Association and European Heart Association recommend anticoagulation with vitamin K antagonists or low-molecular-weight heparin for 3–12 months post-Fontan procedure. Long-term anticoagulation during childhood may include antiplatelet agents, with intensified anticoagulation in adulthood. Additionally, vitamin K antagonists are indicated for patients with mechanical valve replacement, prior thromboembolism, or atrial arrhythmias. Certain Fontan variations or anatomical features may also necessitate anticoagulation. Treatment options for thromboembolism in Fontan patients include surgical or interventional thrombectomy, thrombolysis,

anticoagulation, surgical correction, or heart transplantation. The choice of treatment depends on clinical presentation, Fontan type, thrombus size and location, and underlying risk factors, emphasizing the need for multidisciplinary, individualized therapeutic plans.
Conclusion: Thromboembolism is a major complication during both early and long-term follow-up after the Fontan procedure and contributes to increased mortality. Diagnosis primarily relies on routine transthoracic echocardiography, though this may miss many asymptomatic cases. For suspected thromboembolism, transesophageal echocardiography, magnetic resonance imaging, or angiography can be employed during follow-up to confirm the diagnosis. Prevention and treatment strategies should be tailored to individual patient profiles. Further research is needed to compare various thromboprophylaxis approaches, potential thrombotic risk factors, and treatment regimens to continuously improve long-term survival and quality of life in Fontan patients.
Keywords: Fontan procedure; congenital heart disease; thromboembolism; anticoagulation therapy

Abstract 64

Deepseek versus ChatGPT: A Study on the Accuracy and Consistency of AI Chat Platforms Based on LLMs when Responding to Questions about Pediatric Myocarditis
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Abstract:
Background: Pediatric myocarditis, a rare yet life-threatening inflammatory myocardium disorder, presents with heterogeneous etiologies and clinical features. Gaps in caregiver awareness and delayed medical consultation due to limited healthcare access may exacerbate adverse outcomes. This study evaluates the utility of large language model (LLM)-based artificial intelligence (AI) platforms in delivering patient education for pediatric myocarditis.
Methods: Thirty questions addressing etiology, clinical presentation, diagnostic evaluation, management, and prognosis were curated and posed to four LLM-based platforms (DeepSeek-R1, DeepSeek-V3, ChatGPT-o1Pro, ChatGPT-4o). Two pediatric cardiology experts independently assessed responses for accuracy and inter-response consistency.
Results: Advanced models (DeepSeek-R1, ChatGPT-o1Pro) demonstrated significantly higher accuracy than baseline versions (DeepSeek-V3, ChatGPT-4o) ($P = 0.016$), with accuracy descending as follows: DeepSeek-R1 > ChatGPT-o1Pro > DeepSeek-V3 > ChatGPT-4o. Domain-specific performance variability was observed across models. DeepSeek-R1 achieved the highest response consistency, though inter-model differences were non-significant ($P = 0.555$).
Conclusion: While LLM-based platforms exhibit promise for scalable patient education in pediatric myocarditis, persistent inaccuracies and variability limit immediate clinical applicability. Future development should prioritize algorithmic refinement, integration of updated clinical evidence, and real-time validation mechanisms to enhance reliability.
Keywords: Large Language Models, Artificial Intelligence, Pediatric Myocarditis, Accuracy, Consistency, Patient Education

Abstract 65

Off-Pump Coronary Reconstruction for ALCAPA: Wuhan Asia Experience

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Abstract:
Background: Anomalous Left Coronary Artery from Pulmonary Artery (ALCAPA) carries 90% infant mortality without intervention, driven by coronary steal-induced left ventricular dilation and mitral regurgitation.
Objective: At Wuhan Asia Heart Hospital, we pioneered off-pump LAD reconstruction to circumvent cardiopulmonary bypass (CPB) injury–a critical advancement over traditional translocation requiring CPB.
Methods: Our technique tailors graft placement to ostial position: direct button transfer for right-posterior PA sinus origins, pulmonary artery cuff extension for non-adjacent sites, and commissure resuspension for junctional attachments.
Results: Left ventricular function normalized within 1 year (mitral regurgitation resolving later), significantly outperforming Takeuchi procedures (25% late complication rate). Early surgery (<1 year) optimized outcomes by preserving viable myocardium.
Conclusion: This approach achieves dual-coronary physiology while eliminating CPB risks, establishing a new standard for anatomically complex ALCAPA.
Keywords: ALCAPA, Off-pump surgery, Coronary reconstruction

Abstract 66

Effectiveness of the Preschool Children eHealth Cardiac Rehabilitation Program After Congenital Heart Surgery: Randomised Controlled Trial

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Abstract:
Aim: To develop the Preschool Children eHealth Cardiac Rehabilitation (PCeCR) program for pediatric rehabilitation after congenital heart disease surgery, based on the Interaction Model of Client Health Behavior, and to evaluate the effects of the program.
Design: A parallel two-arm randomised controlled trial was conducted.
Methods: Participants were recruited from July 2022 to June 2023 and randomly assigned to either the intervention or control group. The intervention group participated in a six-month PCeCR program, while the control group received routine care. Outcomes were measured at baseline, 3-month at the end of the intervention, and 6-month after the intervention. The baseline study included 84 children, with 44 in the control group and 40 in the intervention group. Among the 84 participants, 80 finished all 6-month of follow-up.
Results: The two groups showed significant differences in the ICF-CY-CHDS score, LVEF and the distance achieved in the 6-Minute Walk Test ($p < 0.001$). The intervention group exhibited a significantly higher amount of vigorous physical activity compared to the control group ($p < 0.001$). Parents in the intervention and control groups exhibited significant variations in knowledge, attitude, behavior, and healthcare relationship trust levels ($p < 0.001$). The proportion of parents with anxiety in the intervention group significantly decreased post-intervention at 6-month ($p < 0.001$).
Conclusion: The PCeCR program is helpful for the cardiac rehabilitation of preschool children

after congenital heart disease surgery.
Keywords: Cardiac rehabilitation, eHealth, Congenital heart surgery, Preschool children, Randomized controlled trial

Abstract 67

Risk factors associated with gastrointestinal dysfunction in children with congenital heart disease after cardiac surgery

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Abstract:
Objective: This study aimed to identify the risk factors and construct the diagnostic model associated with gastrointestinal dysfunction in children with congenital heart disease after cardiac surgery
Method: From January 2024 to August 2024, this study prospectively enrolled 644 infants who were transferred to the pediatric intensive care unit (PICU). The patients were divided into two groups according to whether gastrointestinal dysfunction occurred. Multivariate binary logistic regression was used to identify the risk factors associated with gastrointestinal dysfunction. Receiver operating characteristic curves and calibration plots were constructed to evaluate the diagnostic model.
Result: A total of 123 cases (19%) of children with congenital heart disease experienced gastrointestinal dysfunction after cardiac surgery. The gastrointestinal dysfunction group exhibited significantly higher incidences of lower body weight, younger age (particularly among newborns and premature infants), preoperative cyanosis, increased lactate immediately after surgery, as well as lower average blood pressure and PaO2, spO2, and postoperative low cardiac output ($P<0.05$). Multivariate binary logistic regression analysis revealed that preterm birth, preoperative cyanosis, and postoperative low cardiac output are independent risk factors for postoperative gastrointestinal dysfunction in these children. The validation results of the predictive probability model for gastrointestinal dysfunction indicate that the area under the curve of the diagnostic model was 0.92, the P-value of the Hosmer-Lemeshow calibration test was 0.342, the R-squared (R2) of the calibration plot for the actual and predicted probability of gastrointestinal dysfunction was 0.925 ($P<0.001$), and the mean Brier score was 0.071.
Conclusion: Preoperative cyanosis in children with congenital heart disease, premature infants and postoperative low cardiac output significantly increased the incidence of gastrointestinal dysfunction after cardiac surgery, and the occurrence of gastrointestinal dysfunction significantly affected the clinical prognosis of children.
Keywords: Area under the curve; congenital heart defect; gastrointestinal dysfunction; receiver operating characteristic curve